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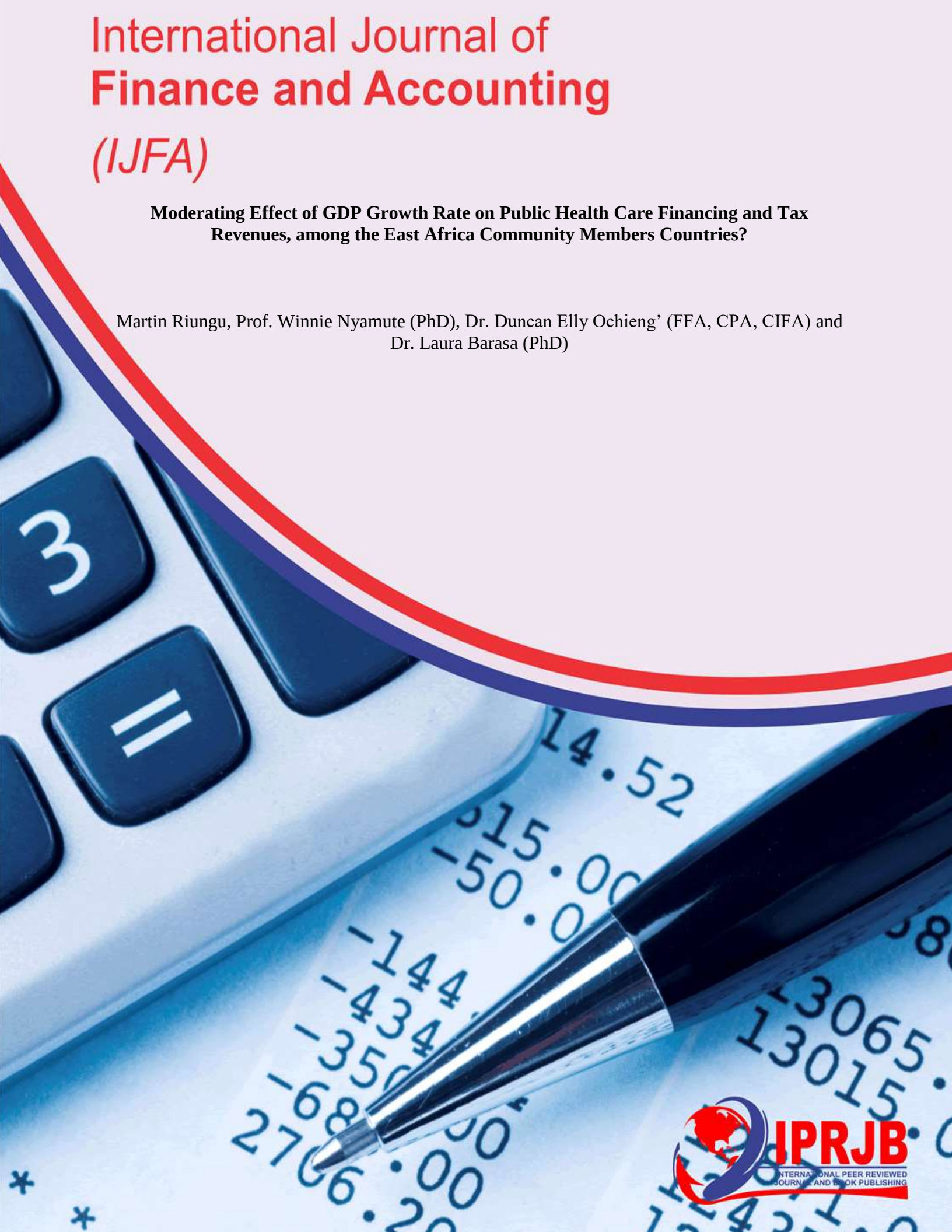

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Moderating Effect of GDP Growth Rate on Public Health Care Financing and Tax Revenues, among the East Africa Community Members Countries?

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Abstract

Purpose: This research aimed at establishing the linkage between public healthcare financing and tax revenues and the moderating effect of GDP growth rate within the context of East Africa Community Countries.

Methodology: The target population was three EAC member countries comprised of Kenya Uganda and Tanzania. Causal and cross-sectional research design were applied. For hypothesis tests, stepwise multiple regression was used to test for moderation effect of GDP growth rate on public healthcare financing and tax revenues. The secondary data was sourced from the research departments of the National Treasury; State Departments of Planning / National Bureau of Statistics; the Revenue Authorities; and the Central Banks of the three countries using a set of data matrix for the period 1982 to 2022. Specifically, tax revenues were proxied by the sum of revenues realized. Public health financing was proxied by the total sum of expenditure towards health. And the GDP rate was indicated by the prevailing GDP rate over the period of study.

Findings: Findings reveal a statistically significant link between PHF and Tax revenues for East Africa member Countries; Although the R-square increased by 2.5%, when GDP rate was introduced into the model, it resulted that no significant moderating effect in the linkage between PHF and tax revenues in EAC. The PHF and Tax revenues relationship that was previously significant also became weaker and negative, hence no moderation.

Unique Contribution to Theory, Practice and Policy: The study extends on predictive insights of ability to pay theory in conceptualization, informing and understanding the linkage of PHF and tax revenues. The study adds to knowledge in PHF, GDP growth rate, and tax revenues by showing that the linkage of PHF and Tax revenues among East Africa member Countries is not direct but rather is moderated by GDP growth rate. Health, budgetary and finance sectors and other agencies in the government can be guided by the findings to inform policies that can address GDP growth rate, guide the healthcare allocations particularly when setting goals to expand tax revenues.

Keywords: *GDP Growth Rate, Public Healthcare Financing, Tax Revenues, East Africa Member Countries*

JEL Codes: *P43, H51, H21, P19*

INTRODUCTION

Non-prioritization of investment in the health sector has been projected as the major hindrance to Africa's progress toward attaining Universal Health Coverage (UHC) or achieving Sustainable Development Goals in the least, which largely mirrors populations' health outcomes. With a widening financial gap for healthcare of USD 66 billion per annum, the extensive health financing constraints that Africa faces arise primarily from the existing health financing mechanisms and models, including considerable out-of-pocket (OOP) payments that continue to jeopardize progression in GDP (United Nations Economic Commission for Africa, 2019). In many countries, OOP spending leading to catastrophic health expenditures is worrisome, representing 40 percent or more of the total health expenditure. This source of financing is the most regressive and inequitable way of funding healthcare (Adebisi, Alaran, Badmos, Bamisaiye, et al., 2021). The heavy dependence on this payment mechanism makes the financial costs a significant barrier to accessing healthcare services and increases the risk of impoverishment (Ngepah & Ndzignat, 2024). Due to impoverishing effects of OOP and constrained spending and investments, the populace becomes incapable of contributing towards taxes.

The economic debate and consequences of the nature and extent of public financing for health care and its relationship with tax revenues has existed for long. Some scholars and practitioners consider public health expenditure as an input that can be harnessed to influence growth (Liping and Zhang (2018); while others conceive it as an outcome or an exogenous factor (Tepovic, 2022; Kazemian, Abolhalaj, & Nazari, 2017). The size and nature of healthcare financing affects the quality of health care received in terms of extent of services and timeliness of the intervention. This can significantly affect economic well-being of citizens both directly in terms of their ability to generate taxable income and indirectly through suffering economic hardships and impoverishment.

Tax revenues are a function of many factors but critical among them is the tax base and efficiencies of the tax administration system. Adequate healthcare financing supports the aspects of expanding the tax base, by reducing economic burden especially to the very poor. Behera and Dash (2017) and Hu and Mendoza (2018) suggest that well-funded health care system leads to a healthy productive population, hence causing progressivity in GDP prospects. This healthy population can greatly generate income for households hence stimulating spending and investment that expand tax base and improve overall total tax revenues. Therefore, the linkage between a healthy nation, GDP growth rate becomes core in understanding variations in tax revenues across economies and particularly in the African landscape.

Publicly funded healthcare is understood as a form of financing, planned to cover most or all healthcare needs from a publicly managed fund (Maina & Kirigia, 2015). According to Mills, Ataguba and Akazili (2012), public healthcare is funded through taxes that are compulsory and pre-paid before care is accessed. Furthermore, Yu, Whynes and Sach (2017) view public health financing as resources, equipment and supplies used in health provision by a central government. Thus, public health coverage is regarded as a boost to economies since it leads to improved health among workers, a decrease in time off and slows the mortality rate that contributes to productivity levels of the citizens. The more the citizenry is relieved of OOP, the more they contribute towards Gross Domestic Product (GDP), ceteris paribus, which translates to generation of more revenues

through taxes (Thiagarajan, 2022). However, health financing is more than an approach to mobilize funds for healthcare but concerns itself with how much money the government uses, how money is raised, at what level and how it is controlled (Lusardi, Schneider & Tufano, 2015).

As an economy expands, the capacity of governments to accumulate resources for health increases, subject to policy desire to expand fiscal allocation towards health. Challenges of ill health and inability to involve in income generating activities has exposed many people to financial misery. Citizens with low income cannot afford health insurance and the proportion of income set aside for health needs is limited hence many citizens forego even the most critical heath service (Palmer & Lagarde, 2018). Although, the general macroeconomic atmosphere could be promising for a well-being financing framework, it doesn't really convert into gains of wellbeing such as health care (Pradhan & Bagchi, 2012).

The role of healthcare financing is found in its ability to expand the taxable capacity through expansion of taxable population. Tax simulation models conclude that although increased taxes on consumption or general income may expand coverage of health, consumption taxes would impoverish nutritional and health care status for the less fortunate families (Begum, 2007). For instance, in Africa and other low-income nations, the average spending of health was only $41 per person compared to $2,937 in high-income countries (WHO, 2022). This notwithstanding, global economies have persistently faced declining or stagnating tax revenues (Khan, Salim, & Laila, 2019). Economies, especially in developing countries are entangled in a poverty vicious cycle whereby the budgets fail to sufficiently cater for healthcare. This leaves households exposed to catastrophic Out of Pocket (OOP) and renders a big proportion of population unable to contribute to a country's GDP (OECD, 2017).

Problem Statement

Within the EAC member countries, health care is financed by a mix of private, donor funds and public resources. The basket of funds is not uniform among the member countries, but a salient denominator is the underfunding of the health care provision in all the EAC member countries as measured by the Abuja declaration (WHO, 2022). Despite the growing economies the EAC countries policy makers have not prioritized the expansion of public funds allocated to health care. While public healthcare financing has been projected as influencer of taxes, over the years, East Africa countries have experienced fluctuations in tax revenues punctuated by lacking ability of potential taxpayers to contribute to tax basket (Mwateu, 2017). The three countries Kenya Uganda and Tanzania have experienced similar challenges in financing their healthcare budgets hence exposing the citizens to catastrophic costs of healthcare. Aggregated by ever rising unemployment rates, this further pre-expose the taxpayers to extra burden hence too impoverished to generate tax revenues for their countries (Lu et al., 2016; Moore, 2018). The direct relationship between the public health financing and its effects on tax revenues is an emerging area of development finance with researchers documenting different results for developed and emergent countries (Renmaks et al., 2017).

An empirical review of literature has concurred on lack of consensus on the link between public healthcare spending and taxes. Further, the moderating role of GDP growth rate on public financing for healthcare and its effect on tax revenue expansion remain unexplored hence no clear

conclusions. Past models have for instance failed to include fiscal shocks in the analysis which present study brought into perspective through the moderation role of GDP growth rate. Evidence has also presented increased tax revenue being largely pegged on other factors such as political regimes and external market dynamics but have not explored country comparisons (Takuma & Iyke, 2017; Lelnikova, & Wilinski, 2022). Although some studies have found a direct association between tax revenue and GDP (Tepovic; 2022; Yu, Whynes and Sach, 2017); literature is lacking as to the link between health care financing and tax revenues, with many studies inclined to healthcare financing and broad economic growth. Although health financing has been widely studied, most empirical studies have been looking at progressivity of healthcare financing in different countries and lacks sound theoretical underpinning.

Erdil and Yetkiner (2009) findings on health expenditure and national productivity in Nigeria indicated that high medical costs in proportion to income have direct effect on the poor. Tepovic (2022) analysis was on GDP and healthcare expenditures worldwide with no specific findings for any country. Globally, literature on tax health expenditure, income levels and tax revenues exist including those done by Lelnikova and Wilinski (2022), Thiagarajan (2022), Khan, Salim and Laila (2019), Renmans et al. (2017), Lau and Fung (2015). However, past studies have not addressed non-linearity issues and have also focused on cross-sectional research that largely fails to indicate temporal trend across time. Within the EAC region, Smithson (2006) analysed data from the Tanzania Demographic and Health Survey (DHS) and showed that families living in urban areas and with a higher income had expanded opportunities for accessing and utilizing health care. In Uganda, minimal information exists on incidence of tax burden among various income groups, but the country reports a high OOP expenditure (Kabia et al., 2019). Even with increased government spending on healthcare, EAC countries are still lagging behind WHO and Abuja declaration targets and this motivated the study to assess how the allocation affects tax revenues. From analysis of Rwanda, Uganda and Tanzania, Kabia et al. (2019) findings indicated that Kenya like many Sub-Saharan Africa (SSA), have slugged in achieving direct benefits of expanding health financing as a strategy to stimulate economic progress. Munge and Harvey-Briggs (2014), Akazili et al. (2012) looked at progressivity of health financing in Kenya, Ghana and Uganda analyzing the Kakwani index.

Past studies have failed to conclusively address the gap due to assumptions adopted, data variability issue, adoption of non-linear models and varied indicators. Issues of research design and analytical models have further contributed to the result variations. Most studies are also bivariate in nature hence overestimation of predictor effects on the dependent variable. It is against this backdrop that this study purposively examines the link between public healthcare financing and tax revenues among three EAC member countries and the moderating effect of GDP growth rate on the relationship.

LITERATURE REVIEW

Theoretical Review

The study is anchored in Peacock-Wiseman theory of public spending, the sacrifice or capacity to pay hypothesis and the human capital theory which are closely intertwined.

Peacock-Wiseman Theory of Public Spending

The linkage of public healthcare financing and tax revenues relationship is founded on the Peacock-Wiseman theory of public spending. This theory was developed in 1967 in the United Kingdom (UK) by Peacock and Wiseman. In reflection to provisions of Peacock-Wiseman theory of public spending, during normal economic times, public expenditure would gradually indicate an upward trend, despite divergence expectations between desirable levels of public expenditure and taxation. In times of social disturbance, the rising trend in public expenditure would be distressed. For the government to finance the upsurge in public expenditure, it would be compelled to grow tax revenues.

In operationalization of the study constructs, Peacock-Wiseman theory comes in handy to explicate the link of fiscal shocks and public healthcare financing and tax revenues. In construct conceptualization, the theory also guides in predictions of public financing of healthcare as an input of national public spending, hence its relationship and role as a catalyst to spur GDP growth and expand tax revenues. The theory helps to provide explanations as to how government spending on healthcare leads to a healthy nation and general productivity of the population that in turn boost GDP growth and vice versa. In such situations a government may experience better revenues generated from taxation depending on the weight it apportions on public healthcare budgetary allocations. What can be done to stimulate this growth of tax revenues and the central role of public financing for healthcare and GDP growth becomes the subject of this study.

The Sacrifice or Capacity to Pay Hypothesis

The sacrifice or capacity to pay hypothesis was developed based on canon of equity proposed by Adam Smith (1981). The fundamentals of this theory have their own significance as it considers the distributional perspective dependent on the standard of fairness and equity. As per this theory, distribution of taxes for essential services such as healthcare should be directly proportion to the individual's ability to pay tax. Payment of taxes by individuals is considered as an opportunity cost since the taxpayers forego alternative spending to pay tax. The principle of ability to pay portrays equality in sacrifice made by taxpayers and therefore a commensurate benefit should trickle to the taxpayers. For the most part, salary or income has been taken as an essential marker of capacity to pay however less significantly, wealth has additionally been utilized. This notwithstanding, lack of economic activities has been projected as key reason as to why those who need fundamental services such as healthcare, are devoid of ability to pay. How to increase ability to pay through enhancing labor productivity by availing quality health care is a key input of the current study. In emerging economies like the East Africa, one would be interested to examine factors like, how GDP growth comes into perspective to moderate tax difference?

A major limitation of this theory is how to determine the ability to pay. It is not clear if it should be pegged on property held, income or expenditure. Critics argue that if various taxes should be imposed on incomes, property and expenditure with a purpose of spreading tax burden and achieving equity, such decision places heavy tax on the rich hence discouraging saving and enterprise. The assessment of the ability of an individual to pay tax is dependent on interpersonal comparisons of sacrifice to establish tax burden for different classes of people that is infeasible. Despite contradictory arguments among the modern economists on measuring utility and

comparing for different individuals, the theory assumes that public policies are significantly influenced by utilitarian concept.

The Human Capital Theory

The fit in of GDP growth rate in the public healthcare financing and tax revenues relationship is supported by the human capital theory. In support of human capital theory, Andersen and Aday (2021) and Auriol and Warlters (2005) put forward that every individual possesses a utility function with ranking of various affordable baskets of goods and services. The choice of individual's combination of goods and services is subject to utility maximization and income level. As proposed by Ferguson and Day (2005), the theory of human capital elucidates the role of human capital investment in raising productivity and income which eventually influences utility function of an individual. In support to this view, Tily (2007) suggest that savings that would result to subsidized healthcare can be multiplied through investment that would again create more resources or even improve the health status and living standard of savers or investors. The theory is key in this study as it explains the linkage of PHF and productivity and how a productive population is intron able to contribute towards the tax basket.

To complement limitations of the capacity to pay hypothesis (e.g. how to determine the ability to pay), human capital theory suggest that subsidized healthcare savings are multipliable through investment that would further generate more resources. Further, provisions of Peacock-Wiseman (fiscal expansion during crises) interacts with Human Capital theory to understand long-run growth effects.

Empirical Review

Public Healthcare Financing and Tax Revenues

Behera and Dash (2017) looked at how GDP and tax income affect spending on public health. The research's 1982–2014 study period included 16 Indian states. With public health expenditure elasticity being less than one, the results showed that per capita GDP and per capita tax income directly impacted the rise of public spending using panel long run cointegrating estimator and panel techniques. The study failed to consider non-income factors on economic growth as well as other income sources for public health funding. Conceptually, the study examined effects of GDP and per capita income public health expenditure while the present study analysed PHF, macroeconomic indicators and tax revenues and made comparisons across three countries. The study however was carried out in Indian economy that has different economic and market dynamics from East Africa economies. Yusuf and Yıldura (2018) conducted a comparable study in Turkey covering the years 1980–2015. It was also established using the co-integration method that there is an insignificant negative correlation between health care spending and economic growth.

The relationship between public health expenditure and economic growth have been highly investigated in developing and developed countries, but these researchers do not come to a general conclusion. Osoro (2015) explored the social and macroeconomic factors influencing Kenya's demand for higher health care spending. He used primary and secondary data from households obtained through interviews to study the dynamics of macroeconomic variables based on a typical demand framework. The findings showed that overall health spending rose as household income

rose. It was discovered that there was a positive correlation between GDP per capita and health spending. The study focused on increasing health care spending from a household's point of view. Conceptually, the study tested how macro-economic and social variables impacted on healthcare spending while present study sought to analyse moderating impact of macroeconomic indicators, methodologically, using panel data from the government side in a context of three countries and how healthcare financing affects tax revenues.

Using the co-integration method, Kar and Taban (2013) confirmed the association between health spending and economic growth in the Southern African region and found a negative correlation. Akizili et al. (2012) study on progressivity of health financing in Ghana utilized two-year data, which would not be reliable or sufficient indication of progressivity since the changes could be short-lived hence inappropriate for long-term forecasting due to variations in political or economic environment. Analyses by Mwaambi (2017) emphasized on universal health care coverage with a focus on medical care funding and access to health care services and economic impact in Kenya. A negative Kakwani index implied a regressive Kenyan health-care financing system despite the assumptions made. The index could be attributed to the regressive nature of OOP payments and that wealthy citizens hardly opt for OOP payments since they have a pool of alternatives to finance their health care as opposed to the poor. From analysis of Rwanda, Uganda and Tanzania, Kabia et al. (2019) findings indicated that Kenya like many Sub-Saharan Africa (SSA), have slugged in achieving direct benefits of expanding health financing as a strategy to stimulate economic progress. Munge and Harvey-Briggs (2014), Akazili et al. (2012) looked at progressivity of health financing in Kenya, Ghana and Uganda analyzing the Kakwani index.

Elmi and Sadeghi (2012) verified this relationship using a sample of ASA countries from 1990 to 2009 and made use of panel co-integration causality vector error correction model (VECM). Their results showed that there is a short-run relationship running from GDP to health expenditure and a bi-directional relationship in the long-run. While some gaps are noted such as household and public sector or government perspectives, most studies displayed statistical models that lack stationarity and cannot test for moderation effects. Other studies were backed by assumptions that cannot fit in the current study context. Data validity issues was present for instance utilization of VECM assumes stationarity, which may not hold in volatile African economies.

Public Healthcare Financing, GDP Growth Rate and Tax Revenues

Khan, Salim and Laila (2019) sought to establish if improved health can raise income and GDP and focused on Pakistan. A descriptive and detail study consisted of 57 periodical observations of time series data to determine the effect of health indicators such as health expenditure, age dependency, health awareness and education on income levels and GDP. They used health expenditure for deterring of major health input variable. The data were taken from 1961 to 2018 on yearly basis form secondary sources such as State Bank of Pakistan, Pakistan Statistics Bureau, World Bank and WHO. Results indicated that health expenditure play significant role in GDP and that spending on healthcare makes a household productive. Results showed that Pakistan required high and optimized level of income ratio per capita, to achieve the target. Results also indicated that public health expenditure and life expectancy did not affect GDP and GDP growth. A contextual gap arises where a study in EA countries is crucial given most citizens rely on publicly funded healthcare

services in governments that allocate a comparatively low budget to fund healthcare. Conceptually, the study focus was household spending whereas current study focused on the allocation by the governments for healthcare.

Hashmati (2010) examined the relationship between health spending and economic growth using the Solow growth model and a sample of OECD nations from 1970 to 1992. He found that there was a positive correlation between the two variables. An analogous investigation conducted in Turkey between 1950 and 2005 by Eryiğit et al. (2023) validated a positive correlation between health spending, employment, economic expenditure and economic growth. Artekin and Konya (2020) studied 19 OECD countries from 1980 to 2017 and concluded that there is long-term relationship between health expenditures and economic growth.

Research Gaps

1. **Limited research on Public Healthcare Financing and Tax Revenues:** Most studies on health financing have focused on progressivity of health care financing and emphasizes on budgetary allocations and economic growth without a focus on tax element. Studies are also inclined to single country setting hence lacks comparability whilst those that focused on several countries have not addressed public healthcare financing, GDP and tax revenues linkages thus failed to address fiscal shocks.
2. **Bivariate nature of existing research:** Majority of scholarly work tests the direct relationship on healthcare budgetary allocations on various depend variables such as economic growth, under-five mortality, demand for healthcare and access. Such tests would overestimate the direct impact. Present study explores the moderating role of GDP growth on the PHF and tax revenues linkage that enhances the robustness of findings.
3. **Contextual disparities:** Studies have focused on individual countries. Due to unique features of nations, it becomes a hindrance to generalize the findings. However, this study purposively explores three countries on East Africa region which forms a basis of comparison and provides a broader perspective on how the region fairs in it healthcare funding and tax revenues.
4. **Methodology gaps:** Methodological gaps also emanate from differences in time periods analyzed and incompleteness of data sets. Use of cross-sectional research was found prevalent whereas analyzing trends over time is largely lacking. In studies that sought data from citizens concerning the incomes and spending on healthcare, most cited inconsistency, incompleteness or wrong undocumented information from respondents. This study purposively selected three of EAC member countries that had complete data sets.

Conclusion

The literature review highlights the critical importance of gaining insights on public healthcare financing and tax revenues within the East Africa Community members' context. Whilst prior research work has laid the basis for exploring this interaction, major gaps remain that calls for focus. By converging on the knowledge, impacts, and implications of healthcare financing, this study addresses the following research gaps established in the literature review imploring on public healthcare financing and tax revenue and examining the moderating role of GDP growth on the

interaction. Thus, the study contributes valuable insights to the knowledge discourse, policy and practical implications for laying forth public healthcare efforts, GDP and tax revenues in the EAC member countries.

H0: *There is no moderating effect of unemployment rate on the relationship between public healthcare financing and tax revenues among East Africa member countries.*

Study Site

The study was conducted in East Africa member community and purposively targeted Kenya, Uganda and Tanzania. Kenya Uganda and Tanzania were the founding members but later joined by Rwanda, South Sudan, Burundi, Somalia and DRC Congo. The health systems and particularly health financing in EA countries reflect a similar pattern of social values. Kenya Uganda and Tanzania make the largest three economies in the region and have the oldest governments having gained independence almost at the same time. The three countries dataset was considered complete and thus selected for this study.

Figure 1: Map of EAC (Kenya, Uganda and Tanzania)

The East African Community (EAC) is in East Africa, straddling the Equator between latitudes 7° north and 12° South, and longitudes 29° and 41° East. The equator passes through Kenya and Uganda. The region borders the Indian Ocean and Somalia to the east, and Ethiopia and Sudan to the north. The EAC's headquarters are in Arusha, Tanzania. The larger EAC's member states are Burundi, the Democratic Republic of the Congo, Kenya, Rwanda, South Sudan, Somalia, Uganda, and Tanzania.

METHODOLOGY

Research designs adopted in this study are the cross-sectional and causal research design for methodology vigour as suggested by Harrison, Reilly, and Creswell (2020). Secondly, the design enhances hypothesis testing employing analytic models upon which the relationships among variables are investigated and because the impact on variables was being examined. The study population was eight East Africa member countries while the target population were three East

Africa countries Kenya, Uganda and Tanzania. The target population was deemed optimal since the researcher purposively choose a sample representative of known characteristics and had a clear notion of the traits of interest. Nevertheless, the information from the three countries was deemed complete and was therefore chosen for this research. Secondary data was collected by data collection matrix from1982-2023, sourced from the research departments of the National Treasury; State Departments of Planning / National Bureau of Statistics; the Revenue Authorities; and the Central Banks. Specifically, tax revenues were proxied by the sum of revenues realized. Public health financing was proxied by the total sum of expenditure towards health. GDP rate was indicated by GDP growth over the study periods. Basically, secondary data provides a more balanced guidance on variables being examined as supported by suggestions of Kothari (2019), and Harrison et al. (2020). Descriptive and inferential analysis was conducted and the results presented in tables

Data Analysis

Descriptive statistics set forth a summary of data to aid on analyzing the relationship among variables. Multiple stepwise regressions as advocated by Baron and Kenny, (1986) were utilized to test the moderating effect of GDP growth rate on the association of PHF and tax revenues.

Model

Baron and Kenny (1986) steps adopted were as follows:-

Stepwise multiple regression analysis was adopted in determining the moderation effect by testing the interaction term and exogenous variables before estimating the model for ease in coefficient interpretations. A basic moderation equation (1) was used to form regression equation.

$$R_t = \alpha_0 + \alpha_1 H_t + \alpha_2 Et + \alpha_3 H_t E_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

H_t = Public health care financing score

R_t = Tax Revenues score

E_t= GDP growth rate

α_0 , is regression constants.

α_1 - α_3, are regression coefficient relating the independent and moderator variable, H_t, to the outcome, R_t, and Et respectively.

RESULTS AND DISCUSSION

Descriptive statistics performed on the data were mean, minimum, maximum, range, standard deviation, kurtosis and skewness. Combined statics was done for East Africa Community. Results were as presented in Table 1.

Table 1: Summary of Descriptive Statistics for PHF, GDP growth Rate and Tax Revenues

Statistics	PHF	GDP.gr	TaxRev
Mean	4.518	4.567	7.833
Std.Dev	1.319	2.635	2. 2.852
Variance	1.741	6.944	8.133
Range	5.96	14.8	9.089
Min	1.64	-3.3	3.89
Max	7.6	11.5	12.98
Skewness	0.403	0.308	0.592
Kurtosis	2.449	3.191	1.862

Results shown in Table 1 above indicated mean and standard deviation values for PHF (4.51;1.3), GDP rate (4.56; 2.6), and tax revenues (7.83; 2.85) for East Africa countries. This was an indication that the variables deviated from a large data. Tax revenues averaged 7.8 with the lowest being reported at 3.9 while the highest was 12.9, this was an indication that in some years the countries collect high taxes while in some other years the tax revenue was so low. PHF reported maximum values of 7.6 while the average for EAC was 4.5 and minimum being 1.6, an indication that public healthcare financing was taken with more weight in some countries over different regimes than in others. GDP rate had an average values of 4.567, maximum and minimum of 5.7 and 0.45 respectively. All the study variables reported positive skewness implying that the long tail was on the right and positive kurtosis and that they were symmetrical and within range.

Pearson Moment Correlation was utilized to test the presence of relationships. Results indicated that tax revenues, had a negative relation with PHF (r= - 0.316*). Such that, for every unit variance of PHF undertaken, tax revenues within EAC member countries varied by -0.316 on the opposite the same direction. Tax revenues reported negative weak and non-significant association with GDP rate (-.0861*), and when GDP was correlated with PHF the results were positive and significant (0.3501*).

Regression analysis was conducted on PHF and tax revenues and the results were as presented in Table 2.

Table 2: Regression Results for Public Healthcare Financing and Tax Revenues for EAC

Variable	Coefficient	Std. Error	Z	Prob.
C	5.685909	2.285628	2.49	0.013
PHF	-.4751954	0.0610472	-7.78	0.000
R-squared	0.100			
Wald chi	60.590			
Prob.	0.000			

Dependent Variable: Tax Revenue
Predictors: (Constant), PHF
Number of groups: 3
Observations: 126
Observation per group:42
Panel variable ID (strongly balanced)
Time variable: 1982-2023

Source: Researcher, 2025

Results indicate that the F-statistics were significant at 95% level of the test (P< 0.05); implying that PHF was a significant predictor of tax revenues in EAC. In addition, the overall model was significant (p=0.000), thus T-tests on the regression coefficients would be statistically feasible. However, results also indicated low values of R-squared of 0.10. In this case where the model has independent variables that are statistically significant but a low R-squared value, it's an indication of correlation presence but little explanation on variability in tax revenues. Further, analysis was conducted on the linkage between PHF and tax revenues with inclusion of moderation effect of GDP growth and the results were as indicated in Tables 3 below.

The moderation effect was estimated using the stepwise regression technique suggested by Baron and Kenny (1986). The analysis was conducted in reference to EAC. The analysis was done on GDP growth rate indicator.

To construct an interaction term, PHF and GDP growth rate ratios were first centered and a single item indicator signifying the product of the two measures calculated (PHF*GDP.R). To solve the possible multicollinearity problems, which could have an effect on the approximation of the regression coefficients for the direct effect, the two factors were standardized to Z scores with a mean of zero and standard deviation of one. The two standardized variables (PHF and GDP.R) were then multiplied to obtain the interaction term. A progressive-stepwise regression analysis incorporating the three models was utilized to assess GDP growth rate as a moderator variable of the study and the results were presented on Tables 3.

Table 3: Moderating Effect of GDP growth Rate on Public Healthcare Financing and Tax Revenues for EAC

Var.	Coefficient.	Std. Error	Z-Stat	Prob.
C	5.8150	1.8532	3.14	0.002
PHF	0.5433	0.4133	1.31	0.189
GDP	0.4978	0.4000	1.24	0.213
PHF*GDP	-0.1241	0.0812	-1.53	0.127
R-squared	0.125			
Wald chi	3.26			
Prob.	0.3532			
Dependent Variable: Tax Revenue				
Predictors: PHF, GDP, PHF*GDP				
Periods included: 1982-2023				
Observations: 126				
Number of groups :3				
Observation per group: 42				

Source: Researcher, 2025

Results in Table 3 point out that when GDP growth rate was used as the moderator between PHF and tax revenues, the moderation effect was not significant. The regression models for individual variables and the interaction term were all not significant and the p values were greater than 0.05. The overall model was also not significant (p=0.3532, F=3.26). Although the R-square increased by 2.5%, GDP was not a significant moderator. The previous significant relationship also became weaker and negative, hence no moderation

The objective of the study was to determine whether GDP growth rate moderated the relationship between public healthcare financing and tax revenues. The null hypothesis held that there is no moderating effect of GDP growth rate on the relationship between public healthcare financing and tax revenues among East Africa member countries. When GDP as assessed as the moderator, the EAC results pointed to R squared 2.5% which imply that only 2.5% of variations in tax revenues in EAC was explained by how public healthcare is financed. The overall model reported p values greater 0.005, variable regression equation was also more than 0.005. Therefore, hypothesis failed to be rejected.

The findings contradict those of Khan, Salim and Laila (2019). Their findings indicated that health expenditure play significant role in GDP and that spending on healthcare makes a household productive. Although their studies were slightly different in a context where Pakistan required high and optimized level of income ratio per capita, to achieve the target. Results of Tepovic (2022) also indicated that public health expenditure and life expectancy did not affect GDP and GDP growth. The divergence in findings could be elucidated by reasons that in Pakistan 67.4 % of households rely on private health care providers with out of pocket taking two thirds of the total public health expenses and government's cost on health is approximately 2.6 %.

According to ability to pay theory predictions, an individual's health status can improve their ability to pay through increased labor productivity. The study supports the principles of this theory by focusing on factors that influence ability to pay and how that ability can be improved as a means of realizing higher tax revenues. In regard to GDP, findings mirror expectations of Human Capital Theory. According to the hypothesis, people have a fixed stock of health that decreases with age but can be restored by spending money on medical treatment. As a result, by increasing the number of days that may be used for economic activities, health is both an investment capital and a crucial consumption commodity in a utility function.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The objective of the study sought to determine whether the relationship between public healthcare financing and tax revenues was moderated by the GDP growth. The null hypothesis held that there is no moderation effect of GDP rate on the relationship between public healthcare financing and tax revenues among East Africa member countries. In the first model where PHF was tested against tax revenues in EAC member countries, the results indicated a statistically significant values characterized by low values of R-squared of 0.10. On introduction of the moderation effect, GDP pointed to R squared increase of 2.5%, which imply that only 2.5% of variations in tax revenues in EAC was explained by how public healthcare is financed. The overall model reported p values greater than 0.005, variable regression equation was also more than 0.005. Therefore, hypothesis failed to be rejected.

Conclusion

This study analysed the relationship among public healthcare financing, and GDP rate on tax revenues in East Africa. The Peacock-Wiseman public spending theory, Adam Smith ability-to-pay theory of taxation and the Human Capital theory provided the theoretical anchorage for the study. A quantitative hypothesis was tested. Secondary data was purposively collected for EAC countries; Kenya, Uganda and Tanzania that had complete record of data from1982-2023. The three countries had experienced stability over the years hence the institutions were able to provide complete data that was sought. These time periods captured different tax regimes and public healthcare structures that has undergone many policy and structural changes as well as dynamisms of GDP rate for the three countries. Secondary data sources were; research departments of the National Treasury; State Departments of Planning / National Bureau of Statistics; the Revenue Authorities; and the Central Banks of the three countries. The GDP rate revealed absence of moderation thus failure to reject hypothesis. These findings were against the theoretical expectations as per the three theories. The results also deviate from most empirical studies that evidenced positive moderate or strong linkages between healthcare financing and tax enhancement. While the researcher would have explored all EAC member countries, limitation of data sets for the long study period was present thus the purposive selection of only three countries that limits generalization of results. From the results, it is inferred that a weak linkage of public healthcare financing and tax revenues in EAC member countries do exist but it’s not moderated by GDP rate.

Recommendation for Policy and Practice

By analyzing the relationship between public Health Financing and Tax revenues, this study provides insightful findings for policy makers in these EAC countries, that will significantly aid in policy making and government projections.

1. *Inform Budgetary Allocation Guidelines:* The government ministries, departments and agencies (MDAs) in finance, health and national planning can employ the findings of the study when undertaking the budgetary process and allocation on public healthcare. The development of proper guidelines on financing of healthcare and ultimate benefits to the citizenry in the EAC region should be fast tracked to ensure that the benefits trickle down to intended healthcare users and create value for the countries.
2. *Consideration on Healthcare Coverage for More Predisposed Groups*: Countries should seek to increase health services coverage by improving access to basic healthcare. Policymakers should also consider the significant OOP expenditures when developing policies specially to cover the elderly and children when designing and implementing health policies. Additionally, improving governance quality will help ensure equitable distribution of and access to healthcare and reduce the existing OOP health spending disparities. The health priority of many African countries should increase that is achievable through increasing government budgetary allocations, fiscal predictability and efficiency of PHF. African governments should increase their share of health to at least 5 percent of GDP as the WHO recommended. Alternatively, governments should strive to achieve fiscal predictability, and efficiency of how PHF fairs on alongside increasing allocations to at least 15 percent as stipulated by 2001 Abuja Declarations.
3. *Sensitization on Healthcare Priority*: Basis of these findings can therefore be adopted to sensitize the county governments on the importance of giving more focus to the health sector to cultivate healthy population that is more economically productive. In addition, policy directions on enhancing GDP growth given its significant effect on spurring increased tax revenues should be pursued.
4. *Facilitate Access for Rural Populace:* Findings can be used to aid mechanisms for compensating rural populations because they are served by dispersed facilities and therefore do not have the advantage of enjoying better quality services. Inequality concerns for health care delivery can be eliminated by introducing an indirect tax, for health care and avoiding routine charges to households, or individuals to reduce the high burden of OOP costs.
5. *Methodological*

   It is recommended to harmonize data collection across EAC to strengthen monitoring and also the EAC can embrace data preservation and creation of sound data bases especially on fiscal and budgetary issues. Results also emerge as a caution against assuming GDP growth will enhance tax-health linkages since evidence shows otherwise.

Based on R-squared values, the study results show that variations in tax revenues is marginally explained by public healthcare financing whilst GDP growth is not a significant factor in shaping this relationship.

Future Research

- The empirical study uses data obtained from the National Treasury; State Departments of Planning / National Bureau of Statistics; the Revenue Authorities datasets for a long period of 40 years. However, several East African countries in these datasets have too many missing data, thus the number of countries were reduced to three. Further studies could account for all East African countries, which may provide a more comprehensive understanding of the region's PHF trends and individual country's unique features, its economics dynamics and effects on tax revenues.
- The study applied fiscal /budget allocation as a percentage of total budget framework to compute public health care financing score. Future research could consider other methods of computing the public health care financing scores that encompass grants and donations that could give different results on tax returns.

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