

Demand-Side Determinants of Educational Inequalities in Northern Ghana

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Abstract

Educational inequalities remain a persistent challenge in many low- and middle-income countries despite substantial investments in expanding access to schooling. Even though existing research has primarily attributed these disparities to differences in school quality and resources, less attention has been paid to how households respond to perceived variations in educational quality and how such responses shape educational outcomes. Drawing on Human Capital, Household Production, and Social Reproduction theories, this study examined the roles of school substitution and complementary educational investments in explaining academic achievement and educational inequality in Northern Ghana. The study adopted a cross-sectional survey design and collected data from parents and guardians of basic school children across five regions of Northern Ghana. Structural Equation Modelling (SEM) was employed to analyse the relationships among perceived public basic-school quality, socio-economic status, household educational investment behaviours, academic outcomes, and educational inequality. The findings indicate that perceptions of public basic-school quality are significantly associated with household educational decisions, particularly investments in private tutoring, supplementary learning resources, parental academic support, and decisions to substitute public schooling with private schooling. Contrary to expectations, socio-economic status did not significantly predict either substitution behaviour or complementary educational investments. Complementary investments significantly predicted students' academic outcomes, whereas school substitution alone had no significant effect on academic performance. Academic achievement mediated the relationship between complementary educational investments and educational inequality, suggesting that disparities in household support mechanisms reinforce unequal educational outcomes. The study contributes to scholarship by integrating supply-side and demand-side explanations of educational inequality within a single analytical framework and demonstrating that household investment strategies constitute a critical mechanism through which educational advantages are accumulated and reproduced. The findings highlight the need for policies that address disparities in households' capacity to support children's learning alongside improvements in school quality.

Keywords: Academic achievement, Educational inequality, Household educational investment, School quality perception, Structural Equation Modeling, Northern Ghana.

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INTRODUCTION

Educational inequality remains one of the most persistent challenges confronting education systems worldwide. Despite significant global progress in expanding access to schooling, disparities in educational quality, learning opportunities, and academic outcomes continue to reproduce socio-economic inequalities both within and across countries (UNESCO, 2021; World Bank, 2020). While efforts to achieve universal basic education have increased school enrolment rates in many low- and middle-income countries (UNESCO, 2020), concerns have shifted from access alone to the distribution of educational quality and the unequal benefits derived from schooling. Consequently, understanding the mechanisms through which educational inequalities emerge and persist has become a central concern in educational research and policy.

Existing scholarship (Glewwe & Muralidharan, 2016; Hanushek & Woessmann, 2015) has largely explained educational inequalities through supply-side factors, including disparities in school resources, infrastructure, teacher quality, and institutional effectiveness. Such factors have been shown to influence students' learning experiences and academic achievement across diverse contexts. However, growing evidence (Coleman et al., 1966) suggests that educational inequality is not determined solely by differences in school provision. Households also play an important role in shaping educational outcomes through the choices they make and the resources they invest in their children's learning. However, the ways in which households respond to perceived differences in school quality remain comparatively underexplored, particularly in developing-country contexts.

The substitution–complementarity framework offers a useful perspective for understanding these dynamics. School substitution occurs when households respond to perceived deficiencies in public education by enrolling their children in private schools, thereby replacing one educational provider with another. Complementary educational investments, by contrast, involve investments that supplement formal schooling, such as private tutoring, additional learning materials, extra classes, and parental academic support. Although both strategies are intended to enhance educational outcomes, access to them is often unevenly distributed across households, creating opportunities for educational advantages to accumulate among some groups while disadvantaging others.

These dynamics are particularly relevant in Ghana, where educational expansion has been accompanied by growing concerns about disparities between public and private schools. While private schools are often perceived to offer more favourable learning environments and stronger academic outcomes, many public schools, especially in economically disadvantaged communities, continue to face challenges related to infrastructure, teacher availability, and instructional resources (Ministry of Education, 2023; UNICEF, 2022). Such differences may influence household educational decisions and contribute to unequal educational outcomes beyond the effects of school quality alone.

Despite increasing policy and scholarly interest in educational inequality, empirical evidence on the interconnected relationships among school quality, household educational responses, academic outcomes, and inequality remains limited. Existing studies have typically examined these factors in isolation rather than as mutually reinforcing processes through which educational advantages are accumulated and reproduced.

This study addresses this gap by investigating how perceived school quality and household socio-economic conditions are associated with substitution and complementary educational investments and how these responses relate to academic outcomes and educational inequality in Northern Ghana. By integrating supply-side and demand-side explanations within a single analytical framework, the study contributes to broader debates on the production and reproduction of educational inequality in resource-constrained settings and offers insights for policies aimed at promoting more equitable educational opportunities.

Hypotheses Development

Construct Definitions

Before presenting the hypotheses, the key constructs examined in this study are defined as follows:

1. **Perceived public-school quality** refers to parents' subjective evaluations of the adequacy of public basic school provision, encompassing perceptions of teacher qualification, availability of teaching and learning materials, infrastructure quality, teacher attention to students' learning needs, and the safety and conduciveness of the school environment.
2. **Socio-economic status (SES)** is conceptualised as a composite indicator of household economic standing, measured through parental income level, educational attainment, occupational type, and the sufficiency of financial resources to support a child's education.
3. **School substitution** denotes the household behavioural response of transferring a child from a public basic school to a private basic school, or expressing willingness to do so, in response to perceived deficiencies in public-school quality.
4. **Complementary educational investments** refer to household expenditures and efforts that augment formal schooling, including payment for private tutoring or extra lessons, purchase of additional learning materials beyond school provision, investment in educational programmes or workshops, and parental time devoted to academic support.
5. **Academic outcomes** are parent-reported indicators of a child's scholastic performance, including perceived performance relative to peers, improvement over time, and meeting grade-level academic expectations.
6. **Educational inequality** is defined as parents' perceptions of disparities in educational opportunities and outcomes among students, particularly between children from wealthier and poorer households and between public- and private-school attendees.

Determinants of Parental Educational Responses

Households differ in their capacity to respond to perceived deficiencies in educational quality. Families with greater socio-economic resources possess a stronger ability to exercise school choice and finance alternative educational opportunities. Similarly, perceptions of poor public-school quality may motivate households to seek alternative or supplementary forms of educational provision. Accordingly, the following hypotheses are proposed:

1. **H1:** Perceived lower quality of public schools is positively associated with households' tendency to substitute public basic education with private schooling.
2. **H2:** Socio-economic status is positively associated with households' tendency to substitute public basic education with private schooling.
3. **H3:** Perceived lower quality of public schools is positively associated with households' tendency to make complementary educational investments.
4. **H4:** Socio-economic status is positively associated with households' tendency to make complementary educational investments.

Parental Educational Responses and Academic Outcomes

Parental educational responses are expected to relate to students' academic performance by providing access to improved educational opportunities and learning resources. Households that substitute public schooling with private schooling or invest in complementary educational resources may enhance their children's educational outcomes. Therefore, the following hypotheses are proposed:

5. **H5:** Complementary educational investments are positively associated with students' academic outcomes.
6. **H6:** Substitution of public schooling with private schooling is positively associated with students' academic outcomes.

Mechanisms of Educational Inequality

Differences in academic outcomes and access to complementary educational resources may contribute to the reproduction of educational inequalities across socio-economic groups. Students who benefit from enhanced educational opportunities are more likely to accumulate academic advantages over time, thereby widening disparities in educational achievement.

7. **H7:** Academic outcomes are positively associated with educational inequalities between students.
8. **H8:** Complementary educational investments are positively associated with educational inequalities.

Furthermore, drawing on the theoretical expectation that household investments enhance academic performance, which in turn shapes perceived disparities in educational outcomes, the study proposes a mediation mechanism:

9. **H9:** Academic outcomes mediate the positive relationship between complementary educational investments and educational inequality.

Theoretical Framework

This study is grounded in an interdisciplinary theoretical framework that draws on human capital, household production, and social reproduction theories to explain how demand-side behaviours shape educational inequality between public and private basic schools in Northern Ghana.

At the core of this study is Human Capital Theory, as advanced by Becker (1964) and Schultz (1961). This theory posits that education is an investment that enhances individuals' productivity and future earnings. Within this framework, households are viewed as rational actors who allocate resources to maximise the returns on their children's education. In contexts where public school quality is perceived to be low, households with sufficient resources are more likely to substitute public education with private schooling, which is perceived to yield higher returns. This directly underpins Hypotheses H1 and H2, where school choice is driven by expected quality differentials and future benefits.

Complementing this perspective is Household Production Theory, also associated with Becker (1964). This theory conceptualises households as producers of outcomes (such as education) using a combination of market goods and non-market inputs (e.g., parental time, tutoring, learning materials). In this study, complementary educational investments, including private tutoring, additional learning resources, and parental involvement, represent household-level investments that enhance children's academic outcomes independent of school type. Households with higher socio-economic status are better positioned to make such investments, thereby reinforcing Hypotheses H3, H4, H5, and H6. This perspective highlights that educational outcomes are not solely determined by school quality but are co-produced within the household.

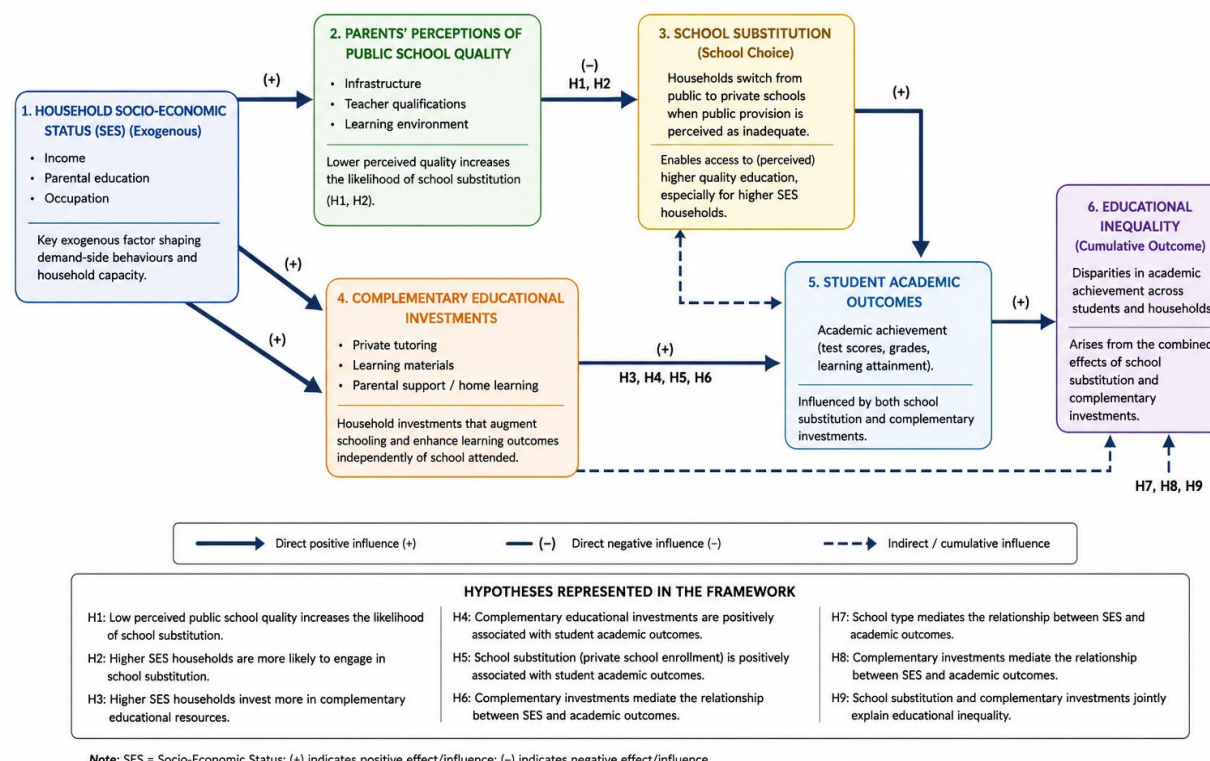
To account for the persistence of inequality, the study further draws on Social Reproduction Theory, developed by Bourdieu (1977). This theory argues that educational systems often reproduce existing social inequalities by privileging students from more advantaged backgrounds who possess greater economic, cultural, and social capital. In the context of Northern Ghana, households with higher SES are more capable of both substituting into private schools and making complementary investments, thereby securing better educational outcomes for their children. Conversely, lower-income households, constrained by limited resources, are less able to exercise school choice or invest in supplementary learning, reinforcing structural inequalities. This theoretical lens supports Hypotheses H7, H8, and H9, which posit that the interaction of substitution and complementary effects amplifies disparities in educational outcomes.

Importantly, the integration of these theories provides a comprehensive explanation of demand-side dynamics in education. While Human Capital Theory explains why households invest in education, Household Production Theory explains how these investments are made through substitution and complementary strategies, and Social Reproduction Theory explains why such investments lead to persistent inequality across socio-economic groups. Together, these perspectives justify the study's central argument that inequalities in educational outcomes are not only a function of supply-side disparities in school quality but are also significantly shaped by household decision-making processes.

Conceptual Framework

The conceptual framework for this study is designed to illustrate how demand-side factors drive educational inequality in public and private basic schools in Northern Ghana, focusing on the mechanisms of school substitution and complementary educational investments. It integrates household socio-economic characteristics, perceptions of public school quality, household investment behaviours, student academic outcomes, and the resulting disparities in educational achievement. The framework is presented in Figure 1.

Figure 1. Conceptual framework: Demand-side inequalities in the provision of basic education



Household SES, encompassing income, parental education, and occupation, is conceptualised as a key exogenous factor shaping demand-side behaviours. Households with higher SES have a greater capacity to make informed choices regarding schooling and to invest in complementary educational resources (Rolleston & Oketch, 2020; Akyeampong, 2011). In the framework, SES directly influences both school substitution and complementary educational investments, reflecting its dual role in enabling private school enrollment and supplementary learning investments.

Parents' perceptions of public school quality, including infrastructure, teacher qualifications, and learning environment, serve as a critical determinant of school choice. Low perceived quality increases the likelihood that households will engage in school substitution, opting to enroll children in private schools to secure better educational outcomes (Ansong et al., 2021; Osei, 2020). This relationship underpins Hypotheses H1 and H2.

School substitution captures the decision of households to switch from public to private schools when public provision is perceived as inadequate. This pathway demonstrates how disparities in school quality can translate into differentiated access based on household capacity (World Bank, 2020; Rolleston & Oketch, 2020). The framework posits that higher SES amplifies this effect, enabling better-off households to avoid lower-quality public schools, consistent with H1 and H2.

Complementary educational investments refer to household investments that augment schooling, such as private tutoring, learning materials, and parental support. These investments enhance academic performance independently of the school attended and reinforce the advantages of children from higher SES backgrounds (Akyeampong, 2011; UNESCO, 2021). This pathway underlies Hypotheses H3, H4, H5, and H6 and illustrates how even within the same school type, learning outcomes can diverge based on household capacity.

Student academic outcomes are influenced by both the school substitution and complementary investment pathways. Enrollment in private schools, coupled with supplementary household investments, is expected to result in higher academic achievement, whereas students in public schools without additional support may experience lower performance (UNICEF, 2022; Osei, 2020).

Educational inequality emerges as the cumulative effect of these mechanisms. School substitution and complementary educational investments jointly reinforce disparities, such that children from low-income households are doubly disadvantaged: they are more likely to remain in under-resourced public schools and less able to access complementary investments, perpetuating achievement gaps (H7, H8, and H9). This aligns with the broader literature on the interplay between school quality, household resources, and educational equity (World Bank, 2020; UNESCO, 2021).

This framework emphasises that educational inequality is both structural and cumulative, arising from interactions between institutional quality and household capacity to respond to perceived deficits. It provides a robust basis for analysing the demand-side drivers of inequality in Northern Ghana and for testing the proposed hypotheses empirically.

Empirical Review

Public–Private Schooling and Educational Inequality

A substantial body of empirical literature has examined disparities in learning outcomes between public and private schools, particularly in developing contexts. Evidence consistently indicates that students enrolled in private schools tend to outperform their public-school counterparts in core subjects such as reading and mathematics (Glewwe & Kremer, 2006; Barrera-Orsorio, 2009). These differences are often attributed to variations in school quality, including teacher effectiveness, infrastructure, and access to instructional materials.

However, empirical studies caution that these observed advantages are not solely attributable to school effectiveness. Rather, they reflect selection effects and socio-economic sorting, where students from more advantaged households are disproportionately represented in private schools (Patrinos, 2013). This suggests that educational inequality is shaped not only by supply-side factors but also by demand-side dynamics, particularly household socio-economic status (SES).

Household Socio-Economic Status and School Choice (Substitution Effects)

Empirical evidence strongly supports the role of SES in shaping school choice decisions. Households frequently respond to perceived deficiencies in public education by enrolling their children in private schools, reflecting a school substitution effect. Across sub-Saharan Africa, private school participation is significantly higher among wealthier households, while access among poorer households' remains limited (World Bank, 2018).

Research further demonstrates that household income and parental education are key predictors of private school enrollment (Colclough et al., 2000). Similarly, studies on low-cost private schooling show that even where private options are relatively affordable, they are still disproportionately accessed by better-off households (Tooley & Dixon, 2006). These findings suggest that substitution into private schooling is constrained by financial capacity, thereby reinforcing socio-economic inequalities.

In addition, parental perceptions of school quality, particularly teacher commitment, class size, and academic performance, play a critical role in shaping school choice decisions. Where public schools are perceived to be of low quality, households with sufficient resources are more likely to opt out, further deepening stratification.

Complementary Investments and Shadow Education

Beyond school choice, households influence educational outcomes through complementary educational investments, including private tutoring, learning materials, and parental involvement. The literature on shadow education provides strong empirical support for this mechanism.

Private tutoring is widespread and disproportionately accessed by higher-SES households, contributing significantly to differences in academic achievement (Bray, 2013). These supplementary investments enhance learning outcomes by reinforcing classroom instruction and providing individualised academic support.

Furthermore, household-level investments in education are critical determinants of student performance, often complementing or even exceeding the influence of school-level factors (Psacharopoulos & Patrinos, 2018). Importantly, such investments operate independently of school type. Even within public schools, students from wealthier households benefit from additional educational inputs, thereby widening achievement gaps.

Interaction of Substitution and Complementary Effects

Recent empirical studies suggest that school substitution and complementary educational investments interact to produce cumulative advantages. Households with higher SES are more likely to both enroll their children in private schools and invest in supplementary learning, thereby amplifying educational outcomes.

Inequality in education is increasingly understood as the result of multiple, interrelated mechanisms, including school quality, household investments, and socio-economic background (Bourguignon, 2015). These dynamics create reinforcing cycles in which advantaged households are able to maximise both institutional and household-level inputs into education.

Moreover, the benefits of private schooling are often magnified when combined with complementary investments. Students who attend private schools and receive additional academic support tend to achieve the highest outcomes, while those in under-resourced public schools without such support are disproportionately disadvantaged.

Persistent Inequality and Structural Constraints

Despite the expansion of private schooling, empirical evidence suggests that it does not necessarily reduce inequality. Instead, it often reinforces existing disparities by creating a segmented education system. Access to quality education remains highly unequal, particularly in low-income and rural contexts (UNESCO, 2020).

Studies in developing countries further highlight the role of structural constraints, such as geographic location, early childhood education, and household background, in perpetuating inequality (Glewwe & Muralidharan, 2016). These findings indicate that even as access to schooling improves, disparities in learning outcomes persist due to unequal access to both school quality and complementary resources.

Research Gaps and Contribution of the Present Study

While the empirical literature provides important insights, several gaps remain. First, many studies examine school choice and household investments separately, with limited attention to their combined effects. Second, there is a lack of context-specific empirical research focusing on Northern Ghana, where inequalities are particularly pronounced. Third, few studies employ advanced analytical approaches such as Structural Equation Modelling (SEM) to estimate the complex relationships among SES, school choice, complementary investments, and learning outcomes.

This study addresses these gaps by integrating school substitution and complementary educational investments within a unified framework and applying SEM to estimate both direct and indirect relationships. In doing so, it contributes to a more comprehensive understanding of demand-side drivers of educational inequality.

RESEARCH METHODS

Research Design

This study adopted a quantitative research approach within the positivist paradigm to examine the demand-side determinants of educational inequality in Northern Ghana. Guided by the assumption that social phenomena can be objectively measured and analysed through empirical observation, the study employed a descriptive cross-sectional survey design. This design was considered appropriate because it enabled the collection of data from a large population at a single point in time and facilitated the examination of relationships among key variables without manipulating the study environment (Creswell, 2014).

The cross-sectional survey design was particularly suitable for capturing prevailing educational conditions, household perceptions, and investment behaviours within their natural context. It also

provided an efficient means of generating evidence from diverse households and schools across the study area while ensuring broad coverage of the target population. Consistent with survey research traditions (Cohen, Manion, & Morrison, 2007), the design supported the systematic description of educational phenomena and the testing of theoretically derived relationships among variables. However, the cross-sectional nature of the data precludes causal inference; the study reports associations rather than causal relationships.

Population, Sample Size, and Sampling Procedure

This study was conducted in Northern Ghana, comprising the Northern, Upper East, Upper West, North East, and Savannah Regions, where disparities in access to and quality of education persist, poverty levels remain high, and educational infrastructure is comparatively underdeveloped (Ghana Statistical Service, 2021; UNICEF, 2022).

Target population: The target population comprised parents and guardians whose children have attended or are still attending basic schools (Kindergarten through Junior High School) in the five Northern Regions. The unit of analysis was the individual parent or guardian household. Each respondent reported on one child currently enrolled in basic school. Where a parent or guardian had multiple children in basic school, the child with the most recent enrollment was selected as the referent to standardise responses. Due to the absence of a comprehensive sampling frame capturing this target population, the population size was considered unknown. This approach is consistent with methodological guidance that allows researchers to treat populations as indefinite when they cannot be clearly enumerated (Cochran, 1977; Israel, 1992).

Inclusion and exclusion criteria: To ensure relevance and comparability, the following inclusion criteria were applied: (a) the respondent must be a parent or legal guardian of a child currently enrolled in a public or private basic school in one of the five Northern Regions; (b) the child must have been enrolled for at least one complete academic term; and (c) the respondent must have resided in the region for at least 12 months. Exclusion criteria were: (a) parents or guardians of children in senior high school or higher; (b) respondents who were not the primary caregiver responsible for the child's educational decisions; and (c) incomplete questionnaires with missing data exceeding 15% of items.

Sample size determination: The sample size was determined using Cochran's Formula, which is appropriate for large or unknown populations (Cochran, 1977). Using a 95% confidence level ($Z = 1.96$), a margin of error of 5% ($e = 0.05$), and a population proportion of 0.5 (to maximise variability), the minimum sample size was calculated as 384. This approach is widely supported in social science research for ensuring adequate representativeness when population parameters are unknown (Glenn, 1992; Krejcie & Morgan, 1970).

However, given that the study employed Structural Equation Modelling (SEM), the sample size was increased to 410 respondents to enhance statistical power and model stability. SEM studies typically require large samples, with recommendations ranging from 200 to 400 or more depending on model complexity (Hair et al., 2019; Kline, 2016). With 26 observed variables and a model containing six latent constructs, the obtained sample of 401 exceeded the 10:1 ratio of sample size to estimated parameters, ensuring adequate statistical power.

Sampling procedure: The study employed a sequential non-probability sampling strategy to select respondents. First, the study adopted purposive sampling to identify respondents whose wards were attending basic schools in the Northern Regions of Ghana. This technique is appropriate when participants are selected based on specific characteristics relevant to the research objectives (Creswell, 2014; Etikan et al., 2016). Second, the study employed convenience sampling to select respondents based on accessibility and willingness to participate. This method is commonly used in social science research where sampling frames are unavailable and where rapid data collection is required (Etikan et al., 2016). Finally, the study made use of snowball sampling to reach additional respondents through referrals from initial participants. This technique is particularly effective for accessing dispersed or hard-to-reach populations (Mahin et al., 2017).

The use of non-probability sampling is justified given the exploratory nature of the study and the lack of a defined sampling frame. Although such methods may limit generalisability, they are widely accepted in behavioural and educational research where populations are difficult to enumerate (Creswell, 2014). Furthermore, the relatively large sample size enhances the robustness and reliability of findings, particularly in SEM-based studies (Hair et al., 2019).

Data Gathering Instrument

The researcher employed a structured questionnaire as the primary instrument for data collection in this study. The questionnaire items were adapted from previously validated scales in the literature (McGreal & Olcott, 2022; Wheelahan & Moodie, 2021; Uggeri & Barlassina, 2019) to ensure content validity and alignment with the constructs under investigation.

The questionnaire consisted of seven sections labelled A to G. Section A contained items designed to collect demographic information about the respondents, including gender, age, educational qualification, and years of professional experience. Section B comprised five items measuring respondents' socio-economic status. Section C contained six items assessing respondents' perceived public basic school quality. Section D consisted of five items measuring school substitution. Section E included five items that examined complementary educational investments. Section F consisted of five items that measured perceived students' academic outcomes, while Section G measured respondents' perceived educational inequality.

All items in Sections B to G were measured using a five-point Likert-type scale to capture respondents' perceptions. The response options ranged from Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), to Strongly Agree (5). The Likert scale was adopted because it enables respondents to express the degree of agreement with statements and is widely used in social science research for measuring attitudes, perceptions, and opinions in a systematic and quantifiable manner.

Validity and Reliability of the Instrument

The validity and reliability of the research instrument were established through a series of procedures. To ensure content validity, questionnaire items were adapted from previously validated scales in the literature on educational quality and inequality and were reviewed by experts in basic education and research methodology to assess their clarity, relevance, and alignment with the study objectives.

Construct validity was evaluated using exploratory and confirmatory factor analyses based on pilot data collected from 310 respondents in selected schools in the Navrongo Municipality. The suitability of the data for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's Test of Sphericity. Consistent with established guidelines, KMO values of 0.60 or above and a significant Bartlett's test ($p < .05$) were considered indicative of adequate factorability (Hair et al., 2019; Kaiser, 1974).

Convergent validity was assessed through factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE). Factor loadings of 0.50 or higher, CR values above 0.70, and AVE values of at least 0.50 were considered evidence of satisfactory convergent validity and internal consistency (Fornell & Larcker, 1981; Hair et al., 2019). Discriminant validity was evaluated using the Fornell–Larcker criterion, whereby the square root of each construct's AVE was required to exceed its correlations with other constructs, indicating empirical distinctiveness among the latent variables (Fornell & Larcker, 1981).

Reliability was assessed using Cronbach's alpha, with values of 0.70 or higher indicating acceptable internal consistency (Hair et al., 2019). The measurement model was further validated through Confirmatory Factor Analysis (CFA). Model fit was evaluated using the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), and Chi-square/degrees of freedom ratio (χ^2/df). Following recommended benchmarks, CFI and TLI values of 0.90 or above, RMSEA and SRMR values below 0.08, and χ^2/df values below 3 indicated acceptable model fit (Hair et al., 2019; Kline, 2016).

Data Collection Procedures

Data collection for this study was conducted systematically to ensure ethical compliance and high response rates. An introduction letter was obtained from the Registrar of the University of Technology and Applied Sciences to formally introduce the researcher to the selected schools. In addition, necessary ethical clearance and institutional permissions were obtained from the relevant authorities before the commencement of data collection.

The questionnaires were personally administered by hand to parents and guardians of the pupils. Completed questionnaires were retrieved on the same day when possible. For respondents who could not complete the questionnaire immediately, the instruments were left in the care of designated contact persons and collected one week later. The entire data collection process was completed over a period of six weeks. Overall, a total of 401 completed questionnaires were returned, representing a response rate of 96.8%, which indicates a high level of cooperation and engagement among the respondents. Of the nine non-returned questionnaires, five were due to respondent unavailability at follow-up, three were declined, and one was incomplete beyond the 15% threshold and excluded.

Ethical Considerations

The study was conducted in accordance with established ethical principles for educational and social science research. In the absence of a formally constituted Institutional Review Board (IRB) at the University of Technology and Applied Sciences at the time of the study, the research protocol, participant information sheet, consent form, and data collection instruments underwent

an internal ethical review by a Senior Academic Member of the university. The review confirmed that the study met accepted ethical standards for minimal-risk research, and a signed Ethical Review Confirmation Letter has been provided as supplementary documentation.

Participation was voluntary, and written informed consent was obtained from all participants prior to data collection. Participants were informed about the purpose of the study, the nature of their involvement, their right to decline participation, and their right to withdraw at any stage without penalty. To protect participants' privacy, no personally identifiable information was collected. Confidentiality and anonymity were assured throughout the research process, and all data were anonymised, securely stored, and reported only in aggregate form.

Given its non-invasive nature, the study posed no physical, psychological, or social risks beyond those encountered in normal educational interactions. The research adhered to internationally recognised ethical principles of respect for persons, beneficence, and justice and complied with the ethical requirements for research involving human participants.

Data Processing and Analysis

The collected data were coded and entered into IBM SPSS Statistics version 25 for preliminary analysis. Structural Equation Modelling (SEM) was subsequently conducted using AMOS to validate the measurement instrument and test the hypothesised relationships among the study variables. SEM is a second-generation multivariate analytical technique that enables the simultaneous examination of complex relationships among latent and observed variables while explicitly accounting for measurement error (Khine, 2013). By incorporating measurement error into the analysis, SEM provides more accurate and unbiased parameter estimates than traditional regression techniques.

The measurement model was first assessed to establish the validity and reliability of the study constructs before evaluating the structural model. Hypotheses H1 to H8 were tested using SEM path analysis to examine the direct relationships among the constructs. Hypothesis H9, which proposed a mediation effect, was tested using a simple mediation model within the SEM framework with bootstrapped confidence intervals (5,000 resamples) to assess the significance of the indirect effect.

Missing data treatment: Less than 2% of data points were missing across the entire dataset. Little's Missing Completely at Random (MCAR) test was non-significant ($p > .05$), indicating that the missing data were random. Expectation-Maximisation (EM) imputation was applied to retain all 401 cases in the analysis. Sensitivity analyses confirmed that parameter estimates did not differ meaningfully between imputed and listwise-deleted datasets.

SEM assumptions: Prior to model estimation, the assumptions underlying SEM were examined. Univariate skewness and kurtosis values for all observed variables fell within acceptable ranges (skewness $< |2|$; kurtosis $< |7|$), supporting the assumption of multivariate normality. The absence of severe multicollinearity was confirmed through variance inflation factors ($VIF < 3.3$) and tolerance values (> 0.1). Linearity and homoscedasticity were assessed through residual scatterplots and found to be satisfactory. The model was identified through the t-rule, with 153 distinct sample moments and 59 estimated parameters, yielding 94 degrees of freedom.

RESULTS AND DISCUSSION

Table 1: Factor Loadings

Item	Description	Factor					
		1	2	3	4	5	6
PBSQ1	Teachers in Public basic schools are well qualified to teach	.650					
PBSQ2	Public basic schools provide adequate teaching and learning materials	.760					
PBSQ3	Public basic school infrastructure supports effective teaching and learning	.720					
PBSQ4	Teachers in public basic schools give adequate attention to students' learning needs	.780					
PBSQ5	Public basic school environment is safe and conducive for learning	.937					
SE2	If the quality of public schools declines , I will consider enrolling my child in a private school	.360					.624
SE3	I have considered transferring my child to a private school						.891
SE4	I will prefer a private school over a public school if given the opportunity						.916
SE5	I am willing to switch my child to a private school for better educational outcomes.						.532
CE1	I pay for private tutoring or extra lessons for my child			.928			
CE2	I purchase additional learning materials beyond what the school provides			.865			
CE3	I spend money on educational programs or workshops for my child			.764			
CE4	I invest financially in activities that improve my child's academic performance.	.337		.562			
CE5	I am willing to spend additional money to enhance my child's education.			.655			

SAO1	My child performs well academically in school	.663
SAO3	My child academic performance is above average compared to his/her peers	.924
SAO4	My child's academic performance has improved over the past year	.859
SAO5	My child meets the academic expectations for the grade level	.651
EI1	Children from wealthier households tend to perform better academically than those from poorer households	.816
EI2	There are significant differences in academic performance between students in public and private schools	.742
EI3	Access to quality learning resources in unequal among students in this area	.604
EI4	Students from disadvantaged backgrounds have fewer opportunities for quality learning.	.776
EI5	Educational opportunities are not equally distributed among all students in the area.	.742
SS1	Level of monthly income	.918
SS2	Level of education	.983
SS3	Type of occupation	.822
SS4	Sufficiency of financial resources to support child's education.	.898

Exploratory factor analysis

Exploratory Factor Analysis (EFA) was conducted to examine the underlying latent dimensions of the constructs measuring demand-side inequalities in basic education. The analysis employed Principal Axis Factoring (PAF) with Promax rotation and Kaiser Normalization. PAF was considered appropriate because the objective was to identify latent constructs underlying the observed variables, while Promax rotation was selected because the study constructs were theoretically expected to be correlated (Costello & Osborne, 2005; Hair et al., 2019).

The suitability of the data for factor analysis was assessed using the determinant of the correlation matrix, the Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy, and Bartlett's Test of Sphericity. The determinant value (1.03E-012) exceeded the minimum acceptable threshold of

0.00001, indicating the absence of severe multicollinearity and singularity (Field, 2018). The KMO value of 0.567 surpassed the minimum recommended threshold of 0.50, suggesting acceptable, though relatively weak, sampling adequacy for factor analysis (Hair et al., 2019; Kaiser, 1974). Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 10,960.701$, $df = 351$, $p < .001$), confirming that sufficient intercorrelations existed among the variables to justify factor extraction (Tabachnick & Fidell, 2019).

Communality estimates ranged from 0.445 to 0.962, indicating that the extracted factors explained a substantial proportion of variance in most items. Although a few items recorded communalities slightly below the preferred threshold of 0.50, they were retained due to their theoretical relevance and acceptable levels of shared variance (Costello & Osborne, 2005).

Based on Kaiser's criterion of retaining factors with eigenvalues greater than 1.0, six factors were extracted. The six-factor solution explained 68.51% of the total variance, exceeding the recommended benchmark of 60% for social science research (Hair et al., 2019). The factors accounted for 19.47%, 14.09%, 10.77%, 9.86%, 7.83%, and 6.48% of the variance, respectively, indicating a stable and interpretable factor structure. The factor loadings are presented in Table 1.

Extraction Method: Principal Axis Factoring. Rotation Method: ProMax with Kaiser Normalizations

The rotated pattern matrix revealed a clear factor structure, with most items loading strongly on their respective constructs. Consistent with the recommendation of Hair et al. (2019), the majority of factor loadings exceeded the minimum threshold of 0.50, providing evidence of satisfactory convergent validity. A small number of cross-loadings were observed (e.g., SE2 loaded on Factor 1 at .360 and Factor 6 at .624; CE4 loaded on Factor 1 at .337 and Factor 3 at .562). These items were retained because their primary loadings were substantially stronger than their cross-loadings and because their content was theoretically aligned with their assigned factors.

Overall, the EFA results support the multidimensional nature of the constructs underlying demand for basic education provision, school substitution, and complementary educational investments. The statistically significant Bartlett's test, acceptable KMO value, satisfactory communalities, strong factor loadings, and substantial cumulative variance explained collectively demonstrate acceptable construct validity and internal structure of the measurement instrument. The extracted six-factor solution was theoretically meaningful and statistically adequate for subsequent multivariate analyses.

Confirmatory Factor Analysis

Prior to evaluating the structural model, a Confirmatory Factor Analysis (CFA) was conducted to validate the measurement model. The CFA model demonstrated acceptable fit to the data: $\chi^2(120, N = 401) = 285.432$, $p < .001$; $\chi^2/df = 2.379$; CFI = .951; TLI = .938; RMSEA = .059 (90% CI [.050, .068]); SRMR = .044. All factor loadings were statistically significant ($p < .001$) and exceeded 0.50, ranging from 0.532 to 0.983. These results provided support for the convergent validity and factorial structure of the measurement instrument before proceeding to hypothesis testing.

Evaluation of the Measurement Model

The study proceeded to evaluate the measurement model. Various indicators of validity and reliability of the measurement model were assessed, including convergent validity, composite reliability, and discriminant validity.

Table 2: Convergent Validity and Composite Reliability Test Results

Construct	Items	Factor Loadings	CR	AVE
Perceived Public-School Quality (PBSQ)	PBSQ1–PBSQ5	.650–.937	.875	.587
School Substitution (SE)	SE2–SE5	.532–.916	.813	.537
Complementary Educational Investments (CE)	CE1–CE5	.562–.928	.865	.572
Academic Outcomes (SAO)	SAO1, SAO3–SAO5	.651–.924	.854	.598
Educational Inequality (EI)	EI1–EI5	.604–.816	.857	.559
Socio-economic Status (SS)	SS1–SS4	.822–.983	.945	.812

Note. CR = Composite Reliability; AVE = Average Variance Extracted.

As shown in Table 2, all constructs exceeded the recommended threshold of 0.70 for CR and 0.50 for AVE (Hair et al., 2019), indicating satisfactory internal consistency reliability and convergent validity. Composite reliability values ranged from 0.813 to 0.945, while AVE values ranged from 0.537 to 0.812. These results suggest that the indicators adequately represent their respective latent constructs and that the measurement model demonstrates acceptable convergent validity.

The study further assessed the discriminant validity of all the constructs using the Fornell–Larcker criterion, whereby the square root of the AVE for each construct exceeded its correlations with all other constructs (Fornell & Larcker, 1981). The results are presented in Table 3.

Table 3: Discriminant Validity Test Results

Construct	PBSQ	CE	EI	SS	SAO	SE
PBSQ	0.766					
CE	−0.299	0.756				
EI	−0.217	0.207	0.748			
SS	−0.100	−0.180	0.095	0.901		
SAO	−0.196	0.340	0.350	0.006	0.773	
SE	−0.016	−0.207	0.309	−0.021	0.010	0.733

Note: Diagonal values (in bold) are the square roots of AVE. Off-diagonal values are inter-construct correlations.

The square roots of AVE ranged from 0.733 to 0.901 and were consistently greater than the corresponding inter-construct correlations, confirming adequate discriminant validity (Fornell & Larcker, 1981). Collectively, these findings demonstrate that the measurement model possesses satisfactory reliability, convergent validity, and discriminant validity.

The Structural Model and Path Estimates

Following the confirmation of the adequacy of the measurement model, the researcher evaluated the structural model and tested the hypothesised relationships among perceived public-school quality, socio-economic status, school substitution, complementary educational investments, academic outcomes, and educational inequality. SEM was employed to estimate the direct, indirect, and total effects among the latent constructs, enabling simultaneous assessment of the proposed pathways (Hair et al., 2019; Kline, 2016). The graphical representation of the Structural Model is presented in Figure 3.

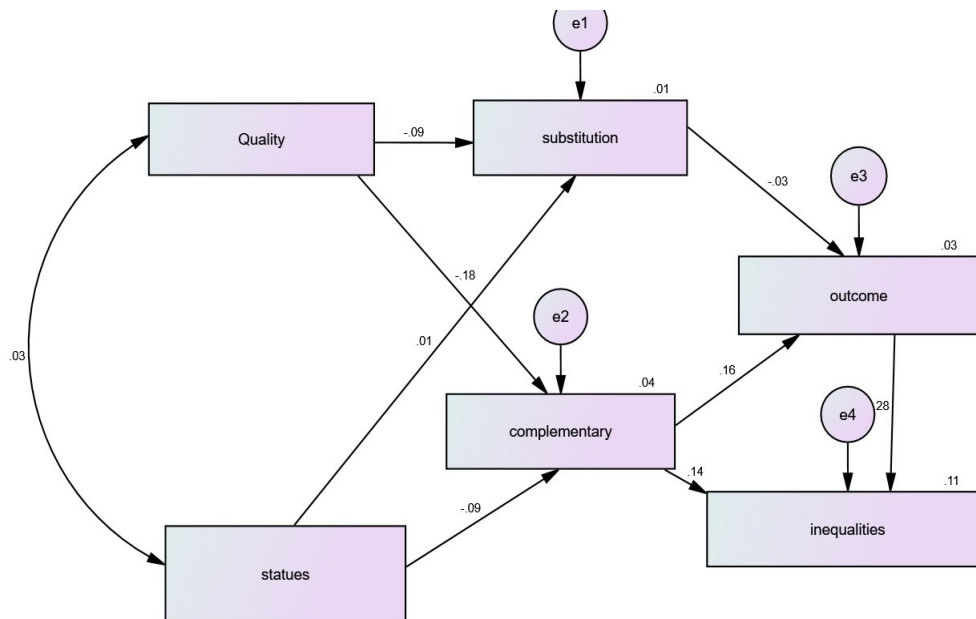


Figure 3: Structural Model of demand side determinants of educational inequalities

Fit indices of the structural model

The overall fit of the structural model was assessed using multiple goodness-of-fit indices, including absolute, incremental, and parsimonious fit measures. The results indicate that the model demonstrates an acceptable to good fit to the data.

The chi-square statistic for the structural model was significant, $\chi^2(94, N = 401) = 392.567$, $p < .001$, with a normed chi-square (CMIN/DF) of 4.176. Although the chi-square test is significant, this is not uncommon in large samples, as the statistic is highly sensitive to sample size (Kline, 2016). The CMIN/DF value falls within the acceptable threshold (≤ 5), indicating reasonable model fit.

Regarding incremental fit indices, the model shows strong fit: the Comparative Fit Index (CFI = .941), Tucker–Lewis Index (TLI = .925), and Incremental Fit Index (IFI = .942) all exceed the recommended threshold of .90, suggesting good model fit (Hair et al., 2019). The Normed Fit Index (NFI = .925) and Relative Fit Index (RFI = .904) further support this conclusion, indicating substantial improvement over the independence model.

The Root Mean Square Error of Approximation (RMSEA) was .088, with a 90% confidence interval ranging from .079 to .097 and a PCLOSE value of .000. While the RMSEA slightly exceeds the more stringent cut-off of .08, it remains within the acceptable range for complex models, particularly in large-sample contexts (Byrne, 2016). The confidence interval suggests a reasonable approximation error, albeit indicating room for minor model improvement.

Overall, the combination of fit indices suggests that the structural model provides an adequate

representation of the observed data and is suitable for hypothesis testing. Based on this, the researcher proceeded to the path analysis, whose results are presented in Table 4.

Table 3: Structural Model Results and Hypothesis Testing

Hypothesis	Structural Path	β	SE	CR	P	Decision
H1	Perceived Public-School Quality → School Substitution	−.091	.026	−1.838	.066	Not supported
H2	Socio-economic Status → School Substitution	.006	.346	0.114	.909	Not supported
H3	Perceived Public-School Quality → Complementary Investments	−.177	.033	−3.643	< .001	Supported
H4	Socio-economic Status → Complementary Investments	−.085	.445	−1.752	.080	Not supported
H5	Complementary Investments → Academic Outcomes	.162	.040	3.313	< .001	Supported
H6	School Substitution → Academic Outcomes	−.030	.052	−0.623	.533	Not supported
H7	Academic Outcomes →	.276	.083	5.812	< .001	Supported

Hypothesis	Structural Path	β	SE	CR	P	Decision
	Educational Inequality					
H8	Complementary Investments → Educational Inequality	.143	.068	3.023	.002	Supported

Note. β = standardised path coefficient; SE = standard error; CR = critical ratio; p = significance level.

The structural model revealed that perceived public basic school quality had a significant negative association with complementary educational investments ($\beta = -.177$, $p < .001$), but no significant association with school substitution behaviour ($\beta = -.091$, $p = .066$). Similarly, socio-economic status was not significantly associated with either substitution ($\beta = .006$, $p = .909$) or complementary investments ($\beta = -.085$, $p = .080$). Complementary investments exerted a significant positive association with academic outcomes ($\beta = .162$, $p < .001$), whereas substitution behaviour was not significantly associated with academic outcomes ($\beta = -.030$, $p = .533$).

Academic outcomes were positively associated with educational inequalities ($\beta = .276$, $p < .001$), while complementary investments also had a significant direct association with educational inequalities ($\beta = .143$, $p = .002$). Furthermore, complementary investments exerted an indirect association with educational inequalities through academic outcomes ($\beta = .045$), resulting in a total effect of $\beta = .188$. Collectively, the findings suggest that educational inequalities are driven more by differential access to complementary educational resources than by household decisions to substitute public schooling with private schooling.

Mediation analysis (H9): To test the hypothesised mediation effect, bootstrapped confidence intervals (5,000 resamples) were computed for the indirect effect of complementary educational investments on educational inequality through academic outcomes. The indirect effect was positive and statistically significant ($\beta = .045$, 95% BC CI [.018, .082]), indicating that academic outcomes significantly mediate the relationship between complementary educational investments and educational inequality. The total effect of complementary investments on educational inequality was $\beta = .188$. Thus, H9 is supported.

DISCUSSION

Determinants of Parental Educational Responses

This study examined whether socio-economic status and perceptions of public basic school quality shape household educational responses through school substitution and complementary educational investments. Contrary to conventional expectations, socio-economic status did not demonstrate a statistically significant relationship with either public basic school substitution or

complementary educational investments. Likewise, perceived public basic-school quality did not significantly predict school-substitution decisions. These findings suggest that parental educational responses in Northern Ghana may be conditioned less by household resources alone and more by contextual and structural constraints within local education markets.

The absence of a significant relationship between socio-economic status and school substitution contrasts with a substantial body of international literature which suggests that economically advantaged households are generally more likely to opt out of public education when dissatisfied with its quality (Coleman et al., 1982; Colclough et al., 2000; Tooley et al., 2008). Research across both developed and developing countries consistently demonstrates that household income and parental education increase the likelihood of private school enrolment because they expand families' capacity to exercise educational choice. Similarly, evidence from sub-Saharan Africa indicates that private-school participation is disproportionately concentrated among wealthier households (World Bank, 2018). The present findings therefore suggest that the mechanisms underlying school choice in Northern Ghana differ from those commonly reported in the broader literature.

One plausible explanation lies in the spatial and institutional characteristics of educational provision within the study area. School choice presupposes the availability of meaningful alternatives. However, many rural and peri-urban communities in Northern Ghana have a limited supply of private schools, making educational choice less responsive to household socio-economic resources. Under such circumstances, even relatively affluent households may be unable or unwilling to substitute public schooling with private alternatives because such alternatives are geographically inaccessible, costly to reach, or perceived as offering only marginal advantages. This finding supports emerging critiques of market-based education theories which argue that educational choice is often constrained by local opportunity structures rather than determined solely by household preferences or purchasing power (Ball, 2003; Gewirtz et al., 1995).

Similarly, the non-significant relationship between perceived public-school quality and school substitution suggests that dissatisfaction with public provision does not necessarily translate into private-school enrolment. This finding challenges assumptions embedded in traditional school-choice models, which posit that households respond to declining public-school quality by exiting the public system (Friedman, 1955; Hoxby, 2003). Instead, the evidence suggests that parental responses to educational deficiencies may be more nuanced and context-specific. In many parts of Northern Ghana, households may respond to variations in school quality by transferring children between public schools rather than moving them into the private sector. Moreover, school-choice decisions may be influenced by factors such as school proximity, social networks, cultural familiarity, perceived safety, and transportation costs, factors that are often underemphasized in conventional economic models of educational demand (Herbert & Pierro, 2019).

In contrast, perceived public-school quality emerged as a significant predictor of complementary educational investments, providing support for H3. Households that perceived public schools as offering lower-quality education were significantly more likely to supplement their children's learning through private tutoring, additional learning materials, and other forms of academic support. This finding is consistent with Household Production Theory (Becker, 1964), which conceptualises educational achievement as the outcome of combined investments from schools and households. Rather than withdrawing from the public-school system, households appear to

compensate for perceived deficiencies in school quality by increasing educational inputs within the home and through external support mechanisms.

The finding also resonates with growing international evidence suggesting that complementary educational investments have become a central mechanism through which families respond to educational uncertainty and competition. Bray (2013) argues that private supplementary tutoring has emerged as a global phenomenon that increasingly shapes educational opportunities and outcomes. Similar patterns have been documented across Asia, Europe, and Africa, where households seek to secure educational advantages through investments that extend beyond formal schooling (Baker et al., 2001; Dang & Rogers, 2008). Such investments often function as compensatory strategies designed to offset perceived weaknesses in school provision while simultaneously enhancing children's academic competitiveness.

Importantly, the results suggest that educational inequalities in Northern Ghana may be reproduced less through differential school-sector participation and more through unequal household capacities to supplement learning. This finding contributes to broader debates on educational inequality by demonstrating that household responses to perceived educational deficiencies are not limited to school choice. Rather, inequality may emerge through the cumulative effects of supplementary investments that enhance learning opportunities for some children while remaining inaccessible to others. Consequently, policies aimed at reducing educational inequality should not focus exclusively on improving access to schools but should also address disparities in households' capacity to provide complementary educational support.

Overall, the findings indicate that parental educational responses in Northern Ghana are shaped by a complex interaction of institutional constraints, educational opportunities, and household strategies. While school substitution appears to play a limited role, complementary educational investments constitute a more important mechanism through which families respond to perceived variations in educational quality. These results underscore the need to move beyond simplistic market-based explanations of educational choice and to recognise the contextual factors that shape how households navigate educational inequalities in resource-constrained environments.

Parental Educational Responses and Academic Outcomes

The study further examined the extent to which parental educational responses are associated with students' academic outcomes. The findings indicate that complementary educational investments exert a positive and statistically significant effect on academic outcomes, providing support for H5. In contrast, school substitution did not significantly influence academic outcomes, leading to the rejection of H6. These findings suggest that educational achievement is shaped less by school-sector choice alone and more by the additional educational resources and support that households are able to mobilise for their children.

The positive effect of complementary educational investments is consistent with a substantial body of international research demonstrating that household educational inputs play a critical role in shaping students' learning outcomes (Bray, 2013; Baker et al., 2001). Investments such as private tutoring, supplementary learning materials, parental supervision, and home-based academic support provide students with additional opportunities to reinforce classroom learning, address learning gaps, and develop academic competencies. From a human capital perspective,

these investments represent deliberate efforts by households to enhance the educational productivity of their children and improve future life opportunities (Becker, 1964). The findings therefore reinforce longstanding arguments that educational achievement is produced not only within schools but also through the interaction of school-based learning and family-level investments.

The results also align with research showing that educational advantages are often accumulated through unequal access to supplementary educational resources. Studies across both developed and developing countries have consistently found that families with greater economic, cultural, and informational resources are better positioned to provide educational support that enhances student achievement (Bourdieu, 1986; Psacharopoulos & Patrinos, 2018). Consequently, complementary educational investments function as an important mechanism through which educational advantages are reproduced across generations. The present findings contribute to this literature by demonstrating that similar processes operate within Northern Ghana, where household efforts to supplement formal schooling significantly improve academic outcomes regardless of school type.

Equally noteworthy is the finding that school substitution did not significantly influence academic outcomes. This result challenges a common assumption within school-choice literature that private schooling automatically yields superior educational performance. Although private schools are frequently perceived as offering higher-quality education, growing evidence suggests that differences in academic outcomes between public and private schools often diminish once household characteristics and family-level educational investments are taken into account (Lubienski & Lubienski, 2013; Tooley & Dixon, 2006). The present findings therefore suggest that the educational benefits commonly attributed to private schooling may be less a consequence of school ownership and more a reflection of the socio-economic and educational resources available to the families who enrol their children in such institutions.

Several contextual factors may explain the absence of a significant substitution effect. First, substantial heterogeneity exists within both public and private school sectors. Not all private schools provide superior learning environments, particularly in underserved and resource-constrained regions where some private institutions face challenges similar to those confronting public schools. Second, educational outcomes are influenced by multiple factors beyond school type, including teacher quality, parental engagement, learning resources, student motivation, and community support structures. Consequently, attending a private school alone may be insufficient to generate measurable academic advantages in contexts where broader educational constraints persist.

More broadly, the findings contribute to ongoing international debates concerning the relative importance of school effects and family effects in explaining educational achievement. Whereas policy discussions often focus on expanding school choice as a strategy for improving educational outcomes, the present evidence suggests that household investments may be equally, if not more, consequential. This finding supports emerging scholarship arguing that educational inequalities are increasingly shaped by differences in families' capacity to invest in children's learning rather than by school attendance alone (Reardon, 2011; Baker et al., 2001).

Overall, the results indicate that educational achievement in Northern Ghana is influenced more

strongly by complementary educational investments than by school-sector substitution. The findings underscore the importance of viewing academic outcomes as products of both institutional provision and household agency. They further suggest that policies aimed at improving educational performance should extend beyond school access and quality to include interventions that strengthen households' capacity to support learning, particularly among socio-economically disadvantaged families.

Mechanisms of Educational Inequality

The final objective of this study was to examine how educational inequalities emerge and persist within the basic education system of Northern Ghana. The findings revealed that both academic outcomes and complementary educational investments exert significant positive effects on educational inequalities, providing support for H7 and H8. These results suggest that educational disparities are produced through cumulative processes whereby unequal access to educational resources translates into differential academic achievement and, ultimately, unequal educational opportunities.

The positive relationship between academic outcomes and educational inequality highlights the cumulative nature of educational advantage. Students with stronger academic performance are more likely to access advanced educational opportunities, competitive learning environments, and future socio-economic benefits, whereas lower-performing students often face restricted opportunities. This finding is consistent with cumulative advantage theory, which posits that relatively small initial differences in educational opportunities can expand over time, leading to increasingly unequal outcomes across social groups (DiPrete & Eirich, 2006).

The study further found that complementary educational investments, including private tutoring, supplementary learning materials, and parental academic support, directly contribute to educational inequalities. Although public education seeks to provide equal learning opportunities, students differ considerably in their access to educational support outside school. Consequently, educational outcomes increasingly reflect disparities in households' capacity to supplement formal schooling rather than differences in school attendance alone.

This finding aligns with international evidence showing that households with greater economic, social, and cultural resources are better positioned to provide educational support that enhances academic achievement and long-term attainment (Baker et al., 2001; OECD, 2018; Reardon, 2011). It also provides empirical support for Social Reproduction Theory (Bourdieu, 1986; Bourdieu & Passeron, 1977), which argues that educational systems often reproduce existing social inequalities through unequal access to economic, cultural, and social capital.

Furthermore, complementary educational investments exerted an indirect effect on educational inequalities through academic outcomes, indicating that household investments serve as a critical mechanism linking family resources to educational stratification. Notably, educational inequality in Northern Ghana appears to be driven more by disparities in complementary educational investments than by school-substitution behaviour. This suggests that improving school access alone may be insufficient to reduce inequality if substantial differences persist in households' capacity to support learning outside the classroom.

Given the cross-sectional design, these findings reflect associations rather than causal relationships. Longitudinal or experimental designs are needed to establish temporal precedence and causal direction.

LIMITATIONS

The findings of this study should be interpreted in light of several limitations. First, the cross-sectional survey design captures data at a single point in time, precluding causal inference. The observed associations between household investments, academic outcomes, and perceived inequality may be bidirectional; for example, parents of high-performing children may invest more because they perceive greater returns, rather than investments causing higher performance. Second, the use of a non-probability sampling strategy limits the generalisability of findings to all parents and guardians in Northern Ghana. The sample may over-represent certain community types or socio-economic groups. Third, all measures were based on parent self-reports, which introduces the possibility of common method variance and subjective bias. Objective measures of school quality and student achievement were not available. Fourth, the study's geographic focus on Northern Ghana may limit transferability to urban centres such as Accra or Kumasi, where private-school markets are more developed and substitution effects may operate differently. Fifth, the non-significant findings for school substitution may reflect limited availability of private schools in rural areas rather than an absence of demand; the study did not directly measure local school supply. Finally, the modest KMO value (0.567) and slightly elevated RMSEA (.088) suggest that model fit and sampling adequacy, while acceptable, were not optimal, indicating that replication with larger, probability-based samples would strengthen confidence in the findings.

CONCLUSION AND RECOMMENDATIONS

This study examined how household responses to perceived educational quality are associated with academic outcomes and educational inequalities in the five northern regions of Ghana. The findings reveal that educational inequality is driven less by school substitution and more by complementary educational investments. While socio-economic status and perceived public-school quality did not significantly predict households' decisions to move children from public to private schools, perceived lower public-school quality was significantly associated with increased investments in supplementary educational support. These complementary investments, in turn, positively predicted academic outcomes and contributed directly and indirectly to educational inequalities. The results suggest that disparities in educational achievement are produced through cumulative advantages arising from unequal access to educational resources beyond the formal school system.

The study recommends that policymakers prioritise improving the quality of public basic education, particularly in underserved communities, to reduce the need for compensatory household investments. Interventions should focus on strengthening teacher quality, learning resources, and instructional support within public schools. In addition, targeted programmes such as subsidised tutoring, remedial learning initiatives, after-school academic support, and the provision of learning materials for disadvantaged students should be expanded to ensure that educational success is not determined by household financial capacity. However, because the

sample was non-probability and cross-sectional, pilot programmes should be evaluated with quasi-experimental designs before large-scale rollout. Addressing both school-level deficiencies and inequalities in access to supplementary learning opportunities is essential for promoting equitable educational outcomes and advancing inclusive basic education in Northern Ghana.

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