

Public Expenditure Effect on Household Welfare in Kenya

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Abstract

Background: One tool that governments utilize to enhance household wellbeing is public expenditure. The United Nations emphasized in 2005 that governments would need to increase public spending in the areas of agriculture, health, infrastructure, and education if the Millennium Development Goal targets were to be realized. This was stressed even more in 2015 under the United Nations 2030 Agenda for Sustainable Development. Between 2006 and 2022, public spending on health, infrastructure, agriculture, and education grew by almost 25 per cent of total national spending in Kenya. Compared to the 2030 Sustainable Development Goal of eradicating poverty, the projected number of impoverished individuals in 2021 was 38.6 per cent, in the field of education, the enrollment rates for primary and secondary schools were 47.8 per cent and 88.4 per cent, respectively, in 2015, falling short of the Sustainable Development Goal objective of 100 per cent target. In the health sector despite the Sustainable Development Goals' aim of fewer than 25 deaths per 1,000 live births by 2030, the maternal mortality rate remained high in 2022, with 41 deaths per 1,000 live births. Kenya will not be able to meet the Sustainable Development Goals by 2030, which include poverty eradication, healthy within the nation, if these trends continue. An increase in public expenditure on health and education without corresponding effects on household welfare has raised concerns among policymakers. Thus, the goal of the study was to ascertain how public spending affects household welfare in Kenya.

Methodology: The study used data from the Basic Report on Well-Being, which is an extract from the Kenya Integrated Household Budget Survey for the 2015–16 year. Public expenditure data at the county levels covering all the 47 counties for the period 2014 to 2016 were used in the analysis, taking the county as the unit of study. The study used Ordinary Least Squares method to address the objective.

Results: The study found that there was empirical support that a 1 per cent increase in government spending on agriculture would enhance household welfare by 0.1 per cent and 0.3 per cent, respectively, with regard to food and non-food household consumption. In addition, the study found that household welfare would improve by 0.18 per cent in terms of aggregate household consumption when the government increases public expenditure on agriculture by one percent. However, the study established that public spending on education had a positive impact on household welfare in terms of food and total household spending, whereas public spending on health per capita only had a positive impact on household spending on nonfood items.

Conclusion: The study concluded that both national and county governments should allocate more funds to infrastructure, education, and agriculture, so that to improve household welfare status among Kenyan citizens.

Keywords: Household welfare, public spending and well-being

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I. Introduction

The United Nations (2005) maintained that public spending must take a "big push" approach to assist developing countries in meeting the demands of the Millennium Development Goals and to alleviate the issue of poverty. The report argued that, for countries to realize the achievement of MDGs, then, they should identify key areas of public expenditures to improve citizens' welfare. Countries should focus on resource mobilization, capacity-building, and official development assistance. In order to address household welfare and income distribution, the United Nations (2005) identified the following public expenditure areas: health expenditure, gender equality expenditure, agriculture, expenditure on environmental programmes, education, and urban infrastructure. While basic public spending on infrastructure and human capital would allow the impoverished to join the global economy and lay the foundation for private sector diversification, the United Nations (2005) reiterated that the goal of the "big push" strategy in public spending was to put low-income nations on a path of growth that would eventually become self-sustaining (United Nations, 2005:50).

Public expenditure on education in low-income countries increased both in absolute terms and as a proportion of GDP beginning in the 1980s, with an average of 4.1 per cent of GDP in 2010 compared to 2.9 per cent in the 2000s, according to the Government Expenditure Watch (2013) report. The increase in public

spending on education was linked to the MDGs' achievement (GSW, 2013). However, in high-income and upper middle-class countries, public education spending increased as well, rising from 4.1 per cent and 5 per cent of GDP in 2000 to 4.9 per cent and 5.6 per cent of GDP in 2010 (GSW, 2013). Specifically, after 2000, the share of GDP that went toward education in low-income nations rose dramatically. From 2.9 per cent, 1.4 per cent, 3 per cent, 3.5 per cent, and 3.8 per cent in 2001 to 6.2 per cent, 4.1 per cent, 4.1 per cent, 4.6 per cent, and 4.7 per cent in 2011 (GSW, 2013), Burundi, Gambia, Niger, Mali, and Ethiopia raised investment in education.

Twenty-three of the thirty less developed nations experienced an increase in health spending as a percentage of GDP after 2000. Between 2001 and 2012, Rwanda, Congo DR, Burkina Faso, Malawi, and Gambia showed notable progress. Specifically, most of these countries doubled their health expenditure relative to GDP, rising from an average of 2 percent in 1996–2000 to 4 percent in 2001–2012 (ERD, 2014). Countries in the Organization for Economic Co-operation and Development (OECD) also increased public spending on programs aimed at improving household welfare and income redistribution. According to the 2016 OECD report, Germany, Denmark, Sweden, France, and Finland each allocated around 42 to 47 percent of their public expenditures to the social sector. In contrast, Canada allocated 24 percent, Iceland 21 percent, the United States 19 percent, and South Korea 11 percent in 2016. Consequently, OECD countries spent an average of 20 percent of total public spending on health in 2016. Education was the next-largest area, accounting for an average of 11 percent of all public expenditure.

In Kenya, the situation has remained unchanged. The government has been committed to addressing household welfare through public expenditure. Kenyan public expenditure increased fourfold in absolute terms from 2006 to 2019. Specifically, spending in the social sector grew by over 50 percent between 2006 and 2019. The proportion of total spending allocated to the social sector increased from approximately 25 percent in 2006 to 34 percent in 2011, then declined to around 18 percent in 2017, before rising again to 34.9 percent in 2019 (Republic of Kenya, 2007, 2012, 2017, 2020). The increased social sector expenditure was aimed at improving the welfare of vulnerable groups in society (Republic of Kenya, 2020). Expenditure on public education grew annually at a rate of 11.7 percent from 2006 to 2019. Additionally, public expenditure on health increased at an average of 21 percent per year during the same period (Republic of Kenya, 2007, 2017 & 2020). However, despite the government's commitment to using such spending to enhance household welfare, Kenya still faces low living standards, as motivated in various policies.

For instance in 1984, the Kenyan government unveiled the fifth development plan. The plan's primary objective was to deploy domestic resources to promote equitable development (Republic of Kenya, 1984). According to the development plan, ministries would get thirty per cent of the funds to address household welfare aggregates. The plan further identified poverty alleviation as a priority of the government and proposed allocation of public expenditure to areas such as agriculture, education, and health care (Republic of Kenya, 1984). Lastly, the plan transferred planning and execution authority from the ministry headquarters to the districts (Republic of Kenya, 1984).

The Sixth Development Plan (1989–1993) aimed to harness the energies of various socio-economic units and organizations in the economy with the participation of all citizens (Republic of Kenya, 1989). The plan was meant to adopt development strategies aimed at achieving a better standard of living for all. The strategies proposed increased public expenditure on health, education, nutrition, water supply, and environmental conservation. In order to address income inequality, the plan proposed a number of measures, namely the provision of welfare services to those in low-income groups and the promotion of non-wage rural incomes for small farmers. This was meant to address the relative attractiveness of rural life as compared to urban life (Republic of Kenya, 1989). In comparison to 1993's 5.6 per cent growth rate, economic growth throughout the plan period decreased to an average of 4.1 per cent. In all of the rural districts, the Gini coefficient grew from 0.40 in 1989 to 0.49 in 1993 (Republic of Kenya, 1997). The distribution of income was weaker and less impressive. Compared to the top 20 per cent who received 56.9 per cent of the income in 1989, 20 per cent of the poorest people living in rural areas only received 4.9 per cent. Moreover, this condition deteriorated further in 1992, when the income distribution between rural and urban areas was 3.5 per cent and 60.2 per cent, respectively. 1992 saw little improvement for the 20 per cent of the urban poorest income group members. Actually, according to the Republic of Kenya (1997), the richest 20 per cent of the population took home 58.8 per cent of the total, while the poorest 20 per cent took home just 2.9 per cent.

Kenya's government introduced the Social Dimensions of Development (SDD) Programmes between 1994 and 1997. The primary goal of the programme was to protect the underprivileged from some of the detrimental consequences of the economic reforms implemented in the 1980s, such as cost sharing in the areas of agriculture, health, and education (Republic of Kenya, 1994). The Kenyan government provided KSh.5.58 million for the SDD programme in the 1994–1995 budget. The amount was meant to address poverty levels and income inequalities in the country. The trickle-down effects of these programmes were felt slightly in addressing income distribution. Gini coefficient dropped to 0.419 in 1997 from 0.443 in 1994 (Wambugu & Munga, 2009). Even so, the national poverty rate increased between 1994 and 1997, going from 46.8 per cent in

1994 to about 52.3 per cent in 1997; the rural poverty rate increased from 46.3 to 52.9 per cent in 1997, while the urban poverty rate increased from 28.9 to 49.2 per cent in 1994 (Wambugu & Munga, 2009). The increased level of poverty was attributed to low agricultural productivity, labor market distortions, low access to healthcare, inadequate physical assets especially land, low access to schooling and within the farm employment opportunities (Wambugu & Munga, 2009). Table 1.1 shows overall poverty estimates across the regions in Kenya.

Table no 1: Overall Poverty Estimates across Kenya (%)

Region	1994	1997
Central	31.9	31.4
Coast	55.6	62.1
Eastern	57.8	58.6
Rift Valley	42.9	50.1
North Eastern	58.0	65.5
Nyanza	42.2	63.1
Western	53.8	58.8
Nairobi	25.9	50.2
Rural	46.8	52.9
Urban	28.9	49.2
National	46.8	52.3

Source of Data: Wambugu and Munga (2009)

Kenya's overall poverty estimates, both regional and national, are shown in Table 1. In Kenya, about 50 per cent of the population was considered impoverished. Between 1994 and 1997, between 29 and 49 per cent of urban residents were impoverished.

Rationalizing governmental spending to support equity and rapid economic growth was the aim of the National Development Plan (1997–2001) (Republic of Kenya, 1997). The Plan's explicit goal was to invest Ksh. 12 billion on social dimension programmes to increase household welfare. The development plan proposed measures to narrow income inequalities. The measures included, the attainment of rapid market-based growth, creation of income opportunities, fiscal redistribution and equalization of government services through regional development authorities (Republic of Kenya, 1997). Kenya's economy grew by 1.5 per cent annually over the plan period, falling short of the 5.9 per cent annual growth target (Mariara, Ndenge & Mwabu, 2006). This implied that the growth targets were not achieved. The slowed economic growth was attributed to weak implementation capacity in the public service, low levels of donor inflows, and exogenous shocks such as droughts, poor governance and perceived weak commitment to the reform agenda.

In 2001, Kenya's government released the Poverty Reduction Strategy Paper (2001-2004). Reducing poverty and fostering economic progress were the objectives of the policy document (Republic of Kenya, 2001). Close examination of the PRSP results from 2001 to 2004 revealed, nevertheless, that the policy's goals were not met. Between 1999 and 2001, the percentage of the population living in poverty rose from 52.6 per cent to 55.4 per cent (Republic of Kenya, 2004). Poverty increment was attributed to lack of full implementation of the policy paper, insufficient allocation of resources, inadequacy in the prioritization, lack of involvement and participation of the key stakeholders, lack of specific plans and budgets targeting key social sectors (Wambugu & Munga, 2009).

In 2003, the Kenyan government unveiled the Economic Recovery Strategy for Wealth and Employment Creation (2003-2007). The policy paper was geared towards enhancing equity and reducing poverty as the main goals of the strategic document commonly referred to as ERS (2003-2007) (Republic of Kenya, 2003). Investing in health, education, agriculture, and the environment was the plan's main focus areas. Its goal was to increase everyone in Kenya's access to and affordability of basic health care. The Plan recommended raising public spending on programmes aimed at combating poverty to 4 per cent of GDP between 2003 and 2007 and raising expenditure on development from 4.3 per cent to 6.7 per cent of GDP in 2003. Furthermore, the plan recommended raising public spending in the domains of agriculture, health, and education from 8.6 per cent, 27.2 per cent, and 3.1 per cent in 2004 to 9.4 per cent, 28.2 per cent, and 3.5 per cent in 2006–07 (Republic of Kenya, 2007). Therefore, the main objective of government spending in Kenya since independence in 1963 have been to improve household welfare. As a result, public spending has increased over time. Spending on infrastructure, health, education, and agriculture rose from about 25 percent of total national expenditure in 2006 to 34 percent in 2011, 18 percent in 2017, and 41 percent in 2022. Despite the government's commitment, the country still faces low levels of household welfare. National poverty level remained at 38.6 per cent in 2021. The MDG aim of halving poverty by 2015 and the SDG goal of eliminating poverty by 2030 were not met by the results (Republic of Kenya, 2018; 2021). Thus, the aim of the study was to establish the effect of public spending on household welfare in Kenya.

II. Theoretical Literature Review

According to Musgrave and Musgrave (1989) public spending directly correlates with a country's developmental stage and is a necessary condition for economic progress (Musgrave & Musgrave, 1989). The theory predicted that the proportion of public investment to total investment would rise significantly in the early stages of economic growth and development. The government mandates are the provision of social infrastructure overheads in terms of law and order, health, sanitation services, roads, education, human capital investments and transport infrastructure. All these social overheads are important for economic takeoff during the social and developmental stages (Musgrave & Musgrave, 1989).

The government should continue the supply of various goods necessary for investment in the middle stages of growth. During these stages, both private investment and public investment are complementary. In the mass consumption stage, public expenditure grows in relation to policies designed for redistribution of welfare indicators, GNP, and income maintenance programmes (Musgrave & Musgrave, 1989). Since the theory establishes the connection between public spending and household welfare, it is pertinent to the current investigation. According to Musgrave and Musgrave (1989), household welfare depends on public expenditure on health, education and road infrastructure, which are important variables considered in this study. Nonetheless, the theory has come under criticism for assuming that the public sector plays a major role in development while neglecting the productive expenditure side of the economy. This is not always relevant (Brown et al., 1996).

Ferroni and Kanbur (1990) extended the theory of public expenditure by Musgrave and Musgrave (1989) and proposed that the government's optimal inter-sectoral allocation of public expenditure is a problem of maximizing welfare under a fixed fiscal budget constraint, as indicated by equation 2.1.

$$\begin{aligned} & \text{Max} W = W(G_i, Y, Z, X_{k \neq j}) \\ \text{St} \\ & \sum G_k = \bar{G} \quad \& \quad G_k \geq 0 \end{aligned} \quad \dots (2.1)$$

Where G_k is public expenditure in sector k , X captured welfare indicators, Y is income, Z is a vector of variables that may affect targeted welfare indicators and $\bar{G}$ is the total amount of public expenditure available to the government. Thus, according to Ferroni and Kanbur (1990), household welfare function gives a relationship between public expenditure, income levels and other variables influencing welfare indicators such as household characteristics. In a related argument, Anderson, Renzio, and Levy (2006) argued that by increasing the quantity and quality of a variety of goods and services, public spending directly impacts household welfare. Thus, in order to determine the impact of public spending on household welfare, Anderson *et al.* (2006) developed the following type of household utility function:

$$V_h = f(M_h, P_j, Z_k) \quad \dots (2.2)$$

Where V_h is the household utility, M_h is household disposable income, P_j are prices of goods and services purchased by households, and Z_k are the fixed quantities of goods and services provided by the government.

The effect of state spending on welfare status is measured by $\frac{\partial V_h}{\partial Z_k}$. It is anticipated that this direct effect will follow the law of declining marginal utility and change based on household preferences. This implies that households' value public goods differently. Important contribution by Ferroni and Kanbur (1990) and Anderson *et al.* (2006), helped to establish link between household welfare and public expenditure.

III. Empirical Literature

Mogues *et al.* (2006) looked at how government investment affected rural residents' quality of life in Ethiopia. Cross-sectional data from household and regional level data for the years 1993–1994 to 2000–01 were used by the researchers. The study estimated several models to address the objectives, namely, two-stage least squares (2SLS) and ordinary least squares (OLS). Lastly, the study used three-stage least squares (3SLS) to respond to the research objectives. The study established that all regions had the highest returns on public investment in road infrastructure. Public investment on agriculture had less of an influence on household welfare than spending on roads, and the difference was statistically insignificant. The analysis of study on the effects of state spending on agriculture across areas revealed that smaller, mostly urbanized regions had the highest returns. The study also discovered that public spending on education improved welfare in all of the regions. The study did discover, however, that public health spending had no beneficial benefits on rural welfare in any of the locations. The current study adopted some of the variables used such as education expenditure roads, agriculture and health expenditures. These factors are crucial, especially for Kenya because they are

significant in resolving concerns related to household welfare and income distribution in the nation (Republic of Kenya, 2007). Since the methodology sought to determine the impact of public spending on household welfare while accounting for the endogeneity issue, it was also pertinent to the current investigation.

Mensah, Bourdon, and Latruffe (2011) investigated how household welfare in rural Ghana was impacted by infrastructure access. The three waves of the national household living standard surveys conducted between 1991 and 2006 provided pseudo-panel data for the study. The Generalized Method of Moments (GMM) estimate technique was utilized in the investigation, and lagged variables served as the instruments. The dependent variable of the study was the household total consumption per adult equivalent, which was used to capture household well-being. The age, gender, size, and level of education of the head of the household, as well as the amount invested in public infrastructure, were the independent variables. The findings of the study demonstrated that public infrastructure, such as public transportation and electricity, positively affects the well-being of Ghanaian rural households. The results also showed that household welfare is directly and significantly impacted by both the size of the household and the prior level of welfare.

Thus, the study concluded that government infrastructure spending is a crucial instrument for reducing poverty in Ghana's rural areas. However, Mensah, Bourdon, and Latruffe's (2011) study only looked at how access to infrastructure affected household wellbeing; it ignored other public spending on sectors like agriculture, health, and education, all of which are crucial for addressing household welfare in Kenya (Republic of Kenya, 2008). This study analyzed some of these variables, such as the size of the household, the gender of the head of the household, and the amount spent on infrastructure, to ascertain the association between public spending and household welfare in Kenya.

Kasimu (2014) looked at the welfare effects of public spending on Kenya's rural electrification programme. The study employed cross-sectional data from government spending from FY 2005–06 and household spending from the Kenya Integrated Household Budget Survey (2005–06). The study utilized benefit incidence analysis estimation procedure to respond to the study objectives. According to the study, not all income categories benefited equally from government subsidies for all rural services. In particular, the findings demonstrated a progressive benefit distribution at the regional level, with impoverished households receiving larger benefits than richer households. However, district expenditures benefited households with higher incomes. Kasimu (2014), however, failed to consider other sectors that may affect household welfare and income distribution, such as agriculture, health, and education sectors. This omission may have led to underestimation of the benefits of public expenditures (Mogues *et al.*, 2006).

Rahmanov (2014) looked at household welfare and social spending in Azerbaijan. The study utilized a panel data set of household deciles spanning the years 2002–2012 to ascertain the link between social spending and household welfare. A fixed effects model was estimated in the research. According to the empirical findings, a ten per cent increase in non-transfer income translated into a 5.2 per cent rise in household consumption. The findings additionally showed that there was no effect of in-kind transfers on household consumption. In addition, the researcher estimated separately income group models using equation for consumption-income. The analysis demonstrated that high-income group had a high elasticity of non-transfer income compared to low- and middle-income groups. For example, a ten per cent pension rise would spur consumption by 1.1 per cent in the low-income categories, 0.7 per cent in the middle-income groups, and 1.3 per cent in the high-income groups. Furthermore, the study found a 10 per cent increase in-kind transfers to have a positive effect on both the middle- and high-income groups at the rate of 0.1 per cent. The study concluded that a ten per cent rise in allowances would result in consumption increases of 0.1 per cent and 0.3 per cent for the middle-class and high-income groups, respectively. The Rahmanov (2014) notable weakness was the exclusion of government spending on road infrastructure and agriculture. Given the importance of road infrastructure development and agriculture in enhancing household welfare and income distribution in Kenya, these factors are especially crucial for the country (Republic of Kenya, 2007).

The study conducted by Garay, Zereyesus, and Thompson (2014) investigated the connection between the financial resources allocated by local governments and the economic well-being of American citizens. The study used panel data from 1991 to 2005 for fifty states. The public expenditure categories included in the study were health, government administration, education, public safety, housing and environment. Household well-being was captured by disposable income, poverty rate and median income. Three distinct models were estimated in the study: the fixed effects model, the random effects model, and the pooled ordinary least squares (POLS) model. Using the poverty rate as the dependent variable and estimating a fixed effects model, the study discovered that spending on government administration and education would lower the levels of poverty. The study found that, in comparison to other expenditure categories, spending on public safety, housing, and the environment increased median income the highest percentage of the typical US median income in the POLS model, when median income was used as the dependent variable. Lastly, the study discovered that spending on housing, education, and the environment all had a beneficial impact on disposable income after estimating a

fixed effects model to investigate the relationship between local government spending and income. Nonetheless, the analysis discovered that government administrative spending affected disposable income negatively.

The study concluded that policy tools had to be designed with the local government's objectives in mind while focusing on certain welfare programmes. For example, greater funding for government administration should be prioritized if lowering the poverty rate is the top goal, and greater funding for housing and the environment should be allocated if the local government wishes to reach the median income. Following Garay, Zereyesus, and Thompson (2014), the current study adopted some of the variables, such as public expenditures on education and health. These variables are important in the Kenyan context, given the government's commitment to improve household welfare through allocation of more funds to these sectors (Republic of Kenya, 2007).

In Rwanda and Tanzania, Almanzar and Torero (2017) conducted research on how state spending and growth affect household welfare. The study used cross-sectional data for both Tanzania and Rwanda from 2000 to 2007. Data on public spending were taken from Tanzanian district budget reports from 2001 to 2007 and Rwandan regional and provincial budget reports from 2004 to 2005. By looking at the effects across a country and within various categories of administrative bodies and households, the study attempted to explore issues of inefficiency in public expenditure and advantages coming from public spending across diverse segments of the population in the countries under study.

The study estimated a system of equations to achieve the intended objectives. The study used public expenditure per capita growth rate for every quintile as the dependent variable and public expenditures on health, education, agricultural development, energy, taxes, and levies collected by the districts as the explanatory variables. The study findings showed contrasting results. According to the study, mean public expenditure growth in Tanzania has a disproportionately positive impact on the top segments of the population while having less influence on the lowest segments. However, in contrast to Rwanda, the analysis discovered that Tanzania's household sector generally benefits from the distributional effects of social spending. In Rwanda, the results showed that increase in public expenditure benefits only households at the top quintile and that no improvement on the middle and poor classes.

Almanzar and Torero (2017) state that in the two countries, welfare benefits were mostly achieved for 20 per cent of the top income distribution. With some slight benefits to the middle and bottom of the distribution in Tanzania. The benefits were attributed to the spillover effects of public expenditure. That is, only the top quintile's household spending growth had positive and above-one elasticities. The researchers concluded that the public expenditure growth effect was biased towards the middle of the distribution, with very little influence on the income distribution. Following Almanzar and Torero (2017), the current study adopted some of the variables such as public expenditures on health, education and agriculture. These variables are important in the Kenyan context given the government efforts to improve household welfare through allocation of more funds to these sectors (Republic of Kenya, 2007).

Ngouhouo and Nguépi (2022) conducted research on Cameroonian household welfare and budgetary adjustments. Computable General Equilibrium Model (CGE) and Social Accounting Matrix (SAM) for Cameroon were used in the study. The National Institute of Statistics provided the national accounts data and resources used to build the SAM. The comparable variation indicator was used to capture welfare. The findings indicated that a twenty per cent increase in public spending would result in a corresponding increase in salaried and capitalist household income of roughly ten per cent and one percent, respectively. In fact, the study found that higher public investment on public services, industry, market, and agriculture would boost the wellbeing of capitalist and salaried households.

IV. Theoretical Framework

The theoretical framework of the study is informed by the principles of both Musgrave and Musgrave (1989) that claimed the state must carry out three functions: distribution, allocation, and stability. Thus, according to Musgrave and Musgrave government budget plan must be aligned to three objectives namely, to influence efficient distribution of income and wealth, adjustments in resource allocation, and economic stability. Thus, this study provides a model to investigate the effects of public expenditure on household wellbeing, based on the household welfare functions presented by Ferroni and Kanbur (1990) and Anderson et al. (2006). According to Ferroni and Kanbur (1990), and Anderson *et al.* (2006), the authors assumed two government levels namely; the national and decentralized governments. It is thought that the national government is made up of equally sized regions, each of which is run by a local government. It is presumed that households in the regions are both impoverished and rich.

On the other hand, provision of pro-poor goods and services financed by taxes is assumed to be the national government responsibility. The function assumed that national government has a cost advantage in the production of public goods and services on a larger scale to all regions due to its command of superior technology, skilled labor and economies of scale. Thus, according to Ferroni and Kanbur (1990), and Anderson

et al. (2006) the household welfare function is a function of basic needs achievement (B), non-basic needs (I) and control covariate (X) as expressed in equation (3.1)

$$W = W(B, I, X) \quad \dots (3.1)$$

Where the first and second order conditions are given by equation (3.2) as:

$$\frac{\partial W}{\partial B} > 0; \frac{\partial^2 W}{\partial B^2} \leq 0 \quad \frac{\partial W}{\partial I} > 0; \frac{\partial^2 W}{\partial I^2} \leq 0 \quad \dots (3.2)$$

The first and second order conditions of equation (3.2) suggest that an increase in basic needs (B) and non-basic needs (I) will lead to improvement on the household welfare. Thus, (B) comprises of public transportation, education, health care, food, water, and sanitation. The United Nations (2005) states that public spending devoted to addressing one of the two common policy targets, namely household welfare and income distribution, is likely to have an impact on the other. Therefore, if the government pursues pro-poor public expenditures, it is reasonable to infer that improvements in household welfare also have an impact on income distribution, particularly for the poor. Thus, B is a function of pro-poor public goods and services or public expenditure on social goods and services (SPE), and that public expenditure on social goods and services will enter welfare function through basic needs as expressed in equation (3.3)

$$B = B(SPE) \quad \dots (3.3)$$

Where the first and second order conditions are given by equation (3.4):

$$\frac{\partial B}{\partial SPE} > 0; \frac{\partial^2 B}{\partial SPE^2} \leq 0 \quad \dots (3.4)$$

The first and second order conditions of equation (3.4) imply that an increase in public expenditure on social goods and services will lead to improvement on basic needs (B).

Non-basic needs (I), on the other hand is assumed to be a function of public expenditure on development (DPE) as shown in equation (3.5)

$$I = I(DPE) \quad \dots (3.5)$$

Where the first and second order conditions are given by equation (3.6)

$$\frac{\partial I}{\partial DPE} > 0; \frac{\partial^2 I}{\partial DPE^2} \leq 0 \quad \dots (3.6)$$

The first and second order conditions for equation (3.6) imply that an increase in public expenditure on development will lead to improvement on non-basic needs (I).

Thus, the household standard welfare function is expressed as shown in equation (3.7)

$$W = W\{B(SPE), I(DPE), X\} \quad \dots (3.7)$$

Where the household standard welfare function is continuous and twice differentiable in B and I . That is, $W_B > 0; W_{BB} \leq 0$ and $W_I > 0; W_{II} \leq 0$... (3.8)

The first and second order conditions of equation (3.8) indicate that an increase in public spending on basic needs (B) and development expenditure on non-basic needs (I) will lead to improvement in the household welfare, but at a decreasing rate.

Therefore, the government will choose the level of public expenditure on social goods and services (SPE) and public expenditure on development (DPE) that will maximize households' welfare. Both national and decentralized governments are assumed to have a balanced budget, where total public expenditure (TE) equal total revenue (R). Additionally, it is anticipated that total public spending would remain constant and must be divided between public spending on social goods and services (SPE) and development expenditure (DPE). Thus, the government budget constraint is expressed as shown in equation (3.9)

$$TE = DPE + SPE \quad \dots (3.9)$$

Thus, from equations (3.7) and (3.9) the government problem becomes:

$$\text{Max} W = W\{B(SPE), I(DPE), X\}$$

St

$$TE = SPE + DPE \quad \dots (3.10)$$

The government optimization problem's Lagrangian function formulation is provided as:

$$L_{SPE, DPE, \lambda} = W\{B(SPE), I(DPE), X\} + \lambda\{TE - SPE - DPE\} \quad \dots (3.11)$$

Following equation (3.11), for maximization problem, the first order conditions (FOC) assuming an interior solution can be obtained as:

$$L_{SPE} = \frac{\partial L}{\partial SPE} = \frac{\partial W}{\partial B} * \frac{\partial B}{\partial SPE} - \lambda = 0 \quad \dots (3.12)$$

$$L_{DPE} = \frac{\partial L}{\partial DPE} = \frac{\partial W}{\partial I} * \frac{\partial I}{\partial DPE} - \lambda = 0 \quad \dots (3.13)$$

$$L_{\lambda} = \frac{\partial L}{\partial \lambda} = TE - SPE - DPE = 0 \quad \dots (3.14)$$

Solving equations (3.12) to (3.14) provides the optimal DPE and SPE, and substituting these into the objective function (3.10) produces the simplified form of the optimal solution to the government problem.

$$W = W(SPE, DPE, X) \quad \dots (3.15)$$

In equation (3.15), welfare indicators (W) depends on public expenditure per capita on social goods and services (SPE), public expenditure per capita on development activities (DPE) and control variables (X) and both public expenditure per capita on social goods and development expenditure per capita are assumed to enter equation (3.15) positively. Thus, the effect of public expenditure on household welfare is derived from equation (3.15).

V. Empirical Model

From equation (3.15) and following Mogues *et al.* (2006) and Mensah, Huchet, and Latruffe (2011), the general model that was estimated to establish the effect of public expenditure on household welfare in Kenya was:

... (3.17)

Where, y_i is the average household expenditure per adult equivalent for the i th county, $i=1, 2, \dots, 47$. This variable is an indicator of household welfare. A study by Deaton and Zaidi (2002) found that household expenditure is less sensitive to short-term fluctuations and more reflective of long-term income levels than income itself. Moratti and Natali (2012) also emphasized that consumption is a more stable measure of household welfare. According to Moratti and Natali (2012), consumption reflects real living standards in agricultural societies since it is stable over the seasons. X_i is a vector of explanatory variables containing the i th county public expenditure per capita allocations on agriculture (AEXPPC), infrastructure (IEXPPC), education (EEXPPC), and health (HEXPPC). Z_i is a vector of control variables, such as the i th county average household size and the proportion of male-headed households in the i th county. β and γ are the corresponding vectors of unknown parameters to be estimated. ϵ_i is the i th unobserved error term. Specifically, the model estimated to achieve the objective was:

... (3.18)

Where all the variables are as defined above in equation (3.17)

VI. Definition and Measurement of Variables

Table no 2: Definition and Measurement of Variables

Variable	DEFINITION	MEASUREMENT
Household expenditure per adult equivalent	The amount spent by a household on food and non-food expenses	An average total expenditure per household in thousands of Kenya Shillings.
Food expenditure per adult equivalent	The total household food consumption expenditure on own production, stocks, and gifts	An average food consumption expenditure per household in thousands of Kenya Shillings.
Non-food expenditure per adult equivalent	The total household consumption expenditure on house rent, water, power, and other cooking-related expenditures	An average non-food expenditure per household in thousands of Kenya Shillings.

Household size	The number of people sharing a residence.	The actual number of persons.
Sex of Household Head	The distribution of male and female-headed households.	Percentage distribution of households by the gender of the head of the household.
Size of the County	It is the budget size of an administrative unit.	Share of county revenue allocation as a percentage of total government revenue allocation to counties.
Public expenditure on education per capita	Total recurrent and development expenditure made by the county government on education.	County total expenditures in Education for the financial years 2014/15 to 2015/16 divided by the projected population for each county in 2016 expressed in thousands of Kenya shillings.
Public expenditure on health per capita	Total recurrent and development expenditure made by the county government on health.	County total expenditures in health for the financial years 2014/15 to 2015/16 divided by the projected population for each county in 2016 expressed in thousands of Kenya shillings.
Public expenditure on infrastructural per capita	Total recurrent and development expenditure made by the county government on infrastructural facilities.	County total expenditures in infrastructure for the financial years 2014/15 to 2015/16 divided by the projected population for each county in 2016 expressed in thousands of Kenya shillings.
Public expenditure on agriculture per capita	Total recurrent and development expenditure made by the county government on agriculture.	County total expenditures in agriculture for the financial years 2014/15 to 2015/16 divided by the projected population for each county in 2016 expressed in thousands of Kenya shillings.

VII. Data Type and Source

Two sets of data were employed in this study in order to meet its objectives. The first set of data came from the Basic report on well-being in Kenya, which is an extract from the Kenya Integrated Household Budget Survey of 2015–2016. The first report of its kind on poverty and other welfare indicators under the implementation of the devolution form of governance in Kenya. The report was produced during the second generation of county integrated development plans and the Third Medium Term Plan's formulation by the government. The expenditure analysis that provided the child poverty measures served as the basis for the report. The Kenya Integrated Household Budget Survey, which was first conducted in 2005–06 to collect representative data at the national and sub-national levels, provided the well-being report. The 2015–16 KIHBS was the first of its kind to be conducted in tandem with the devolution of governance and the country's second integrated household budget survey conducted in a decade (Republic of Kenya, 2015). Providing estimates for a variety of welfare indicators that were representative of the nation, each of the 47 counties, and the individual's place of residence was the aim of the 2015–16 KIHBS. The sample size was calculated for each county independently following household numbers on the 2009 Population Census. A sample of 24,000 households nationwide was taken. The sample was then distributed using the power allocation method among the rural and urban strata. For purposes of this study, the welfare indicators data were extracted for each of the 47 counties. Variables of interest were checked, recoded, and transformed where necessary.

The second dataset was the components of public expenditure at the county level. The data was collected based on an analysis of documents. Data on various county public expenditures, such spending on health, infrastructure, education, and agriculture at the county level, were extracted from Annual County Governments' Budget Implementation Review Reports for the period 2014 to 2016. The total county public expenditure for each component was obtained for the financial year 2014/15 to 2015/16, then divided by the projected population for each county in 2016, expressed in thousands of Kenya shillings. This was done to obtain the county public expenditure per capita. Data on the projected population for each county for 2016 were extracted from Kenya's Statistical Abstract

VIII. Descriptive Statistics

Table 3 shows the descriptive statistics derived from the data. The main statistical values presented are mean, standard deviations, and range of data for the variables.

Table no 3: Descriptive Statistics

Variable	Unit of Measurement	Mean	Max.	Min.	Std. Dev.	No.of Obs
Household expenditure per adult equivalent	Kenya shillings	6,453	14,311	3,460	2,016	47
Food expenditure per adult equivalent	Kenya Shillings	3798	6153	2287	805	47

Non-food expenditure per adult equivalent	Kenya shillings	2655	8158	1097	1292	47
Male headed household	Percentage	66.13	79.70	47.90	7.09	47
Household size	Number	4.32	6.6	2.9	0.83	47
Public expenditure on agriculture per capita	Kenya shillings	857.26	2,077.21	130.47	453.60	47
Public expenditure on education per capita	Kenya shillings	1,493	21,563	276.19	3,064	47
Public expenditure on health per capita	Kenya shillings	3,233	6,317	1,216	1,312	47
Public expenditure on infrastructural per capita	Kenya shillings	1,875	6,713	187.7	1,307	47

Source of data: Own computation based on 2015/16 various published secondary data

According to the descriptive figures in Table 3, by the end of 2016, Kenya's average total spending per adult equivalent was KSh. 6,452. The expenditure per adult equivalent ranged between KSh. 3,460 and KSh.14,311 with a standard deviation of KSh.2,016. On average, the household expenditure per adult equivalent was below KSh. 25,000 per month is considered to be consistent with rapidly-industrialized countries (Republic of Kenya, 2017).

Table 3 presents descriptive statistics that indicate the average percentage distribution of households headed by males was roughly 66.3 per cent. This varied between 47.9 and 79.7 per cent with a standard deviation of 7.1. This implies that there are more households headed by males in Kenya than by females. Nationally, the households headed by males were more in rural Kenya at 72.2 per cent in 2016 compared to urban areas at 64 per cent in the same year (Republic of Kenya, 2018). This finding might indicate that households headed by men had a superior welfare status compared to households headed by women. This is conceivable considering Kenya's low ranking in the global gender gap index (2022), which places Kenya at position 57 out of 149. In 2022, Kenya's global gender gap index was 0.7 compared to 0.9 in Iceland and 0.8 in Rwanda, respectively (GGP, 2022). In particular, according to the Global Gender Gap Report (2022) labor force participation in Kenya stood at 75 per cent in favored of men compared to 70 per cent for women in 2022. The data on labor force participation indicates that, in comparison to households headed by men, households headed by women are more likely to experience financial difficulties. This might have a negative effect on female-headed households' welfare status

Over the period of the analysis, the average public expenditure on agriculture per capita was KSh 857, according to the statistics in Table 4.1. The minimum public expenditure on agriculture per capita in the period of analysis was KSh. 130.5 and the maximum KSh. 2,077. Therefore, over the study period, the range of public expenditure on agriculture per capita was KSh. 1,947, indicating the level at which county governments are increasing their resource allocations to the agricultural sector. This is consistent with various county government agricultural policies on offering extension services to the farmers, procurement of farm machinery, and acquisition of certified seeds and distribution of grade cows over the study period.

According to Table 3, the average county public spending on education per person was KSh. 1,493 with a standard deviation of 3,064, ranging from KSh. 276 at the minimum to KSh. 21,563 at the maximum. Consequently, a range of KSh. 21,287 in county public spending on education per capita over the study period emphasizes the necessity that county governments have at some point seen an increase in county public spending on education per capita due to the establishment of early childhood centers and the distribution of secondary school bursaries, among other activities. Table 3 shows that county spending on health per capita on average was KSh.3,233. The minimum county health expenditure per capita was KSh. 1,216 and a maximum of KSh.6,317. The spread of KSh. 5,101 county public health expenditure per capita could be attributed to relatively high recurrent expenditure and renovations of health facilities by the county governments. County public expenditure on infrastructure per capita had a minimum of KSh. 187.7 and a maximum of KSh. 6,713, with a mean of KSh. 1,876 and a standard deviation of KSh. 1,307. An average of KSh.1,876 infrastructural expenditure per capita could mean that during the study period some of the county governments must have increased their resource allocations to infrastructure development due to the expansion of rural access roads and renovations of the counties' headquarters.

Lastly, Table 3 indicates that the average county size, as determined by the county revenue allocation to the total government revenue allocated to counties, was 2.1 per cent. The minimum share of allocation throughout analysis was 0.8 per cent, while the maximum was 5 per cent with a standard deviation of 0.8 per cent. Therefore, the average share of county revenue allocation to total government revenue allocation over the study period was below the target of 15 per cent as provided in the Kenyan constitution of 2010.

IX. Empirical Results

To address the objective of the study, the OLS technique was used to estimate Equation 3.18. The model was estimated, and relevant diagnostic tests were conducted. Table 4 presents the estimated model findings together with the diagnostic tests.

Table no 4: Effect of Public Expenditure on Household Welfare in Kenya

Variable	Household Consumption Expenditure Per Adult Equivalent		
	FOOD	NON-FOOD	AGGREGATE
Public agricultural expenditure per capita	0.0937** (0.0374)	0.293*** (0.0830)	0.180*** (0.0544)
Public infrastructural expenditure per capita	0.0153 (0.0333)	0.0749 (0.0624)	0.0445 (0.0427)
Public education expenditure per capita	0.0705** (0.0294)	0.0470 (0.0426)	0.0662** (0.0289)
Public health expenditure per capita	0.00617 (0.0518)	0.156** (0.0919)	0.0602 (0.0548)
Household size	-0.199*** (0.0252)	-0.332*** (0.0409)	-0.255*** (0.0260)
Male-Headed Household	0.00198 (0.0238)	0.0115** (0.00538)	0.00560* (0.00310)
Constant	8.924*** (0.295)	8.281*** (0.689)	9.389*** (0.394)
Prob(F-statistic)	0.0000	0.0000	0.0000
R-Squared	0.746	0.736	0.775
Mean VIF	1.73	1.65	1.75
Ramsey RESET test (3,37)	0.5700	0.5520	0.5410
Observations	47	47	47

Notes: Robust standard errors in parentheses and asterisk *** denotes significance at 1 per cent $p < 0.01$;

**denotes significance at 5 per cent level $p < 0.05$ and * denotes significance at 10 per cent level $p < 0.1$

Source of data: Own computation based on study data

X. Discussion

The Ramsey RESET test was initially conducted to identify any specification errors. The null hypothesis, which states that the model is correctly specified, was tested. The results, shown in Table 4, revealed that the probability values exceeded 0.05 in all three household consumption groups. These values indicate that the study accepted the null hypothesis, confirming that the models were properly specified.

Second, multicollinearity within the explanatory variables was examined using mean variance factor. The computed mean variance inflation factors for the three estimated models were less than 10, as indicated by the variance inflation factor test findings shown in Table 4. According to Verbeek (2012), any VIF less than 10 means that multicollinearity falls within a tolerable level and, hence, is not a problem in the dataset.

Thirdly, to address the expected heteroskedasticity issue. Robust standard errors were used to estimate the model (Wooldridge, 2016). The dependent variable was household spending per adult equivalent, as well as other household consumption expenditures on food and non-food items, used as proxies to capture household welfare. The variables were transformed into logarithms to reduce the gaps between the extreme values among the household expenditure per adult equivalent (Maddala & Lahiri, 2010). The county public spending per capita on public education, public health, public infrastructure, and county public agriculture were the explanatory variables under investigation.

All these variables were also transformed into logarithms to reduce the gaps between the extreme values among the respective public expenditure per capita, as depicted in Table 4 (Maddala & Lahiri, 2010). To capture the features of the household, the study incorporated household size and the sex of the head of the family. The estimated results in Table 4 show that the model had a probability value for the F-statistic of 0.000. This indicates that the null hypothesis, according to which the combined coefficients of the explanatory variables equal zero, was not accepted. Implying that explanatory variables jointly explained changes in household welfare as captured by household expenditure per adult equivalent. The explanatory variables of the model account for 77.5 per cent of changes in household welfare, as indicated by the adjusted R-squared of 0.775. This indicates that variables not included in the model account for just 22.5 per cent of the changes. This goodness of fit was considered satisfactory for this investigation.

The results presented in Table 4 show that the difference in household consumption expenditure due to an increase in county public expenditure on agriculture per capita is high for non-food expenditures and low for food expenditures in the sampled households in Kenya. This finding supports the result that, even in low-income nations, spending on basic foods has lower income elasticity than other categories of household consumption expenditures (Colen *et al.*, 2018). This implies that the sampled households in Kenya seek ways to smooth consumption of basic food in the event of a county public expenditure increase on agriculture per capita, compared to non-food spending. This finding is consistent with theory and expectation. According to the theory

of household's utility function, public expenditure improves the household welfare of poor people in the society (Wickens, 2012). The result is in line with research conducted in Nigeria by Iorember and Jelilov (2018), who discovered that government spending on agriculture raises household consumption expenditures. The findings, however, are at odds with those of Mogues *et al.* (2006), who found that state spending on agriculture had little impact on Ethiopian household expenditure. The study findings could be explained based on the household consumption differences due to increased county public expenditure on agriculture, which is an indication that households in Kenya are likely to afford better housing, acquire modern cooking equipment, and be able to pay for both power and water bills as their basic food expenditures are catered for through county public expenditure on agriculture. This is because the study found that an increase in county public agricultural expenditure is high on non-food expenditure as compared to food expenditures.

For all three categories of household consumption expenditures, the predicted coefficients of the county public spending on infrastructure per capita were positive but not statistically significant. The findings suggest that county public infrastructure spending per capita in Kenya has not been high enough to influence household consumption expenditures, whether they be for food, non-food items, or aggregate spending. While this was not expected, given the role that county infrastructure investment plays in terms of market access and movement of people and goods, the finding can be attributed to low rates of budget absorption for county infrastructural projects in some of the selected counties in Kenya. These include Machakos, which had a budget absorption rate of 44.6 per cent in the 2015/2016 fiscal year (Republic of Kenya, 2016). Other counties with low budget absorption rates were Nakuru (41.4 %), Taita Taveta (41.1%), Embu (40.1%), and Makueni (31.7%). However, empirical studies by Garay *et al* (2014) in the USA, Mensah and Bourdon (2011) in Ghana, and Mogues *et al* (2006) in Ethiopia found that public expenditure on infrastructure per capita had a positive effect on aggregate household consumption expenditure. The finding, however, seems to give an indication that budget absorption rates for county infrastructural projects are important drivers in influencing household consumption expenditures in Kenya, rather than a mere resource allocation in the sector. Thus, more resource allocation in the county infrastructural projects by respective county governments without a corresponding full utilization of such resources is unlikely to impact on household welfare.

Table 4 shows that, for food and aggregate household consumption expenditures, respectively, the coefficient of county public spending on education per capita was positive and statistically significant at a five percent significance level. This suggests that household consumption in Kenya is expected to be higher on food expenditures than on aggregate expenditures, with no influence on non-food spending, when county public education expenditures rise. This finding aligns with research by Garay *et al.* (2014), who found a positive correlation between household well-being and public education spending in the United States. Mogues *et al.* (2006) reported similar results in Ethiopia, where they found that household spending per adult equivalent increased with public education spending. Therefore, these findings suggest that improved household consumption expenditure, especially on food in Kenya, requires more allocation of public resources to the county education sector.

The estimated results presented in Table 4 further show that county spending on health per person has an effect on non-food household consumption expenditure but not on food and aggregate expenditures. This indicates that household well-being, as determined by household non-food expenditure, is positively impacted by public health spending. This finding confirms the argument that health expenditure, especially by the sick, improves general welfare (Republic of Kenya, 2016). However, Gupta, Verhoeven, and Tiongson (2003) observed that household welfare in the developing countries could not improve by increasing health expenditure alone. The authors concluded that primary school enrollment was a strong predictor of health status among the impoverished, but they also claimed that economic growth was required to translate primary school enrollment into increased private support for healthcare. Consistent with Mogues *et al* (2006), a study conducted in Ethiopia found that public health expenditure and rural household welfare were positively related. One possible explanation for this finding is that the government needs to address issues related to primary school enrollment and sustainable economic growth rates over time for the positive impact of public spending on health to be realized on household welfare across the three categories of household consumption expenditures. These factors are considered to be important in influencing household welfare.

The estimated results, which are displayed in Table 4, show that the household size coefficient is negative and statistically different from zero at a one percent significance level for each of the three categories of household consumption expenditures. The negative coefficients imply that an additional member in a household in Kenya would reduce household expenditure substantially. The findings align with the findings of Mogues *et al.* (2006), who found that the size of a household hurt the welfare of rural Ethiopian households. This suggests that a greater household size is likely to result in resource constraints, which will lower welfare. On the other hand, Mensah and Bourdon (2011) discovered that household size improved household welfare in Ghana.

The negative relationship between household size and household expenditure can be attributed to a relatively high age dependency ratio in Kenya. Kenya's age dependence ratio for the country as a whole was 81.6 per cent in 2015–16, a little less than the 84 per cent recorded in 2005–06. In 2015–16, the ratio in rural areas was higher at 96.6 per cent than in urban areas at 59.7 per cent. (Republic of Kenya, 2006 & 2018). The counties of Wajir (139.8%), Mandera (137.2%), Samburu (125%), and Garissa (124.2%) have the highest age dependency ratios. That is, a greater burden to the working-age population, especially those between the ages of 15 and 64, is implied by a higher dependency ratio. The three categories of household consumption expenditures may have shown a decline in welfare status as a result of this.

The estimated results showed that at the 10 percent significance level, the household headed by a male had a positive and statistically significant effect on non-food and aggregate expenditures. The findings show that, when all other factors are held constant, a percentage point increase in the number of male-headed households in Kenya will result in a 0.01 per cent boost in nonfood and aggregate spending. The positive relationship between households headed by males and household consumption on non-food and aggregate expenditures in Kenya could be attributed to relatively higher levels of economic, social, and political empowerment by men compared to women. In Kenya, labor force participation by men stood at 68.9 per cent compared to 63 per cent for women in 2017 (GGP, 2018). Other areas with higher men participation include literacy rate at 83.8 per cent against 74 per cent for women, men in parliament at 78.2 per cent against 21.8 per cent for women, and ministerial positions at 77.3 per cent against 22.7 per cent for women by the year 2017 (GGP, 2018). These statistics attest to the fact that in Kenya, households headed by males are more likely to access better employment opportunities, hence, can experience better welfare status as compared to their female counterparts. The findings resonate with those of Mensah and Bourdon (2011), who found similar results in Ghana.

XI. Conclusion

In conclusion, the study results indicated that in Kenya, county public expenditure on agriculture has positive effects on all three categories of household consumption expenditures. Meanwhile, county education and health expenditures have a positive effect on food and non-food expenditures, respectively. However, it was found that the categories of household consumption expenditures were unaffected by county spending on infrastructure per capita. Ultimately, it was discovered that the well-being of a household was positively impacted by households headed by men and negatively impacted by household size. Based on the foregoing, the study concludes that public expenditure indeed influences household welfare in Kenya, and the effect varies depending on the public expenditure component

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