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Environmental Quality, Institutions, and Financial Stability as Drivers of Well-being in Sub-Saharan Africa

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ABSTRACT

Sub-Saharan African (SSA) countries are among the countries with the lowest well-being and quality of life. Furthermore, SSA is characterized with weak institutions and financial systems which makes it difficult for the realization of better quality of life and improve general well-being. This study examines the relationship between institutional quality, financial stability, and well-being. It further explores the role of poverty, food security, and environmental quality in this relationship. The study uses panel data of 26 SSA countries from 2011 to 2021 and employs the fully modified ordinary least squares and the dynamic ordinary least squares estimation techniques. The study finds that institutional quality, financial stability, food security, and environmental quality significantly enhance well-being. However, poverty and inflation negatively affect well-being by limiting access to essential resources and hindering economic and social progress. GDP per capita was found to be insignificant. The findings emphasize that well-being is not solely determined by economic growth but by broader social, environmental, and economic factors. It is suggested that SSA countries should implement policies that enhance institutional capacity, improve financial systems, ensure quality environment, and address poverty and food insecurity to improve the quality of life.

Keywords: Institutional Quality, Well-being, Financial Stability, Sub-Saharan Africa, Environmental Quality
JEL Classifications: E44, I31, O15, O55, Q56, P48

1. INTRODUCTION

Well-being is perceived by some in the most simplistic manner as the indicator of happiness or life satisfaction (Livingston et al., 2022). However, in most of the literature, well-being is referred to as Subjective Well-being (SWB). This reference was first proposed by (Diener, 1984) who defined well-being as the assessment of the quality of life of an individual relative to his or her happiness and life satisfaction. Thus, subjective well-being is referred to as an individual's cognitive and affective assessment of his or her life in which he or she provides an explicit or implicit judgement about his or her satisfaction with life in general (Azizan and Mahmud, 2018). Saklofske et al. (2013) posit that subjective well-being is measured by three components; life satisfaction, positive effect (such as joy, enthusiasm, and interest) and absence of negative effect (like sadness, anger and anxiety).

Generally, well-being goes beyond income and includes physical, mental, health, spiritual, economic, and communal feeling of a quality lifestyle and serves as a fundamental pillar for individual and societal growth and development (Bolanos et al., 2015). The World Happiness Report 2025 stipulates that well-being, despite its relationship with income, depends on the perception of individuals on others benevolence (Helliwell et al., 2025). The Human Development Report of 2023/2024 posit that well-being in terms of human development is more about expanding the quality of life rather than economic growth. This perspective to well-being places freedom of choice as the leading factor that inures to a

widespread positive outcomes for individuals and society (UNDP, 2024). In Sub-Saharan Africa, well-being is a paramount priority tied to its development and growth. The OECD (2020) explains in their report that Sub-Sahran Africa's developments hinges on health status of its populace which is a fundamental component of well-being (Gyimah-Brempong and Wilson, 2004). Similarly, the FAO et al. (2023) also points to the need for Sub-Saharan Africa to improve upon nutrition and food security effort as they have a direct impact on well-being. The FAO et al. (2024) suggests that to improve overall well-being in Sub-Saharan Africa, more policy attention should be tailored towards implementation of technical standards such as improving access to farm inputs, enhancing smallholder farmers capacity and buffers tock initiatives to ensure a secure food system, access, and availability of nutritious food. This will have a long-term impact on well-being (Wudil et al., 2022).

In addition, there are some other dimensions of well-being apart from the subjective well-being which includes physical well-being, social well-being, emotional well-being, economic well-being, life satisfaction, psychological well-being, eudaimonic well-being, and community well-being (Livingston et al., 2022). Despite the concept, definition used, or the dimension measured, well-being is linked to a number of social and economic outcomes such as GDP, household income levels, unemployment levels, educational levels, health status, community solidarity, personal and economic freedoms, food security, and environmental quality (Adesanya et al., 2017; Amoah and Adjei, 2023; Chen et al., 2020; Tehrani et al., 2024; Zhao et al., 2024). Well-being metrics provide policy makers with important data for the development or discontinuation of sustainable social policies geared towards the realization of the sustainable development goal 3 (FAO et al., 2023). More importantly is how the measurement, tracking, and promotion of well-being can be used in ensuring a better quality of life and well-being.

Coming towards the macro side, there are some macro level factors that affects well-being. Economic determinants play a significant role in individual well-being, alongside social and cultural factors (Livingston et al., 2022). Some of the economic determinants of well-being include income and employment (Azizan and Mahmud, 2018), financial stability (Demirguç-Kunt et al., 2018; Nazari and Keshvari, 2024), employment, job security, and active labor market (Heins, 2023), GDP per capita (Dicu & Secară, 2021, Helliwell et al., 2025). However, Bak-Klimek et al. (2015) suggest that circumstantial factors like income have a weaker relationship with well-being compared to dispositional factors and social support. Furthermore, standard macro variables like real GDP per capita may not accurately reflect well-being during early stages of economic transformation (Hayo and Seifert, 2002). Furthermore, institutional factors that affects well-being include governance, social policies, social services, and freedom (Gibbings and Wickramasinghe, 2021; Newton et al., 2024; Ngamaba, 2017; Zubrick et al., 2014); food security and access to nutritious food are crucial for physical and mental health which are critical for well-being (Diener & Tay, 2015; Eger and Maridal, 2015; Graham et al., 2018); natural and built environment have a great influence on health and physical well-being (Dune et al., 2021; Mead et al., 2021); and health and happiness (Adesanya et al., 2017). Additionally, poor health services and crime victimization lower well-being levels (Naehrig et al., 2022). Furthermore, non-income factors such as participation in sports and religious activities may gain prominence in influencing well-being (Pancheva and Vásquez, 2022).

The well-being determinants literature on Sub-Saharan Africa (SSA) are spares, although there are some existing research on individual countries in Sub-Saharan Africa. Studies such as Fayissa and Gutema (2005), Blaauw and Pretorius (2013), Kabote (2017), and Rishworth et al. (2020) all used different proxies for well-being to analyze the relationship between some macro factors and well-being. Additionally, factors like foreign direct investment, remittance, access to basic necessities, income inequality, historical, structural and institutional factors affect well-being in SSA (Csanadi, 2018; Maku and Ajike, 2015; Mignamissi and Kuete, 2020). Furthermore, weak governance and environment al problems in sub–Saharan Africa creates barriers to economic development and contributes to poverty and inequality which affects well-being (Aterido et al., 2013). Adesanya et al. (2017) also used happiness from world value survey as a proxy for well-being and examined the impact of health on well-being in 5 African countries. They found that poor self-rated health impacts well-being negatively.

There are some gaps in literature at the macro level as to how institutional quality, financial stability, poverty, food security, and environmental quality impacts well-being in sub-Saharan Africa. Furthermore, there is no study available in the literature which extends the quality-of-life theory to include institutional quality, financial stability, food security, poverty and environmental quality in explaining well-being. The World Bank (2020) posits that sub-Saharan Africa is home to some of the highest poverty levels in the world, with more than 40% of the population living on <$1.90 a day. Additionally, food insecurity worsens the already fragile well-being of many people in SSA. Thus, most people in SSA lack the resources and institutional structures needed to access sufficient, safe, and nutritious food which impacts wellbeing significantly (FAO et al., 2020). Furthermore, the World Health Organization (2023) stresses that access to quality healthcare facilities proves to be a major bottleneck to good health in sub-Saharan Africa, especially in rural areas, worsening quality of life and well-being. This reflects the negative effect of existing challenges on efforts to achieve a good quality of life and well-being. Additionally, Hussen (2023) posits that despite some countries in sub-Saharan Africa showing considerable improvement in the quality of institutions, many remain with unprecedented levels of corruption, weak governance, and low regulatory frameworks which ultimately deprive people of good health, personal and economic freedom. This reduces the opportunities available for people to pursue a quality lifestyle which affects their well-being. Therefore, ensuring the existence of strong institutions can reduce corruption, thus increasing public trust, which partly forms the bedrock of social cohesion and stability (UNDP, 2024) and improved well-being.

This study seeks to fill this gab by investigating the relationship between well-being, financial stability, and institutional quality while accounting for the intricate role of poverty, food security, and

environmental quality in this relationship in sub-Saharan Africa. Furthermore, from the theoretical perspective, this study relies on the quality-of-life theory approach in defining well-being which is the novelty of this study. In this regard, the study used economic freedom index, personal freedom index and life expectancy to create an index to represent well-being. Diener et al. (2018), posit that the quality-of-life approach integrates health (all health indicators including life expectancy), social (including personal freedoms), environmental, and economic (all economic indicators including economic freedom) dimensions which makes it a full-fledged well-being assessment criterion.

This study uses three hypotheses, thus, (a) institutional quality and financial stability improves well-being, (b) food security and environmental quality significantly improves well-being, and (c) poverty has a negative relationship with well-being. To reach the objectives of the study and to find answers to the hypotheses, the study employed the fully modified ordinary least squares (FMOLS) and dynamic ordinary least square regressions (DOLS) to estimate the relationships. The study further used panel-estimated generalized least square (Panel EGLS) regression with 3 options: cross-section weights, cross-section random effects, and Two-way random effects as a robustness check for our models. The result of the study indicates that while institutional quality, financial stability, food security, and environmental quality significantly enhance well-being, poverty and inflation negatively affect well-being by limiting access to essential resources and hindering economic and social progress. The study suggested that SSA countries should implement policies that enhance institutional capacity, improve financial systems, and address poverty and food insecurity to improve the quality of life and well-being. Additionally, the study suggests that SSA countries should implement policies that enhance institutional capacity, improve financial systems, ensure quality environment, and address poverty and food insecurity to improve the quality of life.

The remainder of this study is organized as follows: The literature review is followed by the methodology, results and discussions, and conclusions.

2. RELEVANT THEORETICAL AND EMPIRICAL LITERATURE

2.1. Theoretical Review

Theoretically, several theories of well-being have been advanced to argue what constitute well-being and quality of life. Prominent among the theories is capability approach theory proposed by (Sen, 1981) in his essay *"Poverty and famines: an essay on entitlement and deprivation"* which was later extended by Nussbaum (2011) by detailing the basic entitlements that every individual should possess if he or she is live a dignified quality life and a higher well-being. This approach views well-being as people's capabilities and not the amount or the list of the resources they hold or even the utility they enjoy from those resources (Sen, 2013). Some studies have assessed the application of this theory to domains such as health (Vásquez et al., 2024), education, and child well-being (Domínguez-Serrano and Del Moral-Espín, 2022). Another theory is subjective well-being (SWB) theory which considers individuals' self-reported happiness and life satisfaction levels. It emphasizes psychological and emotional aspects of life, capturing the overall sense of contentment and fulfillment (Diener et al., 2009). Helliwell et al. (2020) relied on this approach to analyses the impact of access to financial services on well-being. He found that access to financial service and supportive social networks can significantly enhance life satisfaction and overall well-being. However, Tiliouine et al. (2009) stress that incorporating it into development policies can lead to more effective interventions that address the multifaceted nature of well-being. Furthermore, the traditional theory of well-being is the income-based theory which uses metrices such as GDP per capita as a measure of well-being. Although income forms an essential component in determining well-being, it cannot be used to represent the whole gamut of human well-being (Easterlin, 1974). The measure has been one of the most used in development economics for understanding and comparing the economic conditions and well-being of people. However, this measure is partial and fails to capture the multidimensionality of well-being (Stiglitz et al., 2018). In this approach, income or GDP per capita is interpreted as purchasing power to buy goods and services to enhance one's quality of life and well-being (Fleurbaey and Blanchet, 2013).

This study relies one the quality-of-life theory that provides a better measure and definition of wellbeing. The quality-of-life theory offers multidimensional well-being assessments, such as the general well-being of individuals, by considering aspects of their lives such as health, education, environment, and personal safety and freedoms (Alborz, 2017b). These indicators give a holistic picture of well-being, depicting multiple factors that make up one's quality of life and economic well-being. Quality of life theory is deeply rooted in recognizing that well-being is multi-dimensional and cannot be adequately reflected through income (Michalos, 2017). According to Diener et al. (2018) the quality of life integrates health, social, environmental, and economic dimensions, which require a full-fledged well-being assessment. The health component of the quality of life includes life expectancy, infant mortality rates, and access to healthcare services, offering insights into the general health and well-being. Chote et al. (2024) posits that improved health outcomes are associated with a higher degree of quality of life and well-being. The other important dimension of quality of life is education, including literacy rates, school enrollment, and educational attainment. (UNESCO, 2023) stresses that a higher level of education is related to improved economic opportunities, health outcomes, and higher social involvement, which are crucial for a better well-being. Furthermore, the quality of life is significantly influenced by environmental factors such as air and water quality, availability of green spaces, and exposure to pollutants (Ai et al., 2023; Chang et al., 2020; Nguyen et al., 2021). For this reason, environmental sustainability is essential for ensuring long-term well-being (UNDP, 2019). The social constituents of quality of life contain indicators related to social support, personal safety, personal freedom, and community engagement, which are vital for emotional and psychological well-being and improving people's quality of life (Amoah and Adjei, 2023; Chen et al., 2020; Livingston et al., 2022; Tehrani et al., 2024).

2.2. Empirical Review

In development economics, well-being is a comprehensive measure beyond mere economic growth, including health, education, and overall quality of life. It is a multidimensional concept that reflects the fulfillment of basic needs, the capacity for a decent standard of living, and the opportunity to lead a meaningful and satisfying life (Sen, 1999).

Institutional quality is one of the major determinants of well-being. According to Acemoglu and Robinson (2012), good governance decreases uncertainty, boosts investment, and increases social trust, all of which, contribute to improving well-being. Kaufmann et al. (2010) also assert that good governance contributes to well-being. Corruption is also considered a critical eroding factor of institutional quality because it reduces resources from their proper use and undermines public trust. (Mauro, 1995) finds evidence that countries with effective corruption control mechanisms have higher economic growth rates, improving the quality of life and well-being. The wellbeing-institutional quality nexus has also been addressed in the context of Sub-Saharan Africa. For instance, Hussen (2023), using a panel dataset of 31 SSA countries from 1991 to 2015, analyzed the impact of institutional quality on economic growth and well-being. The resultant estimates showed that investment and democratic inclusive institutions significantly enhance economic growth, improving the quality of life. Similarly, Ekeocha et al. (2023) analyzed the sectoral effects of institutional quality in SSA. They found that although institutional quality generally made little impact on the sectoral performance of the economy, robust initial levels of real GDP and labor were strong drivers of well-being.

Financial instability has perpetuated poverty and increased inequality in SSA in the past and undermined progress toward attaining the millennium development goals in the region through its negative consequences on living standards (Reinhart and Rogoff, 2009). Taylor et al. (2011) examines the relationship between financial stability, life satisfaction, and psychological stress. The results show that more financially stable respondents demonstrated greater life satisfaction and lower psychological distress. The study underlines that financial stability, besides mitigating immediate financial stressors, is also associated with a sense of security and mastery over life, which is important for mental health. Lakócai (2024) noted that nations with stronger financial stability have lower crime rates, increased civic engagement, and, collectively, higher standards of living. Ebirim et al. (2024) concluded that financially secure persons have a greater tendency to act favorably in their communities by volunteering, investing in local communities, or patronizing native businesses. This collective stability underpins a more robust social order in which people care for one another, and economic shocks can be more easily weathered. Improvement in the banking infrastructure in SSA can support economic development and create more opportunities for financial inclusion and, therefore, for well-being (Beck and Demirgüç-Kunt, 2009).

Poverty affects individuals' basic needs, such as lack of food, health, and education, which are central to well-being. Carter and Barrett (2006) showed in their findings that areas with a wider gap in terms of poverty tend to have higher incidences of income inequality, reduced access to basic facilities, and generally more cases of social conflict. These disparities make lives less worth living for the people living in poverty, as the basic needs of food, shelter, and healthcare are hardly met. Rojas (2020) indicates that people living in poverty are more likely to suffer from most of the chronic diseases like malnutrition and also mental issues. He further indicates that poor access to health care and social services increases health inequality. Furthermore, Gedro et al. (2021) also studied the impact of poverty on well-being and educational quality in Haiti. They found that kids of lower income or even below the poverty level are not likely to get admission to school for quality education. This further deprives them of their future economic opportunities and overall well-being. Addressing poverty through targeted interventions is essential for enhancing the quality of life for vulnerable populations (Ravallion, 2016a).

Food security is one of the significant determinants of general well-being. Woodhill et al. (2022) examined the challenges and opportunities of food systems and well-being. They found that food security improves physical health substantially because people with adequate access to food are likely to have lower incidences of chronic diseases such as diabetes, cardiovascular conditions, and obesity. Their research further indicates that consistent access to quality nutrition improves health and well-being for children and vulnerable groups. Beyene (2023) studied the relationship between food security and health outcomes. The findings of the study indicate that chronic hunger and food insecurity have severe physical and mental health consequences. Clarkson et al. (2024) also found that food insecurity is associated with higher levels of stress, anxiety, and depression in their study. They also stress that the psychological effects of hunger can generate behavioral issues and lead to poor academic performance and emotional instability. Akinbode et al. (2022) explored the relationship between inequality, population growth, and hunger in SSA countries. Their results reveal that high levels of food insecurity significantly affect economic growth and development. The results further indicate that regions with severe hunger issues experience lower productivity levels, higher healthcare costs, and increased child mortality. They suggest that effective policy interventions aimed at reducing hunger and improving food security are essential for enhancing the overall well-being of populations in SSA.

From the empirical review, no recent studies have examined the determinants of well-being in SSA from the institutional quality and financial stability point of view. Additionally, most recent studies focus on subjective well-being, income, and psychological approaches to well-being. This study explores the QoL and CA approaches to well-being, which is a novelty of the study.

3. METHODOLOGY AND DATA

3.1. Theoretical Method

The capability approach of Sen (1999) and Nussbaum (2011) was extended to model the quality-of-life. The capability approach theory expresses well-being as a set of functionings a person can achieve. Mathematically:

$$W = f(C) \quad (1)$$

Where W is the Well-being, $f(C)$ represents all possible functions that an individual is capable of achieving. The quality-of-life theory expands capability theory by expressing capability or functioning to represent several dimensions of well-being, including material, social, environmental, psychological, and economic (Alborz, 2017b). Therefore, equation (1) is re-written to account for the dimensions of well-being as:

$$W = \sum_{i=1}^{n} w_i f_i \quad (2)$$

Where w_i denotes the weights or coefficients assigned to the i-th functioning or the capabilities and n is the total number of functionings or dimensions.

Bucur (2017) applied the quality-of-life theory in ascertaining the impact of quality-of-life management to the knowledge economy. Similarly, Anand et al. (2020) modified the capability theory to study disability and multidimensional quality of life. This study extended the quality-of-life model to include functionings such as institutional quality, financial stability, poverty, and food insecurity that have a great potential of determining or impacting well-being at the macro level. The extended model in this study is expressed as:

$$WB = w_{ISQ}\, IQ + w_{FS} * FS + w_{pv} * PV + w_{FSC} * FSC + w_{EQ} * EQ + \theta_E * CT \quad (3)$$

Where w_{IQ}, w_{FS}, w_p, w_{FSC}, w_{EQ} are weights assigned to institutional quality (IQ), financial stability (FS), poverty (PV), food security (FSC), and environmental quality (EQ) respectively. Additionally, θ_E is the weight assigned to the control variables (CT). Equation (3) stresses that quality institutions and a stable financial system are key to enhancing people's quality of life. However, these two factors alone are not enough, and thus, the poverty levels, food security levels, the quality of the environment should be accounted for while controlling for other factors (E) such as inflation levels and economic growth.

3.2. Econometric Model and Estimation

The general econometric model is:

$$WB_{it} = \alpha_{0t} + \beta_1 IQ_{it} + \beta_2 FS_{it} + \beta_3 PV_{it} + \beta_4 FSC_{it} + \beta_5 EQ_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \varepsilon_{it} \quad (4)$$

Where WB, IQ, FS, PV, FSC, EQ, INF, and GDP represents wellbeing, institutional quality, financial Stability(proxied by financial institution development index), food security (proxied by cereal production), poverty (proxied by poverty gap), environmental quality (proxied by air quality index), and control variables (proxied by inflation and GDP per capita) respectively. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ are the slope coefficients of the explanatory variable and α_0 is the intercept of the model. ε_{it} is the error term.

This study uses panel Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) estimation techniques to ascertain how institutional quality, financial stability, and environmental quality impact well-being while accounting for the intricate role of poverty and food security. The error correction in FMOLS is adjusted for autocorrelation and heteroscedasticity of the residuals (Moon and Phillip, 1999). This is achieved by modifying the Ordinary Least Squares (OLS) estimator using non-parametric adjustment based on the cointegration relationship. The FMOLS equation is expressed:

$$\hat{\beta}_{FMOLS} = \left(\sum_{t=1}^{T} X_t' X_t\right)^{-1} \sum_{t=1}^{T} X_t' Y_t \quad (5)$$

Where $\hat{\beta}_{FMOLS}$ is the FMOLS estimator for the coefficient of X_t, the sums run over the sample period $t = 1$ to T, X_t' is the transpose of the vector of the independent variable at a time t, and Y_t is the dependent variable at time t. The FMOLS also solves the problems of endogeneity and autocorrelation in panel data series, helping to produce better long-run estimates.

The DOLS estimator by Kao and Chiang (2001) also estimates long-run relationships between cointegrated variables. DOLS uses leads and lags of the independent variables to remove serial correlation in the residuals. The DOLS equation is expressed as;

$$Y_t = \alpha + \beta X_t + \sum_{j=-k}^{k} \gamma_j X_{t+j} + \varepsilon_t \quad (9)$$

Where Y_t is the dependent variable, X_t represents the independent variables(s), α is the intercept, β is the coefficient of the independent variable(s), k is the number of leads and lags included in the model, t is the time, γ_j is the coefficients for the leads and lags of the independent variable(s), and ε_t is the error term. To correct for potential autocorrelation, the DOLS estimator takes into account the leads and lags of X_t as expressed below:

$$\hat{\beta}_{DOLS} = \left(\sum_{t=1}^{T} X_t' X_t\right)^{-1} \left(\sum_{t=1}^{T} X_t' Y_t - \sum_{t=1}^{T} \sum_{j=-k}^{k} \gamma_j X_{t+j}' X_t\right) \quad (10)$$

The double summation term adjusts for the leads and lags in the regression to remove serial correlation from the error term.

While DOLS and FMOLS solve the problem of endogeneity and eliminate the small sample bias, the application of the FMOLS approach essentially requires that all variables have the same order of integration and that the regressors must not appear as co-integrated. In line with Kao and Chiang (2001), DOLS outperforms FMOLS estimators in terms of mean biases.

As the study is about SSA, and all of the countries are like, so there is a need for cross-sectional dependency and slope heterogeneity tests to be conducted. Their results determine unit root tests, and cointegration tests which were conducted. Additionally, to check the model's robustness, Panel EGLS (cross-section weights), Panel EGLS (cross-section random effects), and Panel EGLS (Two-way random effects) were conducted.

3.3. Data and Sources

This study used balanced annual panel data from 26 Sub-Saharan African countries from 2011 to 2021. A principal component

analysis technique was used to construct institutional quality and well-being indices. In constructing the index for well-being, the personal freedom, economic freedom and life expectancy indices were used. According to (Livingston et al., 2022) these three indices capture all aspects of well-being. Thus, while life expectancy covers subjective and health aspects of well-being, economic freedom represents income measure and objective well-being, and personal freedom encompasses social, cultural, spiritual, and psychological dimension of well-being (Kwarciński et al., 2024; Lutz et al., 2018; Morse, 2023; Voerman-Tam et al., 2023). All six world governance indexes (WGI) of the World Bank were used to create a single index for institutional quality whose details can be found in Table 1. Hunger was proxied by cereal production (citation). Inflation and GDP per capita (a proxy for economic growth) were taken from the World Bank's World Development Index for policy control purposes. Air quality data (a proxy for environmental quality citation) was taken from the air quality index from the World Health Organization database. The description of the variables is in Table 1.

4. RESULTS AND DISCUSSION

As SSA countries have similar economic structures and development problems, the cross-sectional dependency test and slope heterogeneity was conducted. The null hypothesis of the cross-sectional dependency and slope heterogeneity tests was rejected (Tables A1 and A2 in Appendix). This implies that there was cross-sectional dependency and that slope coefficients were heterogeneous. Therefore, the panel-enhanced Augment Dickey-Fuller test (PESCADF). A second generation unit root test, was conducted (Table 2). Furthermore, the Kao cointegration test (Table 3) results suggested a long-term relationship among the variables. The descriptive statistics are provided in Table 4.

The second-generation unit root test result in Table 2 indicates that well-being (WB), air quality (EQ), and poverty (PV) are stationary at first difference. Financial stability (FS), institutional quality (IQ), food security (FSC), and GDP per capita (GDPC) are all stationary at level.

Further, the panel Kao cointegration test was conducted, and the result in Table 3 shows that the null hypothesis of no cointegration was rejected. This means there is at least one cointegration equation in the series. This suggests that there is a long-run relation between the variables.

4.1. Estimation Results and Discussion

The results of FMOLS and DOLS in Table 5 indicate that institutional quality (IQ) has a strong positive relationship with well-being. The findings show that improving the quality of institutions significantly improves well-being and quality of life. This result is consistent with the findings of (Olivos and Jin, 2023) and Arshed et al. (2021). The results suggest that improving institutions comes with the efficient distribution of economic and social opportunities, health facilities, and personal development, which are fundamental elements for a quality lifestyle. Therefore, in the long run, improving the quality of institutions would lead to a better quality of life and well-being in SSA.

The results in Table 5 indicate that financial institution development (FS) strongly impacts well-being. A well-functioning financial institution enhances access to credit, savings, and investment, which are part of economic freedom and prosperity. The QoL theory's emphasis on setting up economic resources and opportunities as a core life satisfaction determinant is confirmed by the findings of this chapter. The result is in tandem with the findings of Anandhi and Velmurugan, (2024). The result suggests that the financial system's stability in SSA will foster economic stability, job creation, and income growth, significantly improving objective well-being and a higher quality of life in the long run.

Food security is a central theme in well-being and quality of life discussions. The result indicates that yearly cereal production (FSC) improves overall well-being. Thus, an increase in cereal food production improves access to quality nutritious meals that boost people's health status, improve their well-being, and positively impact their quality of life. Asaki et al. (2024) and Ejiohuo et al. (2024) had similar findings confirming our results. The QoL theory posits that health and safety are basic rights to quality life satisfaction. Therefore, improved cereal production leads to better health. This impacts well-being as improved cereal production is crucial for meeting the basic nutrition needs for a quality life.

Air quality (EQ) proxy for environmental quality has a high positive impact on well-being. This shows that environmental factors directly impact the quality of life. Clean air means physical health, so better air quality boosts health, reduces diseases of the respiratory system, and generally improves satisfaction with life. The result confirms the results of Dolan and Laffan (2016), and Darçın (2017). The strong relationship between air quality and well-being reinforces the importance of environmental quality as a key component of QoL theory, which highlights the impact of the natural environment on health and personal development. Deliberate policies to solve environmental problems and improve air quality in SSA will boost life expectancy and overall well-being.

Furthermore, the result indicates a negative relationship between the poverty gap (PV) and well-being. As the poverty gap increases, well-being decreases, which reduces the quality of life. QoL theory views poverty as limiting well-being, life satisfaction, and social participation. When poverty increases, access to basic services, such as health care, education, and shelter, decreases, automatically reducing total life satisfaction. The larger the poverty gap, the more inequality and, hence, the lower well-being. Inglis et al. (2023) found similar results and emphasized that the stigma of being poor exacerbates the impact of poverty on well-being. Similarly, Mowat (2020) indicates that poverty significantly impacts well-being and is more severe on children's mental health. This reinforces the notion that poverty reduction is crucial to improving quality of life. Policymakers in SSA require a holistic public policy approach to eradicate poverty and improve well-being.

Inflation (INF) has a negative relationship with well-being. Thus, an increase in inflation reduces people's purchasing power and, as a result, directly affects living conditions and well-being. (Akinci and Demiröz, 2024) had similar results for Türkiye and indicated

Table 1: Variable description

Variable	Id	Description	Source
Wellbeing Index	WB	The index was created using the principal component analysis of the life expectancy,	Authors own
Economic freedom	ECF	economic freedom, and human freedom index.	calculation
Personal Freedom	PEF	The ability of an individual to make economic decisions with minimal constraints.	Fraser
Life Expectancy	LXP	Absence of coercive constraints on individual choices the boarders on all aspects of life.	Institute
		Life expectancy at birth	Fraser Institute WDI
Financial Stability	FS	Financial Institution Development Index	IMF
Institutional Quality Index	IQ	Using the principal component analysis, the index was created with all six world governance	Authors
Rule of law	ROL	index datasets.	calculation
Political stability	POL	Captures perceptions of the extent to which agents have confidence in and abide by the rules	WGI
Governance effectiveness	GEF	of society, and in particular the quality of contract enforcement, property rights, the police,	WGI
Control of corruption	COC	and the courts, as well as the likelihood of crime and violence.	WGI
Regulatory quality	REQ	Measures perceptions of the likelihood of political instability and/or politically motivated	WGI
Voice and accountability	VOA	violence, including terrorism. It focuses on the stability of the political environment.	WGI
		Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Measures perceptions of the extent to which public power is exercised for private gain, including both petty and grand corruption, as well as the "capture" of the state by elites and private interests. measures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	WGI
Cereal Production	FSC	Total cereal production per year	WDI
Poverty Gap	PV	Poverty gap	PIP
Inflation	INF	Inflation rate (annual percentage of consumer prices)	WDI
Economics Growth	GDPC	Gross Domestic Product per capita	WDI
Environmental Quality	EQ	Air quality is measured as the average annual mean concentrations of nitrogen dioxide (NO_2), particulate matter (PM10), or equal or smaller than 2.5 μm (PM2.5) of a country.	WHO

Table 2: PESCADF unit root results

Variable	Level		1st difference		Integration order
	Constant	Trends	Constant	Trends	
WB	−1.801	−2.115	−3.687**	−3.001***	I (1)
FS	−2.551***	−2.750***	−4.190***	−4.326***	I (0)
IQ	−1.814	−2.753***	−4.142***	−4.219***	I (1)
EQ	−1.577	1.838	−4.235***	−4.324***	I (1)
FSC	−2.997***	−3.291***	−4.783***	−4.766***	I (0)
GDPC	−3.456***	−3.653***	−5.233***	−5.233***	I (0)
INF	−3.661***	−3.846***	−5.198***	−5.237***	I (0)
PV	−2.009*	−1.787	−2.655***	−2.712****	I (1)

***, **, * denotes 1%, 5% and 1% level of significance

Table 3: Kao cointegration results

Tests	T-statistics	Probability
ADF	−4.404404	0.0000
Residual variance	0.032297	
HAC variance	0.036389	

Table 4: Descriptive statistics

Variables	Mean	Min	Max	Standard Deviation	Obs
WB	−1.27E-14	−3.309	3.7896	1.3466	492
IQ	−3.74E-17	−4.311	5.423	2.260	492
FS	−2.132	−3.638	−0.442	0.689	492
FSC	13.762	4.719	17.238	2.333	492
PV	−2.979	−12.740	−0.810	1.598	492
INF	5.781	−8.975	35.730	5.754	492
GDPC	1.564	36.777	27.831	4.121	492
EQ	3.503	2.196	4.674	0.509	492

that price changes reduce the rate of welfare growth in the long run. Below (2024) also found a negative correlation between inflation and well-being in Eastern and Western Europe. High inflation lowers incomes, leading to an inability to afford basic necessities, and thus reduces the overall well-being of those affected. Such an observation aligns with QoL theory, which places economic stability as the most significant determinant of life satisfaction and general well-being.

GDP per capita (GDPC) indicates a slight positive correlation between well-being. However, it is not statistically significant in the other three models, indicating insufficient reason to bring

well-being. This supports QoL theory, which states that welfare has genesis from factors that account beyond economic growth, such as integration into the community, healthy living, and personal development; therefore, much importance should be given to them when fighting for a high-quality life. Economic growth is thus limited to ameliorating well-being. It does not guarantee its condition over time but must be linked with equal distribution and improvements in other dimensions like health and social relationships.

The robustness check results in Table 6 show similar results as presented in Table 5 above. This indicates that the model we employed was good and provided concrete evidence of the relationship between institutional quality, financial stability, and well-being. Additionally, the mediating roles of environmental quality, poverty, food security, economic growth, and inflation play in improving well-being and quality of life.

Quality institutions are crucial in strengthening frameworks and ensuring efficient systems needed to stimulate the growth and distribution of resources, which ultimately positively impact well-being (Kaufmann et al., 2010). Institutional quality is expected to have a positive impact on wellbeing. Financial stability shows the development of the financial system, which guarantees households access to financial services or credit, which could be used for investment purposes. Developing the banking infrastructure in SSA can support economic development, provide more opportunities for financial inclusion, and impact well-being (Beck and Demirgüç-Kunt, 2009). In this study, financial stability is expected to impact well-being positively. Food security is vital to maintaining physical, mental, and health well-being. Food Security ensures households can access affordable, quality, nutritious foods, which is crucial to their overall well-being. Woodhill et al. (2022) posit that food security significantly enhances physical health outcomes, as individuals with adequate food access are less likely to suffer from chronic diseases such as diabetes, cardiovascular conditions, and obesity. Poverty has a devastating impact on individual well-being. A poor person is less likely to have the capacity to function properly within an economic system and benefit from it.

Table 5: FMOLS and DOLS results

Independent variables	Panel pooled		Panel weighted	
	FMOLS	DOLS	FMOLS	DOLS
IQ	0.046 ***	0.076*	0.098***	0.107***
	(0.015)	(0.045)	(0.027)	(0032)
FS	0.792 ***	0.856***	0.894***	0.810***
	(0.046)	(0.14)	(0.032)	(0.114)
FSC	0.366***	0.390***	0.342***	0.404***
	(0.029)	(0.089)	(0.0224)	(0.072)
PV	−0.194***	−0.188***	−0.183***	−0.208***
	(0.017)	(0.054)	(0.019)	(0.036)
INF	−0.014***	−0.013**	−0.086*	−0.0154***
	(0.002)	(0.0060)	(0.0457)	(0.0045)
GDPC	0.007***	0.005	−0.0306	0.0061
	(0.002)	(0.0062)	(0.029)	(0.0046)
EQ	0.719****	0.625**	0.685***	0.460**
	(0.096)	(0.306)	(0.0310)	(0.1623)

***,**,* denotes 1%, 5% and 1% level of significance

Table 6: Robustness check results

Independent variables	Panel EGLS (Cross-Section Weights)	Panel EGLS (Cross-Section RE)	Panel EGLS (Two-Way RE)
IQ	0.1086***	0.148***	0.1369***
	(0.0228)	(0.026)	(0.0281)
FS	0.823***	0.866***	0.843***
	(0.082)	(0.085)	(0.090)
FSC	0.409***	0.167***	0.173***
	(0.052)	(0.0347)	(0.0408)
PV	−0.201***	−0.269***	−0.245***
	(0.028)	(0.0312)	(0.0335)
INF	−0.015***	−0.0126**	−0.0125**
	(0.0032)	(0.0039)	(0.0041)
GDPC	0.0059*	0.0044	−0.0044
	(0.0034)	(0.00417)	(0.0043)
EQ	0.465****	0.014	0.1163
	(0.128)	(0.149)	(0.1711)
Constant	−6.026***	−1.236*	−1.659**
	(0.8371)	(0.659)	(0.766)
F-Statistics	272.890***	63.843***	53.6299***

***,**,* denotes 1%, 5% and 1% level of significance

Ravallion (2016b) posits in their studies that some SSA countries must implement policies that will drastically cut the poverty gap and enhance the general quality of life. Social protection programs in cash transfers, food assistance, and health care subsidies are instrumental in addressing immediate economic burdens and providing a cushion for the most vulnerable. Conditional cash Transfers have been successful in some regions, but there are difficulties in their effective implementation and sustainability (Fiszbein et al., 2009). In the same vein, inflation depletes the purchasing power of households, reduces their disposable income, and increases people's cost of living. Consequently, it raises financial stress and uncertainty. Chote et al. (2024) and Lokshin et al. (2023) suggested that with increasing inflation, the real income of households decreases substantially, raising financial burdens and lowering the quality of life. While there is an improvement in air quality and an increase in GDP per capita, there is an improvement in well-being since air quality improves health and increases in GDP per capita suggest improvements in the economy, which will improve well-being.

5. CONCLUSION AND RECOMMENDATIONS

This study explored theoretically the quality of life theory approach to well-being to ascertain the determinants of well-being in SSA from the perspective of institutional quality and financial stability while accounting for the role of poverty, food security and environmental quality. The study used a panel dataset of 26 SSA countries from 2011 to 2021 and the FMOLS and DOLS estimators to find the impact institutional quality, financial stability, poverty, and food security on well-being. While institutional quality, financial stability, food security, and environmental quality are positively determining well-being, poverty and inflation affect well-being negatively. These determinants affect living conditions, health, socioeconomic inclusion, and personal development, which are fundamental components of well-being based on life quality theory.

The results suggest that institutional quality and financial stability ensure equal access to opportunities for education, career, financial services, and personal growth that are crucial in enhancing personal development and freedom of choice, which are central to the quality-of-life theory. Air quality and food security (cereal production) are significant for physical and mental health, contributing to an individual's ability to pursue personal goals. The results of this study suggest that improving institutional frameworks, financial systems, food security, and environmental quality while reducing poverty and inflation can enhance well-being. These findings highlight that well-being is not just about economic wealth (GDP) but also about how individuals experience and navigate their environment through social, economic, and environmental dimensions, aligning with the broader views of quality-of-life theory.

The findings of this c highlight the important role of institutional quality and financial stability in shaping prosperity in Sub-Saharan Africa (SSA). While the analysis underscores the need for strong institutions, more robust financial systems and environmental quality, it opens a broad discussion on how these reforms can be achieved and what challenges they may face.

One potential starting point for SSA countries is to focus on strengthening institutional quality to enhance the stability and resilience of financial systems. For example, measures to increase transparency, reduce financial fraud and corrupt practices, and ensure accountability can create a more favorable environment in which both domestic and foreign investment can flourish. However, it is important to recognize that such reforms may face resistance or require significant capacity building efforts.

Additionally, SSA countries should prioritize policies that can improve the quality of their environment which is critical in enhancing the health of their population and creating new opportunities. For instances, policies targeted at reducing PM2.5, carbon dioxide, environmental industrial activities, and sustainable farming practices will ensure quality environment and sustainable food systems.

Another area worth considering is the implementation of anti-poverty policies to reduce inequality and increase household income. Social safety net programs such as conditional cash transfers, means-tested subsidies or targeted education vouchers have shown promise in other regions and could be adapted to SSA. For example, conditional cash transfers linked to school attendance or health service utilization can reduce poverty, improve health outcomes, increase well-being and strengthen human capital at the same time. However, the scalability and long-term sustainability of such programs are important questions.

Supporting small-scale enterprises and the informal sector is an important strategy for improving household welfare in SSA. Sustainable financing schemes, such as microcredit or low-interest loans, can empower entrepreneurs and stimulate local economies. However, key weaknesses of the informal sector - such as lack of collateral and limited access to formal financial services - pose significant obstacles.

Moreover, ensuring macroeconomic stability - particularly inflation control - can have far-reaching effects on household disposable income and welfare. By maintaining stable prices and promoting economic growth, governments can create an environment in which households can invest in health, education and other welfare-enhancing activities. However, achieving this balance requires careful policy coordination and a long-term perspective.

Finally, this study highlights the need for more research to better understand the impact of institutional reforms, financial development and poverty reduction programs on both subjective and objective well-being. For example, how do different population segments such as women, rural communities or youth experience these changes? What roles do cultural and contextual factors play in shaping the effectiveness of policies? By addressing these questions, future research can provide valuable insights for policymakers and contribute to a more nuanced understanding of well-being in SSA.

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APPENDIX A

Table A1. CSD test results

Tests	Statistics	d.f	Prob
Breusch-Pagan LM	1326.882	325	0.0000
Pesaran Scaled LM	39.29740		0.0000
Bias-corrected Scale LM	38.57482		0.0000
Pesaran CD test	−2.92192		0.0035

***denotes a 5% level of significance

Table A2: Slope heterogeneity results

Test	Delta	P-value
Pesaran and Yamagata (2008)	8.960	0.000
Adjusted	12.351	0.000
Blomquist and Westerlund (2013)	9.435	0.000
Adjusted	13.005	0.000