Examining the Impact of Female-Headed Households on Learning Achievements in Tanzanian Secondary Schools

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Abstract
Families led by women frequently encounter various financial and social challenges. As a result, children in these households often face significant barriers to accessing quality education, particularly at the secondary school level. This study investigates the impact of Female-Headed Households (FHHs) on learning achievements, drawing on gendered household dynamics and child learning theory. The study employed Ordinary Least Squares regression analysis using school GPAs of 1,049 randomly selected schools of mainland Tanzania. The findings indicate that the growing number of female-headed households (FHHs) generally promotes better learning outcomes in secondary schools, especially in rural areas where community involvement and work-life balance are more supportive. The results indicate that educated FHHs play an important role in maintaining academic success in children's education. However, this positive impact diminishes as FHH prevalence increases. Furthermore, the findings suggest that urban FHHs encounter challenges in improving their children's educational progress, emphasising the impact of financial pressures and restricted time for educational engagement. Thus, the findings underscore the need for broader support systems to sustain student achievement across various settings. The study recommends for support networks that empower women economically and socially, implement policies for targeted interventions including community education as well as promoting community engagement and school-parent relationships for strengthening educational outcomes.

Keywords: *Female-headed households, learning achievements, secondary schools, Tanzania*

INTRODUCTION

In recent decades, there has been an increasing emphasis on understanding the evolving dynamics of family structures and their

impact on various social and economic outcomes (Chakravorty & Goli, 2021; Zellweger et al., 2018). Among the most significant areas of research is the rise of female-headed households (FHHs), a family arrangement that has gained prominence globally due to various factors, including divorce, separation, widowhood, and single motherhood by choice (Saad et al., 2022). This shift in family structure has important implications for society as a whole. FHHs often encounter a unique set of challenges that can hinder their functioning and stability. Financial instability is a predominant issue; many women who head households struggle to secure consistent income and often work in lower-paying jobs, which can lead to economic vulnerability. This financial strain can limit their ability to meet basic needs such as housing, healthcare, and education, including access to secondary schools, ultimately impacting the overall well-being of the household (Almeida, Ghattas & Barros, 2020).

In addition to financial challenges, social marginalisation frequently affects FHHs. These families may face stigma or discrimination, which can further isolate them from community resources and support networks. The lack of social support can exacerbate feelings of stress and anxiety, making it difficult for FHHs to provide a nurturing environment for their children (Goodall & Cook, 2020). Moreover, limited access to resources is another critical challenge. Female heads of households often find themselves without the same opportunities for education and professional development that might be available to their male counterparts. This lack of access not only affects their immediate economic situation but also has long-term repercussions for their children's developmental prospects. Research has shown that children in these families are more likely to experience educational setbacks, as the financial and social barriers can impede their access to quality education, including secondary schools and extracurricular activities (Almeida et al., 2020; Solehudin et al., 2023).

Children's educational achievements from FHHs have emerged as a critical area of concern. Several studies suggest that children in these households may encounter greater barriers to academic success, including limited access to educational resources, lower economic support, and social challenges that influence learning environments (Sharma, 2023). The financial burdens on FHHs often result in fewer resources available for education, further widening gaps in learning outcomes (Heyes et al., 2023; Sharma, 2023). Additionally, the absence of a second parent may

place further responsibilities on the female head, making it difficult to provide both emotional and academic support to children, especially in navigating the demands of secondary schools (Chavda & Nisarga, 2023; Bannawi et al., 2023).

The Tanzanian context displays a multitude of aspects concerning social attributes regarding women and female-headed households in particular. The 2023 gender profile survey of Tanzania documents several attributes regarding the relationship between gender and poverty, the economy, and education. The survey indicates that female-headed households are less likely to own a variety of assets, are bigger and poorer than male-headed counterparts, and fewer women attend or graduate from different levels of education (Ministry of Community Development, Gender, Women, and Special Groups [MoCDGWSG], 2023). This may be attributed to the fact that female-headed households rely on lower-income jobs while also managing childcare and household responsibilities. Similarly, the status may be a result of educational barriers for girls and women due to the persistence of social and cultural norms (see Maro & Omer, 2024). Some of the notable challenges experienced are early marriages, as statistics indicate that by 2021, Tanzania had 19 percent of women aged 15 years and older married before 18 years (National Bureau of Statistics [NBS], 2023. This practice escalates the prevalence of FHHs in Tanzania due to increased chances of divorce. Thus, the socio-economic statuses of the female-headed households are a result of the intergenerational effects experienced at different stages of their social development. Despite the challenges, female parents struggle for improved livelihoods for their families and children in particular. Al-Samarrai and Peasgood (1997) argue that mothers have relatively stronger preferences for their daughters' education. This is evidence that, despite the challenges, FHHs have the potential to support their children's learning.

The relationship between FHHs and learning achievements is complex and influenced by several variables, such as income levels, regional disparities in education systems, and household-specific factors like secondary school size and class size (Chudgar, 2011). Research has shown that socio-economic variables, including GDP, often play a significant role in determining access to quality education, including secondary school (UNESCO, 2020). Regional educational attainment levels, school infrastructure, and class sizes are also crucial determinants of educational outcomes (Olanrewaju et al., 2014). However, the extent to

which these variables affect children in FHHs remains underexplored, particularly in developing regions, such as Tanzania.

This study, therefore, seeks to contribute to this growing body of research by examining the specific impact of FHHs on educational achievements, focusing on key variables such as GDP, regional educational attainment, secondary school size, and class size. By doing so, it aims to provide a deeper understanding of the broader implications of family structure on children's academic performance and identify potential areas for intervention to support FHHs in improving their children's educational achievements.

Problem Statement and Significance

Families led by women frequently encounter a variety of challenges, both financial and social. These challenges include managing household expenses, raising children, and navigating complex social dynamics, such as provoking male behaviour (Habib, 2017). As noted by Almeida et al. (2020), FHHs often face financial constraints, struggling to meet basic household needs, such as electricity, water, and other essentials, leaving little room for investment in developmental activities. Social challenges, particularly related to child-rearing, further intensify these financial burdens. Moreover, children in these households often face significant barriers to accessing quality education, especially at the secondary school level (Solehudin et al., 2023). In many cases, women in these households seek external support from government programs, NGOs, or community networks to secure educational opportunities for their children in secondary schools. These compounded challenges suggest that the educational development of children from FHHs may be at risk. Therefore, this research aims to explore the impact of FHHs on educational achievement by focusing on four key variables: GDP, regional educational attainment, secondary school size, and class size. Specifically, the study will assess the barriers to accessing quality education in secondary schools, experienced by children in FHHs and how these obstacles affect their learning achievements. Additionally, it will evaluate the broader impact of these households on educational achievement by examining the influence of GDP, regional educational attainment, secondary school size, and class size. Understanding these factors will provide valuable insights into the broader implications of FHHs on learning achievements.

This research is significant for its potential to highlight the specific challenges FHHs face and their impact on children's educational achievements in secondary schools (Solehudin et al., 2023). These families often struggle with financial and social burdens that can limit their ability to meet basic needs and support their children's education (Almeida et al., 2020). As children from these households frequently encounter barriers to quality education, including in secondary schools, it is vital to understand the underlying causes of these challenges to inform effective policy and support solutions. By examining variables such as GDP, regional educational attainment, secondary school size, and class size, this study seeks to explore the broader effects of FHHs on educational achievements. The findings will be valuable to both researchers and policymakers, as well as organisations working to improve access to secondary schools for children in such households. Ultimately, this research will provide insights into how targeted interventions can reduce the disadvantages these families face and foster greater educational equity.

LITERATURE SURVEY

Female-Headed Households and Educational Challenges

FHHs face a range of unique socio-economic challenges that impact their children's educational achievements, particularly in secondary schools. Studies show that these households are disproportionately vulnerable to poverty, with limited access to resources critical for children's development (Habib, 2017; Sharma, 2023). Women in FHHs often struggle to balance work, household responsibilities, and child-rearing without the support of a partner, limiting their ability to provide sufficient educational support for their children, especially when it comes to secondary school education (Almeida et al., 2020; Bammeke, 2010). The absence of a second income earner exacerbates these challenges, leaving many families dependent on government welfare or external aid programs for survival (Tamayo & Popova, 2020). Consequently, children in these households may experience higher rates of absenteeism, lower participation in extracurricular activities, and reduced access to academic resources in secondary schools, resulting in poorer educational outcomes compared to children from two-parent households (Solehudin et al., 2023). This notion is supported by Nonoyama-Tarumi's (2017) investigation into the educational achievement of children from single-mother and single-father families in Japan. These challenges emphasise the need to explore various factors, such as GDP, regional educational

attainment, secondary school size, and class size, that influence the educational outcomes of children in FHHs.

Gross Domestic Product (GDP) and Learning achievements

A country's GDP is a critical macroeconomic factor influencing the quality of education available to children, including access to secondary schools. Studies have shown a positive correlation between higher national GDP and improved educational achievements, as wealthier countries tend to invest more in educational infrastructure, teacher training, and technology in schools, including secondary education (UNESCO, 2021; Sezgin et al., 2023; Goczek et al., 2021). However, Sharma (2023), in an assessment focusing on poverty and gender determinants in female- and male-headed households with children in poverty in the USA, concluded that for children in FHHs, economic disadvantages often persist despite national economic growth. Almeida et al. (2020) also note that even in countries experiencing robust GDP growth, FHHs are frequently marginalised and remain financially insecure. This economic disparity suggests that the benefits of national growth may not extend to vulnerable families (Andersson et al., 2021). As a result, children from these households may face difficulties in accessing quality education, particularly in secondary schools, irrespective of broader economic indicators (Bustamante et al., 2021). Therefore, analysing the impact of GDP on learning achievements must consider how socio-economic inequalities within a country exacerbate educational disadvantages for FHHs.

Regional Educational Attainment

Regional differences in educational attainment significantly influence the learning achievements of children from FHHs in secondary schools (Sharma, 2023; Oluwayemisi et al., 2022). In many countries, access to quality education is unevenly distributed across regions, often reflecting local economic conditions. For example, rural or economically underdeveloped areas may lack adequate secondary school infrastructure, qualified teachers, and educational resources (Smith & Watson, 2019). Studies by Solehudin et al. (2023) and Wendt et al. (2021) suggest that these regional disparities disproportionately impact children in FHHs. In areas with lower educational attainment, children from FHHs face compounded disadvantages, as these households often lack the financial and social capital needed to compensate for inadequate public education, especially in secondary schools (Filmer, 2005; Jones et al., 2008). As a

result, children in these regions tend to have lower test scores, higher dropout rates, and reduced academic engagement (Liu & White, 2017; Truța et al., 2018). Therefore, understanding the regional context is crucial for evaluating the educational achievements of children from FHHs.

Secondary School Size, Class Size and Educational Achievement

Secondary school size has been identified as a significant factor influencing learning achievements. Smaller secondary schools often provide more personalised attention and foster closer relationships between students and teachers, creating a positive learning environment (Lee & Ready, 2009). In contrast, larger secondary schools may struggle to offer individualised support, leading to lower academic performance, particularly among students from disadvantaged backgrounds (Gershenson & Langbein, 2015). This notion is supported by Jepsen and Rivkin (2009), who estimated the effect of transitory changes in school size on academic achievement in North Carolina using student-level longitudinal administrative data. For children in FHHs, smaller secondary school environments may provide the additional attention and social support that is often lacking at home due to the overburdened nature of their single parent (Almeida et al., 2020). These children may benefit from smaller secondary schools where their unique needs can be identified and addressed (Iversen & Bonesrønning, 2013; Francis, 2019). However, in areas where larger secondary schools are more common, FHHs may struggle to ensure their children receive the necessary academic and emotional support, contributing to lower educational outcomes.

Conversely, class size is another critical determinant of educational achievement, particularly for students from marginalised households, including those in secondary schools (Connolly & Haeck, 2022). Research shows that smaller class sizes allow teachers to provide more individualised instruction, which is especially beneficial for students with additional academic or socio-emotional needs (Blatchford et al., 2011). This is particularly relevant for children from FHHs, who may require extra support due to the challenges they face at home (Wendt et al., 2021). Solehudin et al. (2023) argue that children in FHHs tend to perform better in smaller class sizes within secondary schools, where teachers can dedicate more time to addressing their learning gaps and providing encouragement. Conversely, overcrowded classrooms in

secondary schools often result in these students receiving less attention, which exacerbates their academic difficulties (Graham, 2023; Likuru & Mwila, 2022). This disparity in class size contributes to the educational achievement gap between children from FHHs and their peers from two-parent households.

Interconnected Factors and Educational Equity

The interplay between GDP (Sezgin et al., 2023; Goczek et al., 2021), regional educational attainment (Solehudin et al., 2023; Wendt et al., 2021), school size (Francis, 2019; Almeida et al., 2020), and class size (Wendt et al., 2021; Connolly & Haeck, 2022) underscores the complexity of addressing the educational inequities faced by children from FHHs, particularly in secondary schools. While national economic growth and regional educational policies provide a broad framework for improving access to education, localised factors such as secondary school and class size play a more immediate role in shaping individual learning experiences (Maneejuk & Yamaka, 2021). Therefore, addressing the educational challenges of children from FHHs requires a multi-faceted approach that considers both macroeconomic and micro-level factors. The existing literature suggests that efforts to improve educational achievements for children in FHHs must focus on both structural interventions, such as increased government investment in education and targeted regional policies, and school-level reforms, including reducing class sizes in secondary schools and providing more individualised student support. By addressing these factors, policymakers can help reduce the educational disparities that disproportionately affect children from FHHs and foster greater equity in learning outcomes.

Theoretical Foundations

This study is guided by the Gendered Household Dynamics and Child Learning Theory, an integrative approach that draws on several established theories in sociology, economics, and education. These foundational theories provide the building blocks that shape key dimensions such as gender, resource allocation, social capital, and resilience. The Social Reproduction Theory (Bourdieu, 1984) and Resource Dilution Theory (Blake, 1981) explain the economic and cultural constraints faced by FHHs, particularly in terms of their children's access to secondary schools. In contrast, Role Model Theory (Folbre, 1994) and Feminist Economics (Folbre, 1994) highlight the social and emotional strengths these households can offer. Meanwhile,

Intersectionality (Crenshaw, 1989) and Ecological Systems Theory (Bronfenbrenner, 1979) emphasise the importance of broader socio-economic and cultural contexts in shaping educational achievements.
In the context of the current study, the gendered household dynamics and child learning theory is shaped by broader economic, social, and educational factors. GDP, regional educational attainment, and school size each influence how FHHs impact children's learning achievements, especially in secondary schools. For instance, in low-GDP countries, FHHs tend to experience greater financial strain, limiting their ability to invest in educational resources for their children. The World Bank (2018) highlights that low-income families in such contexts often lack access to quality schooling and supplementary learning materials, leading to economic disparities that result in poorer learning achievements. This aligns with the gendered resource allocation aspect of the theory, where FHHs may prioritise their children's education but face constraints due to the broader economic conditions. By synthesising these theoretical perspectives, the gendered household dynamics and child learning theory provide a nuanced framework for understanding how gender, economic constraints, social capital, and resilience interact to influence children's academic performance in FHHs, particularly within the context of secondary schools.

MATERIALS AND METHODS

The study employs a quantitative research approach to elucidate the impact of FHHs on learning achievements in secondary schools in mainland Tanzania. It employs quantitative methods to analyse the causal links between FHHs and learning achievements in secondary schools. As such, it employs quantitative statistical methods to draw inferences on the impact of FHHs on learning achievements.

Research Design

The study employed a cross-sectional survey design for the 2022 data gathered from several surveys documenting educational information and socio-economic profiles concerning the sampled schools. This predictive study aims to explain the impact of FHHs on learning achievements in secondary schools at the prevailing socio-economic conditions of the regions and districts of mainland Tanzania. The study considered the moderating effect of educational attainments of FHHs in urban and rural Tanzania to shed light on the contextual attributes affecting learning achievements, given female parenthood.

Sampling Procedures

The study used multilevel sampling procedures to obtain the sample of schools from regions and districts of mainland Tanzania. Thus, simple random sampling aided to obtain the sampled schools for the analysis. The study employed Lynch's formula to estimate the sample size of schools to be included in the analysis. According to Allibang (2020), Lynch's formula uses probability estimates to compute the sample size of the population parameters, enabling researchers to select the units of the analysis randomly. Thus, the authors obtained the sampled schools following Lynch's formula;

$$n = \frac{NZ^2 * p(1-p)}{Nd^2 + Z^2 p(1-p)} \quad [4]$$

Where n = Sample size, N = Population size, Z = Values of the standard variables (1.96) for the reliability level of 0.95, and d = Sampling error. Given the total number of government secondary schools (N = 4,578), Z = 1.96, p = 0.5 and d = 0.0248, the total sample size of the study becomes 1,158. The authors eliminated the sorted boarding schools as students from the same come from different regions. In that case, the authors used a web-based random number generator published by Urbaniak and Plous (2024) linked to Oxford University's website to obtain random numbers for the sample. A database of secondary schools from the Presidents' Office, Regional Administration and Local Government (PO-RALG) on students' enrolments in secondary schools in Tanzania for the year 2023 helped to obtain a sample of schools to be included in the analysis. However, the nine random numbers sorted boarding schools, which could mislead the interpretation of the results, as students from the same region come from different regions. The authors eliminated such schools; hence, the final sample comprised 1,149-day secondary schools.

Data Sources and Measurements

This paper uses secondary data from various national surveys and National Examination Council of Tanzania (NECTA) to estimate the results. The study comprises secondary school GPAs, FHH socio-demographic data, regional developments in terms of GDPs at market prices, as well as school-specific characteristics as depicted in Table 1.

Secondary School GPAs

Tanzania uses standardised test scores in national assessments as a measure of students' learning achievement. National assessments are

administered by the National Examination Council of Tanzania (NECTA), which is also mandated to publish the results of test scores of all secondary schools in the country. The test score results of individual students yield the school GPA, which ranges from 1.00, the highest score for the best-performing schools, to 5.00 for the least performing secondary schools. This study adapts the results published by NECTA's 2023 school year as the dependent variable of the study. NECTA arranges GPA scores in a descending order, as high-performing schools are assigned the lowest score and vice versa. To easily interpret the findings, the authors reverse the scores so that high-performing schools are assigned high scores. Therefore, the authors used the inverse function to calibrate school GPAs using the following formula;

$$SGPA_{srt} = GPA_{srt}^{-1} \quad [3]$$

Where, $SGPA_{srt}$ is the final secondary school GPA for the estimate, GPA_{srt} represents secondary school grade point average score in CSEE for school i in region r in year t. Reversing NECTA's calibrated GPAs transforms the data into percentages which reflect the performance of secondary schools in national assessments in a respective school year.

FHH socio-demographic data

This paper employs FHHs' data as independent variables. The FHHs' parameters considered significant for this study include the percentage prevalence of FHHs in a district and the percentage of FHHs that attained at least secondary education in the region. The sources of the data are mainly from the National Bureau of Statistics (NBS) of Tanzania, organised from different surveys such as National Economic Surveys (NES) conducted by the Ministry of Finance, the Population and Housing Census (PHC), and the Tanzania Demographic and Health Surveys (TDHS) conducted by the Ministry of Health. This study uses FHHs data from the PHC (2022), NES (2023), and TDHS (2022) as they are the up-to-date information currently used as indicators for social, economic, and demographic profiles of the country. The authors hypothesised that the higher the prevalence of FHHs across regions, the lower the achievements of schools in the region. This is because learning achievements in national assessments are partly affected by socio-economic challenges facing the community, including students from FHHs.

Economic Statuses of Regions

The study employs the regional GDP and Gini coefficients (wealth index)

as one of the control variables influencing learning achievements. These measures are considered plausible as the economic conditions of households of different income groups, including FHHs of respective regions, influence their spending on services, including the education sector. This study employs regional GDPs as a share of the National GDP (NGDP) as an index for the economic performance of the region. It is worth noting that individual household spending is partly constrained by consumer prices and inflation rates of goods and services; hence, changes in such variables may contribute to changes in learning success. The Gini coefficient, on the other hand, measures the distribution of wealth in the population across regions. The study considered this proxy significant as it informs the household's ability to support the learning needs of learners. The assumption is that the higher the disparity in a household's ownership of wealth, the less support there is for individuals' educational achievement. The socio-economic data is published by NBS and the Bank of Tanzania (BoT) from NES, PHC and National Accounts Surveys (NAS). This paper uses the NAS (2022) and NES (2022) statistics on regional GDPs and wealth index published by NBS, which are the updated statistics on GDPs.

Secondary school's specific characteristics

The paper uses secondary school size and class size as control variables influencing learning achievement. In this case, the authors used the number of students enrolled in a school in 2023 and those who sat for the national assessments in the same year to compute the school size. Computation of school and class size based on the Government's circular No.1 of 2007 concerning the sizes of such parameters (See MoEC, 2007). The circular categorises schools into small-sized (160 students or fewer), equivalent to 4 streams, medium-sized (161 to 320 students), making a maximum of 8 streams, and large-sized (321 to 1,280 students), with a maximum of 32 streams. Therefore, this study employs the number of streams in a school following a ratio of students enrolled in the school and those registered by NACTE to the threshold size of 40 students, which is officially recognised as the number of students in a stream at ordinary secondary education. The study also includes the number of teachers in the district to account for learning quality, given the amount of teacher support in facilitating student learning. The school surveys are documented by the Ministry of the President's Office, Regional Administration, and Local Governments, and are also published by NBS.

Table 1
Descriptive Statistics of the Variables

Variables	Proxy and unit of measurement	Source of data	Mean	SD
School GPAs (DV)	GPA scores	NECTA's 2023	26.45	2.92
FHH socio-demographic data (IVs)	Percentage of FHHs across districts	MoFP, National Bureau of Statistics (NBS).	36.11	4.10
	Secondary educational attainment of FHHs	MoFP, National Bureau of Statistics (NBS).	9.04	4.74
Economic statuses of regions (CVs)	Regional GDPs as a share of the National GDP	MoFP, NBS, Bank of Tanzania (BoT)	4.15	3.04
	Average income distribution in the region (Wealth Index)	MoFP, NBS, Bank of Tanzania (BoT)	38.55	8.70
School-specific characteristics (CVs)	School size (Streams) as per Education Circular No.1 of 2007	NECTA and PO-RALG (2023)	17.28	11.27
	Class size (Streams) as per Education Circular No.1 of 2007.	NECTA and PO-RALG (2023)	3.11	2.26
	Average number of Teachers in a school	PO-RALG (2023)	16.66	10.12
Total (N)			1,149	

Note: GPAs = Grade Point Averages, GDP = Gross Domestic Product, FHHs = Female-Headed Households, NECTA = National Examination Council of Tanzania, MoFP = Ministry of Finance and Planning, PO-RALG = President's Office, Regional Administration and Local Government, NBS = National Bureau of Statistics, BoT = Bank of Tanzania. SD = Standard Deviation, DV = Dependent Variable, IVs = Independent Variables, CVs = Control Variables,

Source: Author's construction,2024

Data Analysis

This study aims to examine the causal influence of FHHs on learning achievement in secondary schools in Tanzania. The aim is to infer whether increases in FHHs' prevalence impact students' success in secondary education. Thus, the study employed Ordinary Least Squares (OLS) regression analysis to generate the results. Therefore, the following empirical strategies guided the analysis of the findings.

$$GPA_{srd} = \alpha + \beta FH_{dr} + \gamma X_r + \delta Z_{sd} + \varepsilon_{dr} \quad [1]$$

$$LR_{dri} = \alpha + \beta X_r + \gamma Z_{sd} + \delta [FH_{dr} \cdot U_{dr}] + \varepsilon_{dr} \quad [2]$$

Where, GPA_{srd} is the national assessment GPA for school *s* in region *r* in district *d*; FH_{dr} represents percentage of female-headed households in district *d* in region *r*; X_r is region *r* socio-economic status; Z_{sd} are school *s*

specific characteristics in district *d*; $FH_{dr} \cdot U_{dr}$ is the interaction between the percentage of FHHs and and Urbanity to account for the heterogeneity effect or rurality and urbanity; ε_{rt} is an idiosyncratic error term, β, γ, and δ are coefficients, □ and is the overall intercept.

Robustness Checks

The study used robust OLS to account for issues related to the adoption of cross-sectional data. Consideration of this model is based on both intuition and quantitative assessment methods for model fitting of educational data, as suggested in Theobald (2018) and Rockwood and Hayes (2022). Thus, the authors performed several robustness checks, including homoscedasticity, to account for the variability of the dependent variable as well as linearity, multicollinearity, and normality tests.

RESULTS AND DISCUSSION OF FINDINGS

The impact of FHHs on learning achievement

The study examined the impact of FHHs on learning achievement in Tanzanian secondary education, using the GPAs of 1,149 schools obtained from the results of students who sat for the CSEE in the 2023 academic year. The authors examined whether the prevalence of FHHs across 26 mainland Tanzanian regions affects learning achievement (Table 2).

Table 2
The Impact of FHH on Learning Achievement

Variables	**1**	**2**
Female-Headed Households (FHH)	0.069**	0.068**
	(0.0203)	(0.0213)
	CI[0.03-0.11]	CI[0.03-0.11]
FHH x Urbanisation		0.050
		(0.0709)
		CI[-0.09-0.18]
Urbanisation (Baseline)		-2.218
		(2.703)
		CI[-7.52-3.08]
N	1,149	1,149
R^2	0.05	0.05
F-Statistics	8.02**(df = 6, 1142)	8.02**(df = 6, 1142)
RMSE	2.86	2.86

Note: N = Number of observations, FHHs = Female-Headed Households, R^2 = R-squared, CI = Confidence Interval, df = degrees of freedom, RMSE = Root Mean Square Error. Robust standard errors are reported in parentheses

* p<0.10, ** p<0.05, *** p<0.01

The increasing prevalence of FHHs influences learning achievements in secondary education. As shown in Table 2 (column 1), an increase in FHH prevalence raises school GPAs by 0.07 points. These results suggest that the presence of FHHs does not negatively impact students' learning, implying that FHHs successfully sustain students' education despite facing challenges such as a lack of support from a second parent. These findings align with Bammeke (2010). Interestingly, this result is somewhat unexpected, as one might anticipate a decline in learning achievement due to the challenges typically caused by single parenthood (Heyes et al., 2023; Sharma, 2023). However, this relationship may be driven by the economic stability of FHHs, as women's participation in productive sectors in Tanzania has been increasing in recent years. This trend is common among both married and unmarried women, who engage in productive activities to boost their family's income. The effects of FHHs' prevalence are particularly notable between 34 and 36 per cent, as shown in Figure 1a. Beyond this threshold, further increases in FHHs' prevalence may become detrimental to students' learning achievements. This is likely due to the greater number of children affected by issues associated with single parenthood, such as absenteeism and limited access to educational resources (Nonoyama-Tarumi, 2017; Solehudin et al., 2023). While the findings indicate a positive influence of FHH prevalence on learning achievements, they also highlight the potential risks of higher FHH rates. Despite initial gains in learning, higher levels of FHHs' prevalence introduce uncertainties regarding effective learning, as students from these household's face challenges that can hinder their educational progress.

The impact of FHHs on learning achievements differs between the rural and urban areas. As indicated in Table 2 (column 2), an increase in FHHs prevalence has ambiguous effects on learning achievements of urban schools, even though the results show that school GPAs rose at similar rates in both rural and urban schools, as depicted by the slopes in Figure 1a. In contrast, the results demonstrate a positive impact of FHHs on learning achievements in rural schools, where a higher prevalence of FHHS increases GPAs by 0.07 points. These findings are consistent with Chudgar's (2011) assertion that regional development disparities account for differences in the impact of FHHs on learning achievements. It is important to note that the time mothers spend on family responsibilities is critical to children's development in all aspects of life. The rural-urban differences in the caregiving roles of women in Tanzania partly explain

the impacts observed in this study. In rural areas, where women's participation in agriculture and small businesses has grown, they can balance their work with family responsibilities, including taking care of their children. However, in urban areas, women are more often involved in business-oriented production activities, which limit their time for childcare. Additionally, FHHs in urban areas are often affected by low-income statuses, and the higher costs of education further limit their ability to adequately support their children (Almeida et al., 2020; Sharma, 2023). In this context, the effects of FHHs are shaped by local factors that constrain their ability to support their children's schooling. The study finds that the impact of FHHs' prevalence, both in urban and rural areas, is most pronounced when prevalence rates are between 36 and 38 per cent (Figure 1c). Therefore, the findings suggest that FHHs' prevalence should not exceed this threshold in either rural or urban areas, as doing so may result in more detrimental effects on learning achievements.

The impact of FHHs' educational attainment on learning achievement

The analysis considered the secondary education attainment index of the FHHs as a factor to account for learning achievements. The authors hypothesised that the higher the attainment index of the FHHs, the greater the impact on students' learning achievement. Furthermore, the study accounted for urbanisation heterogeneity to determine whether contextual attributes moderate the effects of FHHs on learning achievements (Table 3).

Table 3
The Effect of FHHs' Educational Attainment on Learning Achievement

Variables	**1**	**2**
Educational Attainment of FHHs	0.077**	0.074**
	(0.033)	(0.0329)
	CI[0.01-0.14]	CI[0.01-0.14]
Educational Attainment of FHHs x Urbanisation		0.064
		(0.059)
		CI[-0.05-0.18]
Urbanisation (Baseline)		-0.770
		(0.467)
		CI[-1.69-0.15]
N	1,149	1,149
R2	0.05	0.05
F-Statistic	8.02**(df = 6, 1142)	8.02**(df = 8, 1140)
RMSE	2.86	2.86

Note: N = Number of observations, FHHs = Female-Headed Households, R2 = R-squared, CI = Confidence Interval, df = degrees of freedom, RMSE = Root Mean Square Error. Robust standard errors are reported in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 3 presents the results on the impact of FHHs' secondary education attainment on learning achievements in Tanzanian schools. The results show that a rise in the prevalence of FHHs with at least secondary education leads to an increase in school GPAs by 0.08 points. The results are consistent with Bammeke (2010), suggesting that females' formal education influences the learning outcomes of secondary school students. This implies that educated mothers are likely to prioritise the education of their children even in the absence of the second parent. According to Becker et al. (2013), educated mothers tend to have stronger preferences for the education of their children, hence, support for their learning in schools. Mothers play a role in supporting their children's education through maintenance costs, including transportation, study materials, and school uniforms, which enhances learning achievement in schools.

The moderating effect of urbanisation on the impact of FHHs is improbable, but positive effects are evident in rural schools. As indicated in Table 3 (column 2), the prevalence of FHHs in the rural areas increases school GPAs by 0.07 per cent. The improbability of the effect of FHHs on learning achievement in urban schools may result from several factors, including lack of engagement in their children's schooling, partly due to prioritising financial stability to meet household needs, as also suggested by Almeida et al. (2020). This may be possible in the Tanzanian context, particularly for FHHs, where women's engagement in both family responsibilities and economic activities aimed at boosting household income may reduce their ability to support their children's education. The positive effects of educational attainment of the FHHs in rural areas are attributed to active participation of parents and communities in schools discussing their children's schooling with schools (European Commission, 2023). However, the moderating role of rural schools in the effect of FHHs' secondary education attainment on learning achievement appears plausible at prevalence rates below 32 per cent and becomes unlikely above this threshold (Figure 1d). Therefore, increasing FHHs with secondary education poses a threat to higher learning achievements in secondary schools both in urban and rural areas, partly due to the lack of financial and social capital for their education, as also noted by

Solehudin et al. (2023) and Wendt et al. (2021). Therefore, the educational attainment of FHHs exerts diverse influences on learning outcomes, particularly when considering the contextual disparities between urban and rural schools. This suggests that additional social stability mechanisms may be required. Support for dual-parent households could prove vital, as the increasing prevalence of FHHs may jeopardise students' academic achievements regardless of parental education.

CONCLUSION

Increases in FHH prevalence contribute to improved GPAs, particularly in rural areas. However, the positive impact of FHHs on learning achievements is most substantial when prevalence rates are minimal. The rural-urban disparities matter in the impact of FHHs on influencing learning achievements in secondary schools, with the rural areas being more advantageous than the urban areas. This is partly due to factors related to differences in caregiving roles, economic opportunities, and the cost of living that affect a mother's ability to support their children's education. The study emphasises that women, especially FHHs, are taking on a greater role in productive sectors, which has likely helped FHHs maintain or even improve students' academic performance, particularly in rural areas. Educated female heads of households significantly support student outcomes by prioritising and investing in education, especially in rural areas where community involvement and work-life balance foster a supportive environment. Urban-educated FHHs face greater challenges due to economic pressures, time limitations, and higher living costs, which hinder their children's support for education. The increase in the number of FHHs is significant for improved learning achievements, but could be offset by reduced financial and social support resources. Factors like community engagement, resources, and living costs influence educational results. Parental education is valuable but requires broader support systems to sustain its positive impact, particularly in disadvantaged areas.

RECOMMENDATIONS

Maintaining the positive effects of FHHs on learning outcomes, particularly in rural areas, requires support networks that empower women both economically and socially. Policies should expand access to income opportunities, childcare, and education programmes for FHHs. Urban areas need targeted interventions such as community education to

address the challenges of parental involvement due to economic pressures. Promoting community engagement and school-parent partnerships can strengthen educational outcomes. FHHs should be matched with sufficient financial and social support to prevent adverse effects on student achievement in both rural and urban areas.

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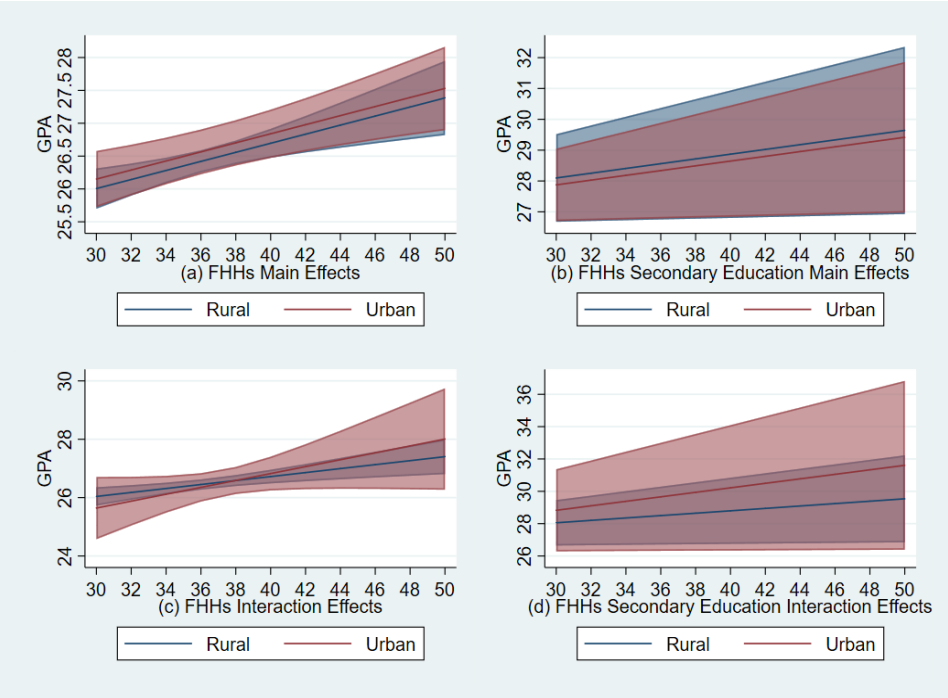
Appendix I: Main and Interaction Effects of FHH and SEAFHs on learning achievement

Figure 1:

Main and Interaction Effects of FHH and SEAFHs on learning achievement



Note: FHH = Female Headed Households, Predictive Margins with 95% Confidence Interval