Public debt, social spending, and well-being in Africa

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Abstract

Despite extensive research on the effects of public debt on economic outcomes, there is a lack of studies on the channels through which it can impact well-being, especially in Africa. This study aims to fill this gap by examining the influence of public debt on well-being through education and health spending channels in 41 African countries from 2012-2021. We specify a panel equation with an interaction term between public debt and social spending and estimate it employing the Two Stage Least Squares method. Findings show a negative relationship between public debt and well-being which is mitigated by public spending on education and health. The analysis suggests that investing in education or health can counteract the negative effects of public debt on well-being, offering valuable insights for African nations to enhance well-being.

Introduction

Public debt refers to the money a government borrows to fund its activities and projects, which it must repay with interest. Theoretically, public debt is one key for financing sustainable development because it enables governments to invest in infrastructure, education, and other areas essential for long-term economic growth and poverty reduction (Barro, 1979). Based on this assumption, African countries continue to experience a rapid increase in public debt to finance their economies. The regional ratio of general government debt to GDP grew from 32.2% at the end of 2014 to an estimated 45% by the end of 2017 (Caselli and Wingender, 2018). The median public debt-to-GDP ratio has continued to increase, reaching 61.9% in 2023. Moreover, the median public debt almost doubled, from 25% to 46% between

2013 and 2023 (UNCTAD, 2024). However, the issue of the public debt's benefits for Africa arises insofar as well-being in this region lags all other regions of the world (UNECA, 2022). Hence, there is a need in the context of "Redefining African Futures" to ensure that public debt in Africa contributes to enhance well-being and build resilience, rather than strengthen vulnerabilities.

Well-being is a multidimensional concept, which can be defined subjectively or objectively[1]. The study adopts the objective view, where well-being is achieved when society, forming the foundation of the state, creates conditions and opportunities for individuals to realize their potential as human beings, fulfill their potential, and attain the desirable aspects of life that people seek (Alatartseva and Barysheva, 2015). In this line, well-being includes income level, education, healthcare, societal options, and the development of subjective components (Stiglitz et al., 2009). One indicator which considers these dimensions of well-being is Inequality-adjusted Human Development Index scores (IHDI). Regarding this indicator, Africa has the highest contribution to the overall loss of well-being. The proportion increased from 33.3% in 2014 to 33.9% in 2022. In 2014, 41 out of 54 African countries had an IHDI score below 0.50, while in 2022, 40 out of 54 countries had scores below 0.50, indicating significant inequalities in health, education, and income among populations (UNDP, 2015; 2024).

The direct relationship between public debt and well-being is still controversial. Empirical studies have shown mixed evidence, with some indicating negative effects (Bjørnskov et al., 2007; Kang and Rhee, 2024) and others suggesting positive effects (Kose et al., 2020; Ostry et al., 2015). Moreover, recent African data show no correlation between public debt and well-being. For instance, in 2022, the Seychelles had the highest IHDI score (0.715) with a percentage of government debt (%GDP) at 58.34%, while the Central African Republic, Chad, Mali, and Niger had similar percentages of government debt (%GDP) but the lowest IHDI scores. On the other hand, Cabo Verde had the highest government debt (% of GDP) at 127.50% the

[1]For a discussion on the subjective and objective approach, please see Alatartseva and Barysheva (2015) and McGillivray and Clarke (2006).

same year, with a medium IHDI score (0.471) (IMF historical debt database, 2024; UNDP, 2024).

Moreover, empirical studies since Musgrave (1972) have shown conflicting results on the effects of high public debt. Song et al. (2012) argue that increased public debt benefits citizens in the short term but can lead to economic vulnerability in the long term. Sanz and Velázquez (2007) and Seater (2013) link higher government debts to increased social expenditures. Conversely, Blanchard (2019), Fosu (2007), and Lora and Olivera (2007) suggest that high government debts result in austerity measures and cuts to social services.

Despite the expanding literature on the effects of public debt on economic development (Law et al., 2021; Panizza and Presbitero, 2014), there are few studies focused on the channels through which debt can impact well-being. This article fills this gap by contributing to the literature on the indirect effects of public debt. Specifically, this paper extends the existing literature on public debt, which interests economists and policymakers by examining the role of spending on education and health in the relationship between public debt and well-being. To the best of our knowledge, this study presents the initial international analysis on the indirect effect of public debt on well-being in Africa.

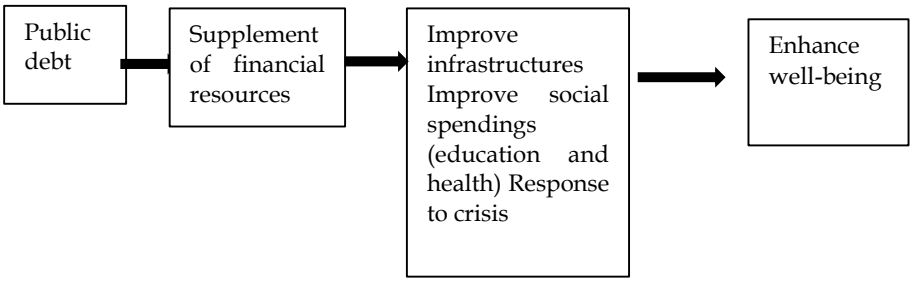
The rest of the paper is structured as follows: Section 2 presents the analytical framework. Section 3 presents the empirical design of the study. Section 4 shows the empirical findings, and Section 5 concludes the analysis.

Analytical framework of relationship between public debt and well-being

To achieve our objective, we use a framework based on Essama-Nssah and Moreno-Donson (2013) and Zhao et al. (2019) to explore how public debt affects well-being. We assume that public debt can influence well-being using borrowed funds, as governments borrow to finance various projects like education, health, infrastructure, and regulating economic operations. In this vein, the public provision of these various projects can create conditions and opportunities for individuals to realize their potential as human beings (optimistic scenario part a of Figure 2). However, if such debt continues to accumulate above the debt ceiling, there can be serious consequences for well-being. Indeed, a substantial portion of revenue is diverted from social services to debt repayment and crowding out private

investment (pessimist scenario part b of Figure 2). This negative impact is also recognized by Zhao et al. (2019). Figure 2 depicts the conceptual framework of the study on public debt's impact on well-being in Africa.

a. Optimist scenario



b. Pessimist scenario

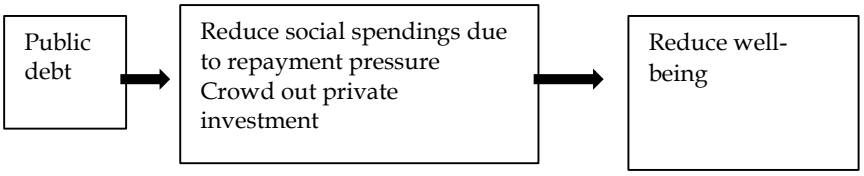


Figure 1: Mechanism of the effect of public debt on well-being
Source: Author, adapted from Essama-Nssah and Moreno-Donson (2013) and Zhao et al. (2019).

Empirical design

Data

In this study, unbalanced panel data from 41 African countries over 2012-2021 were used. The study period and sample size were based on data availability. Descriptive statistics for all variables are presented in Table 1, and the countries included in the study are listed in Appendix A1.

Table 1: Summary statistics of variables

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
IHDI	407	0.35	0.09	0.18	0.58
Central government debt (%GDP)	410	51.35	30.22	7.09	275.04
Domestic government health expenditures (%GDP)	410	1.88	1.31	0.14	6.12
Government expenditures on education (%GDP)	361	4.36	1.92	1.57	10.32
Individuals using the Internet (% of population)	399	25.13	19.87	1.05	88.13
Military expenditure (% of GDP)	372	1.74	1.11	0.26	6.69
Rule of law	410	-0.66	0.52	-1.85	0.66
Ethnic fractionalization index	400	0.63	0.25	0	0.93
Landlocked status dummy	410	0.29	0.45	0	1

Source: Author, using IMF historical debt database, UNDP Center and World Development Indicators (WDI) databases

Dependent variable (IHDI)

The main outcome variable of this study is well-being, measured by the IHDI for two main reasons. Firstly, IHDI provides a more nuanced and realistic assessment of well-being in Africa. Unlike other indices like the Human Development Index and Human Poverty Index, the IHDI considers inequalities in access to healthcare, education quality, and income distribution, which are pronounced within African countries and among different demographic groups (Sachs et al., 2024). This adjustment ensures that the measure reflects not only average achievements but also the impact of inequality on income, education, and health outcomes. Secondly, the IHDI is comparable across countries and regions and widely used by international organizations, governments, and researchers. Data were obtained from the UNDP data center.

Interest variables

The first variable of interest is public debt, measured by central government debt (% GDP). This indicator includes both domestic and external debts, offering a comprehensive view of the government's financial commitments and reflecting the country's fiscal health and stability. In numerous African countries, the central government is chiefly accountable for borrowing and overseeing public debt, making its debt levels a direct reflection of national financial responsibilities (Reinhart and Rogoff, 2010). The data was sourced from the IMF historical database.

Figure 3 illustrates a comparison of central government debt (%) between 2010 and 2022. Lighter shades represent less indebted countries, slightly darker shades represent moderately indebted countries, and darker shades represent indebted countries. The debt levels in Africa increase over time. Some countries, like Cabo Verde, Congo, Eritrea, Gambia, Ghana, Mozambique, Senegal, Sierra Leone, Tunisia, and Zimbabwe, became more indebted or maintained high levels of debt in 2022 (exceeding 70% of GDP). However, countries like Cameroon and Nigeria managed to improve their debt levels and remain less indebted.

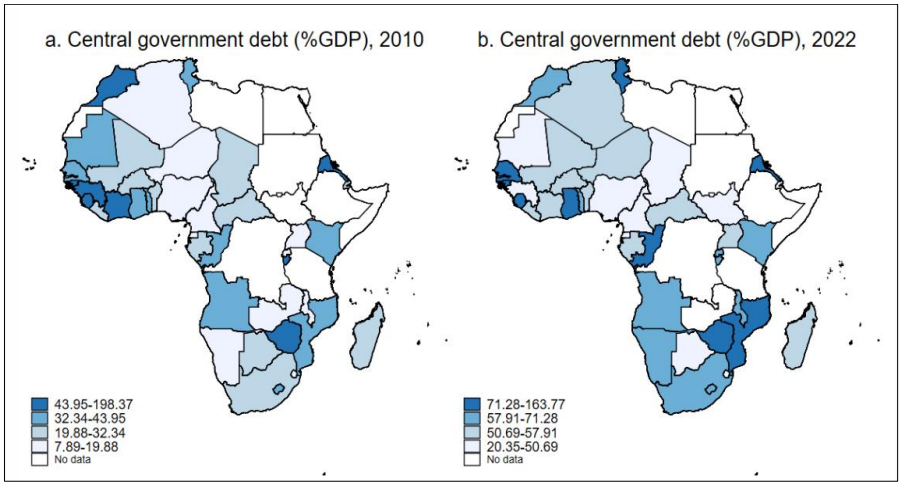
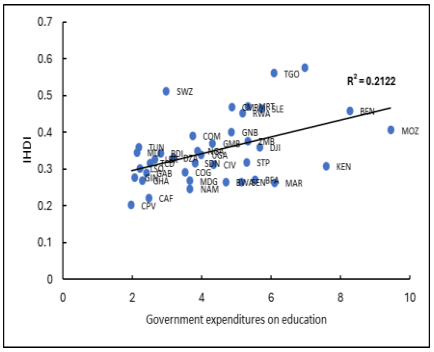


Figure 3: Spatial spread of debt in Africa
Source: Author, using IMF historical debt database

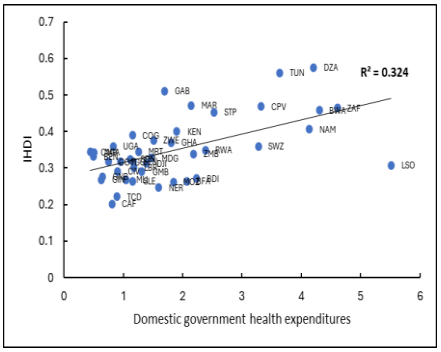
The second interest variable is social spending, measured by two indicators: domestic government health expenditures and government expenditures on education (% GDP). We selected these indicators because

public expenditures in these sectors is one instrument used by states to allocate and distribute resources to reduce social inequalities and ensure that all segments of the population can have access to education and health services (Dahl and van der Wel, 2013; Haile and Niño-Zarazúa, 2018). Figure 4 shows a weak positive correlation between public spending on education or health and IHDI (refer to parts A and B).

a. IHDI and government expenditures on education



b. IHDI and government health expenditures



c. IHDI and central government debt

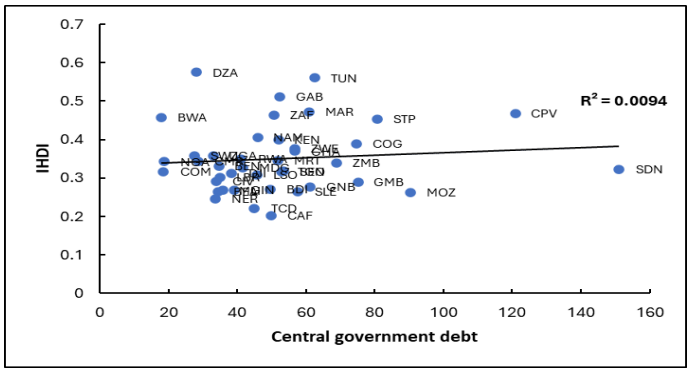


Figure 4: Correlation between well-being and interest variables
Source: Author, using IMF historical debt database, UNDP Center and WDI databases

To substantiate the indirect relationship between IHDI and our variables of interest and to reduce variable omission bias, we control our model by including several variables that have been identified as relevant determinants of well-being. The first variable is the rule of law obtained from

the Worldwide Governance Indicators (WGI). It captures the quality of institutions according to the SDG 16.3 target. The effects of this variable on well-being have received attention in the literature (Nikolova, 2016). The second variable is military expenditures (% GDP). There is an ambiguous effect of military spending on well-being. Indeed, military expenditures increase security and stability, which are fundamental for well-being. However, excessive military spending can reduce funds available for social services (Fan et al., 2018). Another variable is the number of individuals using the internet (% population), which captures the utilization of ICT which in turn affects a country's well-being by helping citizens develop their social capital and achieve social equality (Ganju et al., 2016). These two variables were obtained from WDI. The fourth variable is ethnic fractionalization, obtained from Ashraf and Galor (2013). Ethnic fractionalization has been shown to be a determinant of well-being (Kwakwa and Peña-Vasquez, 2019). The last variable is landlocked status, which can affect well-being. Yitayaw et al. (2022) identified being landlocked as one of the primary factors driving poverty and reducing well-being because it generates high transaction costs that reduce economic opportunities in developing countries. The variable equals 1 if the country is landlocked and 0 otherwise.

Model specification and estimation strategy

As mentioned above, we tested the indirect link between public debt and well-being by using an interaction term between public debt and public spending on education or health. We drew a model as follows:

$$WB_{i,t} = \beta_0 + \beta_1 PD_{i,t} + \beta_2 \vartheta_{i,t} + \beta_3 (\vartheta * PD)_{i,t} + \beta_4 X_{i,t} + \lambda_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

Where *WB* is the IHDI score, *i* is the country, and *t is the year*. *PD* is the central government debt (%GDP). $\vartheta_{i,t}$ is the mediating variable (education or health government expenditures as % of GDP) $(\vartheta * PD)_{i,t}$ is an interaction term to account for the effect exerted by the mediating variable

$\vartheta_{i,t}$. X is the vector of control variables. λ_i are the unobserved country-fixed effects, μ_t represent the time-fixed effects, and $\varepsilon_{i,t}$ is the error term.

The specification of equation (1) makes it possible to determine the marginal effects of public debt on well-being. Thus, the marginal effects are given by the equation (2) below:

$$\frac{\partial WB_{i,t}}{\partial PD_{i,t}} = \beta_2 + \beta_3 \vartheta_{i,t} \quad (2)$$

Equation (1) can be estimated using conventional ordinary least squares, but this method may lead to biased estimates in the presence of endogeneity issues. In our study, endogeneity biases may exist between IHDI and social spending due to simultaneity bias, where higher well-being levels could drive the demand for social services (Layard et al., 2013). To address these biases, we utilize two-stage least squares (TSLS) with one-period lag and two-period lags of each social spending type as instruments. The validity of TSLS relies on three tests: the identification test (significant Kleibergen-Paap rk LM statistic p-values), Cragg-Donald Wald F statistics exceeding Stock-Yogo critical values at 10%, and non-significant results from the Hansen test (Kleibergen and Paap, 2006).

Results and discussion

Table 2 presents the main results. Panel fixed effects (FE) are reported in columns (1) to (2), and the TSLS results are presented in columns (3) to (6).

Table 2: effect of public debt and social spending on well-being

Variables	Fixed effects		Two stage least squares			
	(1)	(2)	(3)	(4)	(5)	(6)

Central Government Debt (Percent of GDP)	**-0.003*** (0.001)**	**-0.002*** (0.0005)**	**-0.003*** (0.001)**	**-0.001** (0.001)**	**0.014*** (0.005)**	**-0.003** (0.001)**
Rule of Law	0.155*** (0.046)	0.155*** (0.044)	0.07 (0.059)	0.074 (0.05)	0.359*** (0.087)	0.14 (0.093)
Military expenditure (% of GDP)	0.029** (0.012)	0.025** (0.011)	0.024* (0.014)	0.024* (0.014)	0.228*** (0.038)	0.164*** (0.031)
Individuals using the Internet (% of population)	-0.111*** (0.018)	-0.080*** (0.017)	-0.095*** (0.025)	-0.063*** (0.024)	0.356*** (0.07)	0.410*** (0.057)
Landlocked status	-	-	-1.650*** (0.071)	-1.619*** (0.075)	-0.581*** (0.087)	-0.662*** (0.08)
Ethnic fractionalization	-	-	-1.437*** (0.187)	-1.452*** (0.148)	-0.913*** (0.166)	-0.694*** (0.18)
Government expenditure on education, total (% of GDP)	**0.004 (0.007)**	-	**0.007 (0.012)**	-	**0.105* (0.057)**	-
Domestic general government health expenditure (% of GDP)	-	**0.024* (0.014)**	-	**0.116*** (0.035)**	-	**0.156* (0.09)**
Central government debt*Government expenditure on education	-	-	-	-	-0.003*** (0.001)	
Central government debt*Domestic general government health expenditures						0.003** (0.001)
Constant	3.609*** (0.06)	3.530*** (0.055)	6.342*** (0.195)	6.105*** (0.14)	2.582*** (0.371)	2.888*** (0.259)
Marginal effect	-	-	-	-	**0.103* (0.057)**	**0.160* (0.089)**
Observations	324	361	254	291	254	291
Kleibergen-Paap rk LM statistic (p-value)	-	-	12.46 (0.00)	24.48 (0.00)	67.89 (0.00)	79.29 (0.00)
Cragg-Donald Wald F statistic	-	-	44.11	43.76	237.09	224.83
Stock and Yogo critical values at 10%	-	-	19.93	19.93	19.93	19.93
Hansen J statistic p-value	-	-	0.70	0.72	0.92	0.14

The results show that central government debt reduces well-being. Indeed, its coefficients are weak, negative, and statistically significant at 1% level from columns (1) to (4). The signs of the coefficients align with theoretical expectations, but the small coefficients suggest that each additional debt results in a small decrease in IHDI scores. These results are consistent with Kang and Rhee (2024). One explanation could be the

utilization of borrowed funds. Even though African governments claim to prioritize the well-being of the people in their policies, the general tendency shows that government debt and social spending vary independently of each other (refer to Appendix A2). In other words, one reason for the policy debt failures to enhance well-being may lie in the sector where governments allocate borrowed resources. This misalignment points to broader governance challenges, where the lack of strategic planning and effective allocation of resources undermines the potential benefits of borrowed funds. Failing to align public debt with social spending can exacerbate the dual challenges of debt burdens and low well-being in Africa.

Since an increase in central government debt itself can be closely related to the composition of public expenditures such as spending on defense, security, and social sectors, we examine the model with the interaction term between central government debt and public spending on education and health from columns (5) to (6). Regarding public spending on education, the estimated coefficient (0.014) for debt in column (5) implies a positive effect of government debt on well-being. This effect is different from those observed in columns (1) and (3). Moreover, the interaction term (debt*education spending) was statistically significant at the 1% significance level, with a positive and significant marginal effect of 0.103. It suggests that central government debt enhances well-being as government expenditures on education rise. As in column (5), we find that the positive net effect of public debt on well-being depends on a country's public health. Despite the negative coefficient of central government debt, the interaction term (debt*health spending) is statistically significant with a positive coefficient of 0.160, confirming that increased indebtedness could enhance well-being with more public expenditures on health.

In the debt literature, increased public debt often carries a negative connotation due to concerns about fiscal sustainability. However, the results on interaction fit into the scope of studies claiming that with good utilization of borrowed funds, central government debt can enhance well-being, particularly through expenditures on education and health. Furthermore, these findings indicate that the impact on well-being in Africa is not solely determined by government debt but rather by how the debt is utilized. Countries that increase public expenditures on education and health may see an enhancement in well-being even with increased government debt.

Conversely, nations with low social spending may struggle to enhance well-being as government debt rises.

Regarding the control variables, the results indicate that being landlocked and having ethnic diversity tend to lower well-being, as indicated by their negative and statistically significant coefficients. This might be because these factors often lead to higher costs and difficulties, which can negatively affect people's well-being. Military spending is found to enhance well-being, aligning with earlier research. The Rule of Law has a weak positive effect on well-being, with some coefficients being both positive and significant.

Conclusion

This study investigates the effects of public debt on well-being in Africa through social spending. While research on public debt's effects on economic growth is abundant, its influence on well-being through public expenditures on education and health remains understudied. We used data from 41 African countries from 2012 to 2021. We found that an increase in central government debt is associated with a decline in well-being. We also found that the negative effects of debt on well-being can be alleviated when considering the interaction between government debt and spending on education or health. Indeed, strategic allocation of borrowed funds, particularly in education and health, mitigates the negative effects of public debt on well-being. The research underscores the need for strategic allocation of government debt to improve social outcomes, suggesting that debt, when managed correctly, can be leveraged to enhance well-being rather than diminish it. This insight is highly relevant to the Summit of the Future, as it emphasizes the importance of developing sustainable public policies that prioritize human development. By identifying the potential for public debt to either harm or help well-being, the study offers a nuanced perspective that can inform policy discussions aimed at building resilient African economies. However, the study does not specify the thresholds for profitable public debt levels for well-being or the minimum social expenditure thresholds to counteract public debt effects. Moreover, it does not explain how

institutional, and governance quality are crucial in public debt management. Future research should address these aspects.

References

Alatartseva, E. and G. Barysheva (2015). Well-being: subjective and objective aspects. *Procedia-Social and Behavioral Sciences* **166**, 36-42.

Ashraf, Q. and O. Galor (2013). The "Out of Africa" hypothesis, human genetic diversity, and comparative economic development *American Economic Review*, **103**, 1-46.

Barro, R.J. (1979). On the determination of the public debt *Journal of Political Economy*, **87**, 940-971.

Bjørnskov, C., Dreher, A. and J.A. Fischer (2007). The bigger the better? Evidence of the effect of government size on life satisfaction around the world *Public Choice*, **130**, 267-292.

Blanchard, O. (2019). Public debt and low interest rates *American Economic Review*, **109**, 1197-1229.

Caselli, F. and P. Wingender (2018). Bunching at 3 percent: the Maastricht fiscal criterion and government deficits, IMF Working Papers, 18(182).

Dahl, E. and K.A. van der Wel (2013). Educational inequalities in health in European welfare states: a social expenditure approach *Social Science and Medicine*, **81**, 60-69.

Essama-Nssah, B. and B. Moreno-Donson (2013). Fiscal policy for growth and social welfare, pp. 26-63 in Moreno-Donson, B. (Ed.), *Is fiscal policy the answer? A developing country perspective*, World Bank, Washington DC, United States.

Fan, H., Liu, W. and P.C. Coyte (2018). Do military expenditures crowd-out health expenditures? Evidence from around the world, 2000–2013 *Defence and Peace Economics*, **29**, 766-779.

Fosu, A.K. (2008). Implications of the external debt-servicing constraint for public health expenditure in sub-Saharan Africa. *Oxford Development Studies*, **36**, 363–377.

Ganju, K. K., Pavlou, P. A. and R.D. Banker (2016). Does information and communication technology lead to the well-being of nations? A country-level empirical investigation. *MIS Quarterly*, **40**, 417-430.

Haile, F. and M. Niño-Zarazúa (2018). Does social spending improve welfare in low-income and middle-income countries? *Journal of International Development*, **30**, 367-398.

Kang, H. and D. E. Rhee (2024) When does government debt make people happier? Evidence from panel data of 125 countries. *Economics of Governance*, **25**, 1-26.

Kleibergen, F. and R. Paap (2006). Generalized reduced rank tests using the singular value decomposition. *Journal of Econometrics*, **133**, 97-126.

Kose, M. A., Ohnsorge, F. and N. Sugawara (2020). Benefits and costs of debt: The dose makes the poison. Policy Research Working Paper 9166.

Kwakwa, M. and A.C. Peña-Vasquez (2019). A neighbor like me: The effect of fractionalization on subjective well-being, *Politics, Groups, and Identities*, **9**,1–19.

Law, S.H., Ng, C.H., Kutan, A.M. and Z.K. Law (2021). Public debt and economic growth in developing countries: Nonlinearity and threshold analysis. *Economic Modelling*, **98**, 26-40.

Layard, R., Clark, A.E., Cornaglia, F., Powdthavee, N. and J. Vernoit (2014). What predicts a successful life? A life-course model of well-being. *Economic Journal*, **124**, 720-738.

Lora, E. and M. Olivera (2007). Public debt and social expenditure: Friends or foes? *Emerging Markets Review*, **8**, 99–310.

McGillivray, M. and M. Clarke (2006). Human well-being: Concepts and measures, pp. 30-46 in McGillivray, M. and Clarke, M. (Eds.). *Understanding human well-being*. Tokyo: United Nations University Press.

Musgrave, R.A. (1972). Fiscal Policy. *Proceedings of the American Philosophical Society*, **116**, 197-202.

Nikolova, M. (2016). Minding the happiness gap: Political institutions and perceived quality of life in transition. *European Journal of Political Economy*, **45**, 129-148.

Ostry, M.J.D., Ghosh, M.A.R. and M.R.A. Espinoza (2015). *When should public debt be reduced*? International Monetary Fund, Washington, DC.

Panizza, U. and A.F. Presbitero (2014). Public debt and economic growth: is there a causal effect? *Journal of Macroeconomics*, **41**, 21-41.

Reinhart, C.M. and K. S. Rogoff (2010). Growth in a Time of Debt. *American Economic Review*, **100**, 573-578.

Sachs, J.D., LaFortune, G. and G. Fuller (2024). The SDGs and the UN Summit of the Future. Sustainable Development Report 2024. Paris: SDSN, Dublin: Dublin University Press. doi:10.25546/108572.

Sanz, I. and F.J. Velázquez (2007). The role of ageing in the growth of government and social welfare spending in the OECD. *European Journal of Political Economy*, **23**, 917-931.

Seater, J.J. (2013). Government debt, entitlements, and the economy, pp. 428-442 in Parker, R. and Whaples, R. (Eds.), *Routledge Handbook of Major Events in Economic History*. Routledge.

Song, Z., Storesletten, K. and F. Zilibotti (2012). Rotten parents and disciplined children: A politico-economic theory of public expenditure and debt. *Econometrica,* **80**, 2785-2803.

Stiglitz, J.E., Sen, A. and J.-P. Fitoussi (2009). Rapport de la Commission sur la mesure des performances économiques et du progrès social. www.stiglitz-sen-fitoussi.fr.

UNCTAD. (2024). A world of debt A growing burden to global prosperity. Report 2024. https://unctad.org/publication/world-of-debt/regional-stories#:~:text=In%202022%2C%20public%20debt%20in,of%20GDP%20in%20dollar%20terms.

UNDP. (2024). Human Development Report 2023/2024: Breaking the gridlock Reimagining cooperation in a polarized world. https://hdr.undp.org/content/human-development-report- 2023-24.

UNDP. (2015). Human Development Report 2015: Work for human development. https://hdr.undp.org/system/files/documents/global-report-document/2015humandevelopmentreport1.pdf

UNECA. (2022). Africa Sustainable Development Goal progress report 2021: Is Africa on track to achieve the Sustainable Development Goals by 2030? United Nations. Economic Commission for Africa. www.uneca.org.

Yitayaw, M. K., Feyisa, H. L., Mamo, W. B. and Y. K. Mogess (2022). "Nexus between being landlocked and living standards in Sub-Saharan African countries: A two-step System GMM analysis", *Journal of Infrastructure, Policy and Development*, **6** 1-14.

Zhao, R., Tian, Y., Lei, A., Boadu, F. and Z. Ren (2019). The effect of local government debt on regional economic growth in China: A nonlinear relationship approach. *Sustainability*, **11**, 3065.

Appendices

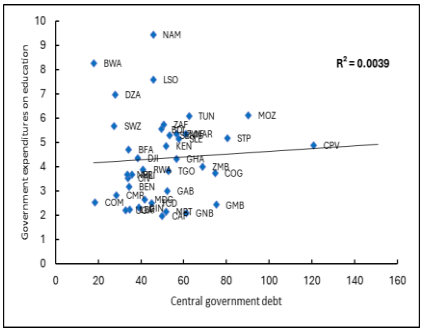
Appendix A1: List of countries

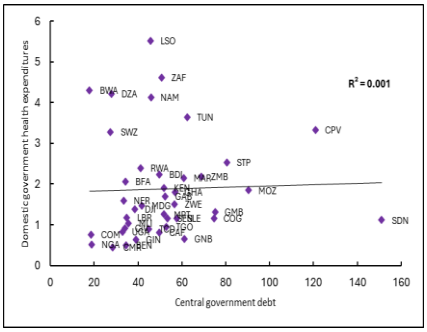
Algeria, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Djibouti, Eswatini, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Mali, Mauritania, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Togo, Tunisia, Uganda, Zambia and Zimbabwe.

Appendix A2: Scatter plot central government debt and social spending

a. Debt and public education expenditures

b. Debt and public health expenditures





Source: Author, using IMF historical debt database and WDI databases