



(RESEARCH ARTICLE)



## Do household characteristics affect per capita household income? An empirical analysis of Zambia's living condition monitoring survey data

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### Abstract

Demographic shifts have brought many socio-economic challenges and opportunities. The changes in household size and composition have in many cases been found to alter the path of socio-economic progress. In this paper, we analyse how changes in household characteristics affect per capita household income using data from the 2022 Living Condition Monitoring Survey (LCMS). We estimate the effect size of each of the covariates and estimate the age primer. Using OLS regression and omega squared effect size measurement, we found that household size had significant negative effect of 9 percent. We further found that the size of the working-age members had an increasing effect on per capita income, though the measured effect size was small at 0.3 percent. On education, we found that education level had an increasing effect on per capita income with a measured effect size of about 14 percent. The age of the household head was also found to have an increasing effect on per capita income of 0.2 percent, though this effect was small. On gender, region and access to credit, we found male headed households to have about 22 percent higher per capita household income compared to female headed households and that rural household had 25 percent higher capita income than urban households. Lastly, we found that access to credit through village banking had an increasing effect on per capita income though the effect size was found to be small at 0.1 percent. We estimated the age-primer and found that per capita household income keeps increasing with age till at the age of 44 years, beyond which it starts falling.

We concluded that at household level, income based socio-economic development can be enhanced through increased number of working-age members, investing in education, having access to credit and reducing on the household size especially the proportion of members falling outside the working-age. We recommend developing targeted policy interventions to abate structural inequalities inherent in gender roles to equilibrate earnings and job opportunities between males and females, and investment in programmes and trainings for the population aged 15-44 years.

**Keywords:** Per capita income; Demographic shifts; Socio-economic development

### 1. Introduction

Zambia like many countries, is facing demographic shifts that are affecting the socio-economic development. Changes in household characteristics such as household composition, age of the household head, gender distribution, education levels of household head and household members, and access to microfinancing, can all affect the household's development trajectory. For instance, household composition affecting the proportion of the working-age of the household members relative to the household size can affect investment in education which in turn affects the earning potential of the household member. As Becker & Lewis (1973) asserts, if parents have more children, investing a certain amount in per-child quality, for example their education, is more expensive, than if they have fewer children. For the growing household size, Argys & Averett (2015) argues that these households face possible trade-off between quantity-quality, suggesting that parents maximize utility by allocating time across a number of uses with expenditures on a

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variety of goods. This utility includes consumption choices which include the demand for 'child services' influenced by the number of children and their quality.

The level of education is one key instrument to the attainment of socio-economic development. It is for this reason that households seek to invest in education to improve their welfare. Ghazarian (2015), recognises education as human capital which communicates in the labour market, that people have various levels of innate ability but no easy way to communicate these abilities to potential employers, thereby education being the only signal to the employer about the individual's ability. Thus, level of education transmits a signal of the individual's worthiness in the labour market. Households defined by high levels of education attainment are likely to possess higher incomes compared to households characterised by lower education levels.

Household size also plays an important role in shaping key socio-economic outcomes including per capita income and income inequality as observed by Peichl, et al., (2010). It is for this reason that economic debate on whether size affects income distribution and other socio-economic outcomes lingers on. For instance, scholars such as Peichl, et al., (2010) have argued that a reduction in household size caused by a decline in the number of births, means that couples tend to stay childless. This in itself creates a smaller household size which leaves them with higher equivalence-weighted incomes than in a situation with a higher birth rate which result in more children though this alleviates double-earnership (Peichl, et al., 2010). They further point out that the increase in the number of single households results in a growing number of individuals with lower equivalence-weighted incomes, since they cannot share fixed costs of living expenses. Therefore, the shrinking average household size has contradictory effects on income distribution (Peichl, et al., 2010). This observation may have implication for both gender of the household head and age. In a single headed household and with high income disparities, female headed households are more likely to face reduced weighted income compared to male headed. This is also true for single aged households.

To alleviate the income constraints emanating from changing household characteristics, households look to both formal and informal credit. The role of access to credit in household welfare cannot be overemphasised. Giang, et al., (2015) urges that access to credit is an important condition to determining the ability of the household to increase income for poorest household. They observed that access to credit has positive impact on increasing income of the household and has contributed to improving their living standards.

As the country continues to face changing household characteristics driven by demographic shifts, there is growing uncertainty on the extent to which changing household characteristics affect socio-economic development. This uncertainty has been especially advanced due to mixed findings on the subject. This is even worse for Zambia where there are no current studies that have strived to quantify the effect of changing household characteristics on socio-economic development, specifically, per capita household income. It is for this reason that we model the effect of changing household characteristics on per capita household income. Specifically, we sought to;

- Ascertain the effect of household size on per capita household income;
- Estimate the effect of the working-age household size on per capita household income;
- Estimate the effect of education attainment on per capita household income;
- Determine the effect of age distribution of the household head on per capita household income;
- Assess the effect of gender of household head on per capita household income; and
- Estimate the effect of access to credit on household per capita income.

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## 2. Review of Related Studies

Scholars have dissected on how changes in household characteristics affect the delivery of socio-economic development. In this context, socio-economic development according to Chojnicki (2010), is the changes of an economic and social nature taking place in the social sphere. Midgley, (2013, p. 13) sees socio-economic development as a process of planned social change designed to promote the well-being of the entire population within the context of a dynamic multifaceted development process. There are a number of indicators that are used in monitoring and observing socio-economic development. Key among them is the per capita income. Higher per capita income translates into higher socio-economic status. This relationship is premised on the fact that countries with higher per capita income are associated with development of key social and economic sectors. At micro level, higher capita income enables investment in quality education, improved family nutrition, enables access to quality health services, and is the enabler of sound social choices. As observed by Duncan, et al., (2017) and Cooper & Stewart (2021), parents, and hence households with higher incomes are likely to have higher levels of human capital due to their emphasis on education. These higher levels of human capital position them to help with school work and to negotiate public services in the interest of their children.

The higher income enables parents to buy goods for the family that include; good quality housing and a healthy diet; books and other learning materials; and other social investments for them to flourish (Cooper & Stewart, 2021).

There are a number of factors that affect household income level. These may include the family size, education levels, age, employment opportunities and financial inclusion, among others. The education-effect on household income stems from Spence's signaling effect. According to Ehrmantraut, et al., (2020), education which signals worker productivity, is used as a signal to earn higher wages as firms screen workers for their education to attract high-productivity-type workers. Kaymak (2025) noted that the return to education of the wage captures both the value of the acquired skills and the value of the perceived ability by potential employers. In evaluating these postulations, Mou (2023) analysed the relationship between education level and income in China. He found that income of the people with junior high school education or above to be 0.61 percent higher than those without a junior high school education. Further, his study found that income of people with a high school education or above to be about 0.74 percent higher than those without a high school education. The income of people with a college education or above was also found to be about 0.96 higher than those without a college education, and that income of those with graduate education or above was 1.38 percent higher than that of those without graduate education.

The result in Li (2023) found a significant positive correlation between family education level and family income at the 1.0 percent level. She attributed this positive correlation to the fact that higher family education levels are characteristically associated with better employment opportunities and career development prospects (Li, 2023). Further, Scherer & King (2025) found that between 2004 and 2024, earnings of those with a high school degree but no college rose by 3.2 percent, while earnings of those with a bachelor's degree or more went up 6.3 percent, signifying the role of education attainment.

On household size, Lai, et al., (2023) observed that household size is related to socioeconomic development and family factors that include income and housing issues. They have attributed the increase in household income to rapid economic development. Lai, et al., (2023) further argued that it is this increase in income which has led to the separation of families and a decrease in family size. In their argument, family size was associated with higher income which is as a result of economic development. Kuznets (1979) argued beyond the household size that while evidence point to the substantial increase in income with increase in household size, it is possible for some socio-economic groups within a country, which are characterized by large households, to show an average income per household distinctly lower than that for other groups with a smaller average household based on the type of economic activity (Kuznets, 1979). He argued that average income per household will differ beyond size, pointing to the example of households in the United States in 1975 with employed heads who are blue-collar workers compared with those whose employed heads were white collar workers; or, in Taiwan in 1975, farmer households compared with non-farmer households (Kuznets, 1979). Empirically, he found for each of the six countries (United States, Germany, Israel, Thailand, Philippines and Taiwan), a decline in per person income as household size increased. Despite these findings, Skog (2016) argues that the consequences of having siblings may depend on family resources, and that the concept of resources and the presumed dilution of resources are further complicated by the fact that additional individuals in the household may also bring resources to the family for distribution between its members (Skog, 2016). This would entail increased household income per increase in the household size.

In line with the life cycle hypothesis, age of the economic agent is not only important in defining levels of productivity but also in shaping household incomes. Individuals accumulate wealth whilst they are young such that at a certain age in their life when they are no longer available to engage in working, they can survive on the savings they made when young. Empirical evidence has shown that age of the household is a significant factor in explaining household income. For instance, Son, et al., (2024) analysed factors affecting income of rural households and found that age of the household head had a positive impact on household income. However, the magnitude of the effect was found to be moderated and varies by economic group (Son, et al., 2024). These results are consistent with those by Han & Chung (2021) who with fixed effect analysis, found the effect of aging to be negative and significant in both agricultural and non-agricultural household samples. Han & Chung (2021) reported that the marginal effects of aging showed significant lowering of household income in both sectors, though the negative effect of aging was more severe in the agricultural households.

Income disparities has remained one of the key concerns of the socio-economic policy. At household level, female headed households are usually characterised by lower household incomes and high incidences of income poverty compared to their male counterparts. This could mainly be attributed to what Bertrand, et al., (2013, p. 3) called slow-moving identity norms. In some countries like Zambia, earnings differentials are not very prominent with only labour participation rate being the main determinant of differences in household incomes. However, studies that include Dunga (2017) and Gebeyehu (2020), have consistently found that female headed households had lower household incomes

compared to male headed households. In addition, Batista & Costa (2022) found female headed household to have high poverty levels.

Access to credit allows households to borrow, and invest the borrowed funds to increase future income. It also allows them to cushion against income shocks in times of calamities like crop failure or health emergencies, thereby protecting their welfare. According to Mugabi, (2010), access to credit improves the borrowers' well-being, boost income levels, and increases employment of household members. Hossain, et al., (2021) found that access to any credit source increased the income from crops and businesses, as borrowers engaged in agriculture and self-employment activities. These results were consistent with Chen, et al., (2021) who found that formal credit had a significantly positive impact on rural households' income, though the impact was only in the year in which the household acquired the credit.

The attainment of socio-economic development remains one of the core issues in public policy debate. The challenges that come with the dynamics in household characteristics cannot be overemphasised. While the reduction in household sizes that many homes face can be held as positive in alleviating household poverty, it can have serious ramifications in future as it may signal falling fertility rates, which may in turn breed ageing. Lower per capita income experienced by most households in developing countries is another serious public policy concern that requires attention if the countries are to develop. Based on these and many others socio-economic matters, we strive to measure the effect size of household variables in relation to socio-economic development as measured by per capita household income. Firstly, we apply the Ordinary Least Square (OLS) regression to establish the relationship between household size, number of the working-age members, age, education level, and gender of the household head and access to credit, and per capita household income. We then measure the effect size of each variable on per capita household income, relying on the principles set out by Selya, et al., (2012) who posit that measuring the effect size is important in understanding whether a statistically significant result is also meaningful in the real-world. Lastly, we develop a model based on the estimated effect size.

### 3. Data and Methods

#### 3.1. Data

To effectively analyse the effect of household characteristics on per capita household income, the 2022 Living Condition Monitoring Survey (LCMS) data obtained from the Zambia Statistics Agency, was employed. The survey drew respondents from the all 10 provinces of Zambia with 8,520 households. From these households, 5,440 were included for the purposes of this analysis while 3,080 were excluded. The exclusion of some representative households was based on incompleteness of data and the household monthly income not exceeding K200. The income threshold was established based on the Social Cash Transfer (SCT) monthly payment for households considered in extreme poverty.

#### 3.2. Model

The OLS structural model is given as;

$$LHI = \beta_0 + \beta_1 HHS + \beta_2 WPS + \beta_3 EDU + \beta_4 AGE + \beta_5 SAG + \beta_6 GEN + \beta_7 REG + \beta_8 AVB + \mu \dots \dots \dots (1)$$

Where:

- LHI is the log of monthly average household income (per capita income);*
- HHS is the household size;*
- WPS is the number of household members above 15 years;*
- EDU is the education level of the household head;*
- AGE and SAG are the age and squared age of the household head; and*
- GEN, REG and AVB are dummy variables, gender of the household head (which is 0 if female and 1 if male), region (which is 0 if rural, and 1 if urban), and access to village banking (which is yes if the household was a participant in village banking, and "no" if did not).  $\beta_s$  are the slope coefficients including the intercept  $\beta_0$ .*

In estimating the age-primer, we obtain the first partial derivative of structural model with respect to change in age of the household head given that;  $SAG = AGE^2$

Therefore, age-primer was estimated as;

$$AGE_{\text{primer}} = -\frac{\beta_4}{2\beta_5} \dots \dots \dots (2)$$

Equation (2) computes the age at which per capita household is maximised, hence referred to as age-primer.

On the effect size, we adopt the omega squared ( $\omega^2$ ) in line with Olejnik & Algina (2003). We obtain the estimated effect size of each of the covariates as;

$$\hat{\omega}^2 = \frac{\hat{\sigma}^2_{\text{effect}}}{\delta * \hat{\sigma}^2_{\text{effect}} + \sum_{\text{measure}} \hat{\sigma}^2_{\text{Measure}} + \hat{\sigma}^2} \dots \dots \dots (3)$$

Where;

$\hat{\sigma}^2_{\text{Measure}}$  is variance component for a source of variance that involves a measured factor, and  $\hat{\sigma}^2$  is the pooled variance. As observed by Olejnik & Algina (2003), the use of Omega squared is based on its use of unbiased estimators of the variance components associated with the sources of variation in the design. Omega squared is also preferred as it can be used with between subjects, repeated measures, and mixed designs, when all factors except subjects are fixed (Olejnik & Algina, 2003).

## 4. Results

### 4.1. Summary Statistics

We analysed the distribution of household monthly income and the respective monthly per capita household income. The reported income was aggregated across the various income sources per household. The results obtained are summarised in **Table 1**.

**Table 1** Summary Statistic for Monthly Household Income

Variable	Observations	Mean (K)	Std. Dev(K)	Min(K)	Max(K)
Monthly HHI	5,440	4,390	9,355	200	346,600
Monthly Per Capita	5,440	1,106	2,652	16	64,000

We found that the mean household income for the 5,440 households was K4,390.00 with the least household earning K200.00 and highest earning K346,000.00 per month. We established a variability of K9,355.00 around the mean household income. Given this spread, we found high income disparity within this sample. It should be noted that the established cut-off point of the sample at the monthly income of K200.00 was to equate the monthly income paid through the SCT programme in 2022 such that the minimum earned is equivalent to the SCT payment. Further, we considered the variability of the monthly per capita income (monthly household income divided by the household size). With mean of K1,106.00 and the standard deviation of K2,652.00, we found disparity in the distribution of income across the sample. The disparity is much visible looking at the minimum per capita income of K16.00 and the maximum per capita income of K64,000.00. However, the variability in the monthly per capita income is significantly lower than the variability in the monthly household income. This may point to higher household income being associated with bigger household size.

### 4.2. Regression Results

The estimated results of the OLS model are shown in Figure 1.

Source	SS	df	MS	Number of obs	=	5,440
Model	2909.87416	8	363.73427	F(8, 5431)	=	280.77
Residual	7035.76526	5,431	1.29548246	Prob > F	=	0.0000
				R-squared	=	0.2926
				Adj R-squared	=	0.2915
Total	9945.63942	5,439	1.82857868	Root MSE	=	1.1382

  

LHI	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
HHS	-.2219271	.0098931	-22.43	0.000	-.2413215	-.2025327
WPS	.067308	.0159492	4.22	0.000	.0360413	.0985747
EDU	.1286788	.0044167	29.13	0.000	.1200203	.1373373
AGE	.0225447	.0065271	3.45	0.001	.0097489	.0353405
SAG	-.0002575	.000065	-3.96	0.000	-.0003849	-.00013
GEN						
Male	.2008806	.0366479	5.48	0.000	.129036	.2727252
REG						
Urban	-.2178136	.0335761	-6.49	0.000	-.2836363	-.151991
AVB						
YES	.2831612	.1219458	2.32	0.020	.0440985	.5222239
_cons	5.229847	.1515391	34.51	0.000	4.932769	5.526924

**Figure 1** Estimated Regression Model

The results of the model are presented as in equation 4 as follows;

$$LHI = 5.22 - 0.22HHS + 0.06WPS + 0.13EDU + 0.02AGE - 0.00SAG + 0.20GEN - 0.22REG + 0.28AVB.....(4)$$

**4.3. Effect Sizes**

We estimated the effect size as presented in Figure 2.

Source	Omega-Squared	df	[95% Conf. Interval]	
Model	.2915358	8	.2716256	.3092923
HHS	.0846311	1	.0711509	.0988598
WPS	.003085	1	.0007539	.0068012
EDU	.1350076	1	.1189033	.1515303
AGE	.0020081	1	.0002259	.0051847
SAG	.0026973	1	.0005514	.0062315
GEN	.0053186	1	.0020897	.0099135
REG	.0075064	1	.003568	.012792
AVB	.0008079	1	0	.0031806

**Figure 2** Effect Size Estimation

Based on this regression model, household size was found to have negative effect on per capita household income with an increase in household size by one member expected to reduce household per capita income by 20 percent. These results are against the priori expectation that household size has a positive effect on per capita household income. We find that increasing the number of household members would lead to a reduction in the per capita household income.

Our findings are consistent with the findings by Blaabaek et al., (2020) that household size had significant reducing effect on household income. These findings are also consistent with the resource dilution theory propounded by Downey (2001) which postulates that parental resources are finite, thus, as the number of children in the family increases, the resources accrued by any one child tends to decline. Further, the notable reduction in the per capita income in line with the resource dilution theory is that siblings tend to compete with parents in terms of other resources like parents' time, energy, and financial resources. This is especially true in the case where additional household members enter the household before reaching the working age, thereby taking away parents' time to invest in other economic activities (especially for female headed households).

On the measured size of the effect, we found that the effect size of the household size was approximately equal to 9.0 percent. In line with Elsayir (2024), while the effect of the household size on per capita household income was significant, the computed size was found to have a moderate or medium effect since it is in the range of 6 to 14 percent. The results were however, found to contradict the findings by Lupapa & Silwimba (2025), who found no significant effect of household size on household income. However, their results looked at total household income as opposed to per capita household income which was our focus.

On the effect of the working-age population, we found that increasing the number of working-age household members by one, has an increasing effect on per capita household income by approximately 6.0 percent. These results augment the demographic dividend hypothesis in which the growth in the number of the working-age household members is expected to contribute to increased household income, and therefore per capita income. This is done through what Bloom, et al., (2003) called the mechanical effect of the demographic dividend in which case, this proportion is more likely to be working, thus lowering the ratio of dependents to non-dependents. When this size participates in economic activities, they drive up the household income, thereby increasing the per capita household income. Through these findings we provide further evidence that demographic shifts that lead to increasing the size of working-age relative to the aged, can stimulate economic activities and increase per capita income. These findings are consistent with the priori expectation concerning the relationship between the working-age population and per capita income. While the findings were significant, we found the computed effect size of 0.3 percent to be small as it was below 6.0 percent. This however does not negate the significance of the working-age in stirring national output.

On the effect of education attainment of the household head on per capita income, we found that when the education level of the household head increases by one level (where levels are primary, secondary, certificate, diploma, degree, masters and doctoral), per capita household income tends to increase by 14 percent. These findings are consistent with those by Alali (2012) and Qi, et al., (2022), who found education levels to positive influence economic output and incomes. The results also support the theoretical standing of the Human Capital Theory and the Signalling Hypothesis that education enhances an individual's cognitive and technical skills. The increased skills result in higher labour productivity, which is rewarded through higher wages. This is also supported by an estimated medium effect size of 13.5 percent.

We find on the significant effect of age of the household head on per capita household income, that age of the household head does affect per capita household income with additional year of the household head, resulting in an increase in per capita household income by 2.0 percent. Additionally, the squared age of the household head was found to be significant though the slope coefficient was very small. This means that per capita household income tends to rise with age, reaches a certain age and then starts to decline. These findings are consistent with the Life Cycle Hypothesis which expects an inverted-U life-cycle income profile that at younger age, income and savings are low. This however rises with age before declining.

On the effect of gender of the household head on per capita household income, we found that male headed household had about 22 percent higher per capita income compared to female headed households. These results confirm the income disparities reported in the 2023 Labour Force Survey (LFS) which found females' average monthly earnings to be about K5,100, compared to K5,510 earned by males (Zamstats, 2024). The findings are also consistent with Dunga (2017) who found female headed households to have lower household income than male headed households.

Thus, our findings reflect the ever-existing gender disparities in labour force participation and asset ownership. For instance, Zamstats (2024) reported that female labour force participation rate was 31 percent, compared to 47.3

percent for males. While in formal workplaces there is equal pay for the same role, the cause of income disparity can be attributed to low labour force participation rate as fewer females, compared to males, make themselves available for work. While the effect size was significant, we found it to be small at 0.5 percent.

The findings on region indicate that on average, households in urban areas have per capita household income that is 25 percent lower than the per capita household income in rural areas. While these results are significant with small effect size of 0.8 percent, they contradict our priori expectation that urban region have higher per capita income compared to rural region. This expectation is premised on a number of factors that include; earning differentials between the regions, access to job opportunities and access to markets, among others. Further, our findings were inconsistent with Zamstats (2024) that reported labour force participation rate of 52 percent for urban areas and 26.9 percent for rural areas. The report further indicated that the average monthly earnings for urban areas was K5,680 compared to the average monthly earnings of K4,540 for rural areas. The observed disparity in per capita household income across these regions could mean that the urban households were relatively bigger compared to rural households. This was confirmed by the computed average household sizes which were 7.6 members per rural household and 8.4 members per urban household. Further, the disparity could be as a result of urban households potentially under-reporting earnings due to higher exposure to tax and local authorities. Generally, these findings have established the rural-urban income paradox.

On access to village banking, our findings indicate that households that accessed village banking had higher per capita income compared to those that did not access village banking. Specifically, we found that access to village banking increased per capita household income significantly by 32 percent. However, the computed effect size of 0.1 percent was found to be very small. This means that while access to village banking would increase per capita household income, the magnitude of the effect is very small as it is less than 6.0 percent. The effect of access to village banking on per capita income is through its effect on household income. Village banking is now being considered as source of credit for most households. This offers households flexibility in terms of access and repayment while also ensuring that the participating households share into the profit accruing to the group. Thus, whether through borrowing or lending to the group, the participating households get to increase their household incomes.

Our findings are consistent with Ellis, et al., (2010) postulation and the findings by Mbiakop & Oyekale (2017) who on South Africa, found that membership in village banking increased per capita expenditure and per capita income. In Zambia, our findings are consistent with the works of Mushikiti, (2025) who found that access to village banking stimulated savings and lending practices, and supported investments in income-generating activities. These findings point to improved socio-economic outcome that include increased per capita income.

On the overall effect size and significance of the model, we found that jointly, the effect size was large at 29.5 percent. Further, we found that about 29 percent variations in per capita household income were explained by variations in household size, working-age population, education attainment of the household head, age, including gender of the household head, access to village banking and dwelling region of the household. As the p value of "F" statistics was greater than 5.0 percent, the model as indicated by the RESET, and heteroscedasticity, was found to be significant, of good fit and can be taken with economic interpretation.

#### 4.4. Age-primer

Based on equation 2, we estimated the age-primer as follows;

$$AGE_{\text{primer}} = -\frac{\beta_4}{2\beta_5} = -\frac{0.0225447}{2(-0.0002575)} = 43.77$$

***AGE<sub>primer</sub> = 44 years***

From the sampled households, we found that the contribution to per capita income of an additional year of the household head tends to increase until at the age of 44 years. Beyond this age, the contribution to the per capita household income for an additional year of the household head tend to decline. Although this age was slightly lower than the Bloom, et al., (2003) projected age-primer range of 45-50 years, it was within the range of 40-49 years proposed by Feyer (2008). Thus, age of the household head up to 44 years remains critical age for Zambia's socioeconomic progress.

## 5. Conclusion

Based on our findings on per capita income at micro level, we conclude that in Zambia households can improve their income by increasing the number of working-age members, investing in education, accessing credit and reducing on the household size especially the proportion of members falling outside the working-age, that is, the young or the aged. We therefore, recommend the need to develop targeted policy interventions to abate structural inequalities inherent in gender roles to equilibrate earnings and job opportunities between males and females, and investment in programmes and trainings for the population aged 15-44 years.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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