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Can financial inclusion improve children's learning outcomes and late school enrolment in a developing country?

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Abstract

This study uses comprehensive household data from Ghana to examine the link between financial inclusion and children's learning outcomes and late school enrolment. After resolving endogeneity, we find that a standard deviation increase in financial inclusion is associated with 0.7882 to 0.9504 standard deviations increase in children's learning outcomes. It also reduces late school enrolment by 0.9493 standard deviation. Financial inclusion enhances learning and schooling outcomes more for girls and urban children. These findings are robust to different indicators of learning outcomes and alternative approaches to addressing endogeneity. Parents' ability to spend on extra classes and on books and other school-related supplies serve as possible channels through which financial inclusion affects children's educational outcomes.

Keywords: Financial inclusion; Reading; Writing; Learning poverty; Education, Ghana

JEL Code: D03, D14, I21, I22, J13

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1. Introduction

The world is faced with a learning crisis that is considered a threat to countries' efforts in building human capital and achieving the Sustainable Development Goals (SDGs). Currently, 80% of children in poor countries are unable to read proficiently by age 10 or even at age 12. This problem, also referred to as learning poverty, stands at 87% in sub-Saharan Africa (SSA) and 53% in low- and middle-income countries in general (World Bank, 2019). The World Bank estimates that by 2030 about 43% of children will be learning-poor globally (World Bank, 2019). Although learning poverty focuses on reading proficiency, its higher rate implies that these children are yet to unlock their writing and numeracy potentials. A research agenda on learning outcomes has become imperative for two reasons. First, there are compelling evidences of young adults who are leaving school with too little learning and too few of the skills needed to make them employable and productive citizens (Afoakwa & Koomson, 2021; World Bank, 2019). Second, many countries have implemented or in the process of implementing free education policies which are known to considerably increase enrolments (UNESCO, 2011), so it has become important to focus more on policies that can enhance children's learning outcomes and provide them with the skills needed for productive adulthood.

In addition to poor learning outcomes, many children in SSA enroll late in school which affect their grade progression and, in some instances, leads to high school dropout (UNESCO, 2016). Considering the benefits of improved learning and schooling outcomes on individual and household welfare and in the economic development of countries (FitzRoy, & Nolan, 2020; Pritchett, 2013; Schmillen, 2019; World Bank, 2018), the World Bank has identified five pillars of system improvement needed to enhance children's learning outcomes. These seek to ensure that (i) learners are prepared and motivated to learn; (ii) teachers at all levels are effective and valued; (iii) classrooms are equipped for learning; (iv) schools are safe and with inclusive spaces; and (v) education systems are well managed (World Bank, 2019). Although the last four pillars place a bigger responsibility on society, governments' education expenditure as a percentage of GDP has been low globally and even lower in low-income countries—ranging from 1% in South Sudan to 6.5% in Mozambique (UNESCO, 2015). Pillar one is of relevance to this study because it calls for school-parent partnership that helps to build language and preliteracy skills needed to enroll and complete school. Parents are also expected to provide children with care, stimulation, and nutritional inputs for long-term cognitive, emotional, and physical health needed to reduce learning

poverty even after enrolling in primary school (World Bank, 2019). According to Elliot III and Lewis (2014); and Ansong et al. (2021), recent global policies are gradually shifting more financial burden from governments to parents, which calls for increased savings on the part of parents.

Since households play a key role in education financing, the role of financial inclusion has become paramount. Some evidence exist in support of a positive relationship between financial inclusion and children's education, health and poverty (Abdul-Mumuni & Koomson, 2019; Ansong et al., 2021; Awaworyi Churchill & Marisetty, 2020; Jalilian & Kirkpatrick, 2002; Koomson et al., 2020a; Q. Zhang & Posso, 2019). This is because financial inclusion is directly associated with expansions in parents' ownership of transactions and savings accounts, payment facilities, access to credit and receipt of remittances, which further enhances entrepreneurial propensities, women's empowerment, risk management and investment in education (Ashraf et al., 2010; Bruhn & Love, 2014; Dupas & Robinson, 2013). This notwithstanding, studies on the financial inclusion and child education remain sparse (Ansong et al., 2021; Rosner, 2011). Financial inclusion has the propensity to improve children's education through overcoming the cost constraints to education (Ansong et al., 2021).

In this study, we examine the link between financial inclusion and children's learning outcomes—reading, writing, calculation skills, and late enrolment. By doing so, we contribute to the literature in several ways: first, we exploit rich household data on children's learning outcomes, which are rare in developing countries, to examine the link between financial inclusion and children's educational outcomes. To our best knowledge, this is the first study to focus on such an important but neglected relationship. Second, we utilise a comprehensive measure of financial inclusion to tease out all aspects of household's financial participation to better unpack its effect on children's educational outcomes. Finally, we interrogate the potential channels through which financial inclusion impacts children's education. Our findings show that financial inclusion improves children's ability to read and write in both English and their native languages as well as their ability to do written calculation. Financial inclusion also reduces the chances of children enrolling late in school. Finally, our findings reveal that financial inclusion influences children's educational outcomes through parents' ability to spend more on extra classes, books, and other school-related supplies.

The remaining sections of this paper are organised as follows. Section 2 presents the contextual issues on financial inclusion and children's education in Ghana. It also discusses the

theoretical link between financial inclusion and children's education. Section 3 discusses the methodology, which includes data sources, measurement of key variables and estimation techniques. Section 4 presents the results and discussion and Section 5 deals with robustness and sensitivity checks while Section 6 concludes.

2. Financial inclusion and children's learning and schooling outcomes in Ghana

Financial inclusion in Ghana is considered low despite an increase from 29% in 2011 to 58% in 2017 which represents a 29-percentage points increase over the period. This improvement notwithstanding, 54% of adult females have a transaction account compared to 62% of adult males (Demirgüç-Kunt et al., 2018). Savings account ownerships within the rural population is 19% while 36.2% of the urban population owns a savings account. Regarding insurance, 22.7% of Ghanaians own a policy but those in the urban areas (25%) own more compared to those in the rural areas (19.6%). In general, those who applied for credit in 2016 were 7.1%, with rural dwellers (8.1%) being more than urban dwellers (6.2%). Female loan applicants (8.0%) were more than males (6.6%). Mobile money adoption has also increased from 13% of the population in 2014 to 39% in 2017 (Mattern & McKay, 2018). Similar difference exists in children's learning and schooling outcomes.

According to the 2019 Multiple Indicator Cluster Survey (MICS) report, the proportion of Ghanaian children aged 7-14 years who demonstrated foundational reading skills is 21.4%. This figure was found to be higher among girls (29.3%) than boys (20.4%). It was also found to be higher among urban (33.6%) than rural (12.4%) children. This implies that learning poverty is higher among male and rural children (GSS, 2018). Previous studies have found the issue of late enrolment to be a common phenomenon in Ghana. Seshie-Nasser and Oduro (2016) found that late enrolment among six and fifteen year olds was 40% and 61.5% respectively. Across the globe, gender disparities in enrolment and attendance have narrowed over the past 20 years. This is reflected in the male-female gender difference in out-of-school rates, which is now close to zero at all three levels of schooling, but at varying rates in different regions of the world (UNESCO, 2022). Although gender parity in enrolment is far from being achieved in SSA in general, countries like Djibouti, Rwanda and Ghana have either achieved or almost achieved gender parity in out-of-school rates (UNESCO, 2022). Achieving gender parity in enrolment indicates that enrolment among girls has outpaced that of boys. Based on the existing gender and locational differences in

parent's financial inclusion and in the learning and schooling outcomes for boys and girls, it is prudent to estimate separate models for boys and girls and for rural and urban children.

2.1 Why should financial inclusion affect children's education?

Within the framework of financial development, financial inclusion can influence children's education either directly or indirectly. Directly, financial inclusion improves children's learning and schooling outcomes through enhanced access to credit, insurance, receipt of remittances and other financial services, which provide resources that are invested in children's education (Ansong et al., 2021; Goodman, 2010; Islam & Choe, 2013; King & Levine, 1993; Rajan & Zingales, 1998; Ringo, 2019). Enhanced financial inclusion can also spur entrepreneurship for the poor which increases their capability to achieve sustainable livelihoods (World Bank, 2001). Financial resources from the sustained livelihoods can be used to pay for high cost but quality education; buy textbooks and other reading materials and computers; and pay for extra classes (Behrman & Knowles, 1999). Considering Willingham (2012), we infer that the possible channels through which financial inclusion can influence children's learning outcomes can be seen in how it enables: investment in quality pre-school which provide children with a stronger foundation; acquisition of educational stationary and domestic library materials; extra tuition for children and investment in well-resourced schools for children. Existing studies point to a positive association between expenditure on extra classes or private tutoring on children's academic performance (Mischo & Haag, 2002; Ryu & Kang, 2013). It is worthy to note that some studies on parents' investments in education have also yielded mixed/conflicting results which implies that investments in education do not always translate into better academic performance (Ono, 2007; Zhang, 2013). Indirectly, financial development influences child education through economic growth. Economic growth benefits the poor through job creation and increased government social spending on education subsidies, health, and social protection (Abosedra et al., 2016; Perotti, 1993).

In this paper, we focus on the direct link between financial inclusion and child education, but previous studies have identified the existence of endogeneity between financial inclusion and household welfare (Awaworyi Churchill et al., 2020; Awaworyi Churchill & Marisetty, 2020; Koomson et al., 2020a; Koomson & Ibrahim, 2018). According to these studies, the endogeneity either emanates from bi-causality or from the omission of some components of transactions costs

on financial services. Although the omitted variable problem could exist in our case, we consider endogeneity in this study as resulting mainly from bi-causality. On one hand, improved financial inclusion is likely to enhance children's learning and schooling outcomes through parents' ability to purchase reading materials and afford quality schools. On the other hand, parent's desire to invest in quality education for their children can also drive them to be financially included. There are numerous child education insurance packages and other education-related financial products that have been designed to smoothen household education expenditure over time. Consistent with the studies that have identified endogeneity, we resolve the problem using distance to the nearest bank in an instrumental variable estimation procedure. The validity of the instrument is explained in Subsection 3.3.

3. Methodology

3.1 Data

This study uses data from the 2016/17 round of the Ghana Living Standards Survey (GLSS7) which was conducted by the Ghana Statistical Service (GSS). Using a probability sampling approach (two-stage), information contained in the data include education (learning and schooling) outcomes, demography, housing conditions, employment, water and sanitation, health, access to financial and insurance services, remittance and household assets, disability, migration, agriculture, non-farm activities and governance, among others (GSS, 2019). The sample is nationally representative, covering 15,000 households in 1,000 enumeration areas (clusters) across the 10 (now 16) regions of Ghana. Although the regions of Ghana have been increased from 10 to 16 after the GLSS7 was released, all the geographical areas in the 16 regions were covered as part of the then 10 regions in the GLSS7. With a 93.4% response rate, the final sample size was 14,009 households with 59,864 individuals. After merging files containing our variables of interest, the sample size reduced to 13,844 households. Out of these, we had 5,786 children with information on learning outcomes and 7,648 children with information on late enrolment. The bigger observation for late enrolment is because we focused on basic educated for learning outcomes but for late enrolment, we extended our scope up to secondary education. The rationale for this has been provided in Subsection 3.2.1.

3.2 Definition and measurement of key variables

3.2.1 Learning outcomes and late school enrolment

We measure children's learning outcomes using five different but related variables that depict literacy and numeracy ability—read English or French; write English or French; read native (Ghanaian) language; write native language; and ability do written calculation. Using a binary measure, a child who is able to perform in any of these learning outcomes is given a value of 1 and 0 otherwise. For learning outcomes, we focus on children in basic school (year one to year nine) due to the existing evidence of young adults who are leaving school with too little of basic literacy and numeracy skills (World Bank, 2019). Late or delayed enrolment on the other hand refers to a child beginning school at the age of 7 or later. Similar to Afoakwa et al. (2020), this threshold is used because the required school entry age for primary 1 in Ghana is 6 years. A child who enrolls late is given a value of 1 and 0 otherwise. Unlike learning outcomes, the scope of late enrolment is extended up to children in secondary school (year one to year twelve).

These variables are key to our study because they form part of the core curriculum and children at the basic education level are required to pass both written English and mathematics exams in order to progress to the secondary or tertiary levels of education (Afoakwa et al., 2020). These learning outcomes are also selected because, they provide children with the strategic skills needed to effectively study and operate as adults and to be of productive service to society (World Bank, 2019). Enhancing children's learning outcomes in basic literacy and numeracy (target 6 of SGD 4) has long-term development implications in achieving higher rates of employment, productivity, and earnings; poverty reduction, better health outcomes; and greater civic engagement. At the community-wide level, highly educated members contribute to faster innovation and growth; greater integrational social mobility, better functioning institutions; higher levels of trust and lower likelihood of conflict (Pritchett, 2013; World Bank, 2018). In a multilingual country like Ghana, where English is a formal language, children's ability to read and write English helps them to interact effectively in school and their societies as well as prepare them for future interactions at their workplaces. The full descriptions of the variables have been provided in Table A3.

3.2.2 Financial inclusion

Following Koomson et al. (2020a); and Aslan et al. (2017), we apply multiple correspondence analyses (MCA) to generate a multidimensional measure of parents' financial inclusion using 15 binary indicators across four broad dimensions. These widely used dimensions are ownership of financial products, use of financial products, access to credit and receipt of financial remittance (Aslan et al., 2017; Demirgüç-Kunt et al., 2018; Koomson et al., 2020a). Compared to other approaches to index generation, such as principal component analysis (PCA) and factor analysis, MCA is considered the most suitable when the set of indicators are categorical rather than continuous. MCA is a PCA equivalent for categorical data (Abdi & Valentin, 2007; Aslan et al., 2017; Stata, 2015). For indicators that are peculiar to Ghana (e.g., E-zwich), further explanations have been provided beneath Table A1.

The Burt approach is applied using the principal normalisation which scales the coordinates by the principal inertias. As presented in Table A2, the MCA with the Burt matrix and adjustments explains 70.05% of the total inertia in the first two dimensions. Stated differently, dimensions 1 and 2 jointly explain 70.05% of the variation in the financial inclusion index. Dimensions 1 and 2 are retained to generate the index the increment in variance explained beyond dimension 2 reduces to 3.64% and becomes negligible afterwards. Our approach used in choosing dimensions is consistent with existing literature (Aslan et al., 2017; Hamid et al., 2016; Koomson et al., 2020a; Stata, 2015). The financial inclusion index is a continuous variable for which a unit increase indicates an enhancement in the level of financial inclusion. Similar to Koomson et al. (2020a), the average value of 0.038 for financial inclusion (see Table A2) indicates that financial inclusion among Ghanaian parents is quite low.

3.3 Empirical strategy

To estimate the link between financial inclusion and children's learning and schooling outcomes, we use a linear probability model (LPM). Our choice of LPM as the main model is because: (i) its marginal effects are easy to interpret (Afoakwa et al., 2020; Afoakwa & Koomson, 2021; Koomson et al., 2020b); and (ii) its coefficients are directly comparable with those of the two-stage least squares (2SLS) procedure which is employed to address the problem of endogeneity associated with financial inclusion. For robustness check, we also estimated a probit model and reported the marginal effects to confirm our baseline estimates.

As discussed in Subsection 2.1, a potential endogeneity exists between financial inclusion and children's education. Consistent with previous studies (Churchill et al., 2020; Churchill & Marisetty, 2019; Koomson et al., 2020a), we resolve this problem by instrumenting financial inclusion with distance to the nearest bank in the community (district). In Ghana, districts are the second-level administrative subdivision below regions. Average distance to the nearest bank in a community satisfies both the relevance and exclusion restriction conditions. The longer the distance to the nearest bank, the higher the financial, in-kind and psychic costs and the lower the level of access to and use of financial products and services (Brown et al., 2015; Demirgüç-Kunt & Klapper, 2012; Koomson et al., 2020a). This hypothesis will further be tested in our first stage regression. On the other hand, the distance to the nearest bank does not have a direct influence on children's learning and schooling outcomes but only through indicators of financial inclusion such as access to credit, ownership and use of financial products and receipt of financial remittance. The Ghanaian government in the last decade has implemented financial policies that have substantially increased the spread of rural and community banks to serve the financial needs of Ghanaians irrespective of geographic location (Koomson et al., 2020a). With such widespread financial institutions, it is expected that improved access (distance) to banks will increase financial inclusion thereby improving children's learning outcomes. We include regional-level fixed effect to tease out the impact of unobservable regional level variables that varies between regions but constant across time. Regions are the highest geographical disaggregation in Ghana. Since the GLSS7 was collected between 2016 and 2017, we also include year of survey fixed effects.

Therefore, we specify the first and second stage models in equations 1 and 2 respectively.

Reduced Form Equation (1st stage)

$$FI_i = \delta + \gamma Dist_i + \eta X_i + \varepsilon_i \quad (1)$$

Structural Equation (2nd Stage)

$$Y'_i = \alpha + \beta \widehat{FI}_i + \lambda X_i + v_i \quad (2)$$

where Y'_i is a vector of all the six learning and schooling outcomes, which are captured as binary variables. A child's ability to perform any of the learning outcomes is given a value of 1 and 0 otherwise. A child who enrolled late in school is given a value of 1 and 0 otherwise. FI is financial

inclusion and $Dist$ is the average distance to the nearest bank in kilometers. X is a vector of variables consistent in the literature regarding the determinants of child learning and schooling outcomes. These include child-specific variables such as age and gender, distance to school, provision of free meals, and disability. It also includes household and household-head characteristics such as age of head, household size and its squared term, gender and educational status of household head, location, employment and marital status of head, regional and year of survey fixed effects and household per capita expenditure. $\delta, \gamma, \eta, \alpha, \beta, \lambda$, are parameters to be estimated while ε and ν are random error terms.

3.4 Summary statistics

The descriptive statistics in Table A3 indicate that 72.5% of the sampled children can read English or French while 69.8% of children can write in English or French. Also, about 31.9% of the children can read in any native language whereas only 28.8% can write in their native language. The proportion of children who can perform a written calculation task is 79.4% while those who enrolled late are about 51.9%. The average age of children in the sample is 13 years while the average distance to the nearest bank is recorded as 12.8 kilometres.

4. Results and discussion

Table 1 presents a condensed version of baseline results for the association between financial inclusion, children's learning outcomes and late school enrolment. The full results are presented in Table A4 in the Appendix. Marginal effects are reported for probit estimates while unstandardized as well as standardised coefficients are reported for the LPM. A visual inspection of the probit and LPM estimates shows a similar pattern with the biggest difference being 0.0011 for the unstandardized coefficients (Columns 1 and 2). Based on this, we focus on the LPM estimates and interpret only standardized coefficients because they are easily comparable across estimation types for both financial inclusion and children's education measures. In Columns 2 and 4, we observe that a standard deviation increase in a parent's financial inclusion is associated with 0.0400 and 0.0349 standard deviations increase in a child's ability to read and write in English/French respectively. From Columns 6 and 8, a standard deviation increase in a parent's financial inclusion is associated with 0.0421 and 0.0513 standard deviations increase in a child's ability to read and write in a native (Ghanaian) language respectively. Lastly, a standard deviation

increase in a parent's financial inclusion is associated with a 0.0252 standard deviation decrease in late enrolment.

Overall, our findings across estimates suggest that financial inclusion can contribute to a reduction in learning poverty through an enhancement in children's learning and schooling outcomes. The possible link to be drawn for this outcome is the fact that financial inclusion provides the financial resources needed to access quality education. The resources can also be invested in reading materials and technology (i.e., tablets or laptops, internet etc) that promote quality learning. Savings and investment in child education fund/insurance, can help to smoothing households' consumption of education in times of idiosyncratic shocks. These results are consistent with previous studies and existing theory that point to a positive relationship between financial inclusion and children's education and their learning outcomes, by extension (Abdul-Mumuni & Koomson, 2019; Ansong et al., 2021; Awaworyi Churchill & Marisetty, 2020; Koomson et al., 2020a).

These notwithstanding, OLS (LPM) results are biased in the presence of endogeneity so we estimate and present 2SLS results that use average distance to the nearest bank as instrument in **Table 2**. Consistent with expectations, the first stage results indicate that an increase in distance to the nearest bank is associated with a decline in financial inclusion (Columns 1 to 6). Since the F statistics are all greater than the threshold of 10, we can deduce that our instruments do not have a weak relationship with financial inclusion (Stock & Yogo, 2002). With the 2SLS results being considerably higher than the baseline estimates, we can infer that the endogeneity of financial inclusion causes a downward bias in our baseline (LPM) estimates. Specifically, a standard deviation increase in a parent's financial inclusion is associated with 0.6542 and 0.9027 standard deviations increase in a child's ability to read and write in English/French respectively (see Columns 1 and 2 of Table 2). In Columns 3 and 4, a standard deviation increase in a parent's financial inclusion is associated with 0.9504 and 0.8606 standard deviations increase in a child's ability to read and write in a native language respectively. Finally, a standard deviation increase in a parent's financial inclusion is associated with a 0.7882 standard deviation increase in a child's ability to do written calculation and decline of 0.9493 standard deviation in late school enrolment.

Table 1: Financial inclusion and child learning and schooling outcomes (Baseline results)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Learning Outcome										Schooling outcome	
	Read English/French		Write English/French		Read native language		Write native language		Do written calculation		Late enrolment	
Variables	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM
Financial inclusion index	0.0045*** (0.0016) [0.1030]	0.0034*** (0.0013) [0.0400]	0.0037** (0.0016) [0.0806]	0.0030** (0.0013) [0.0349]	0.0032** (0.0014) [0.0700]	0.0037** (0.0015) [0.0421]	0.0037*** (0.0013) [0.0835]	0.0044*** (0.0015) [0.0513]	0.0012 (0.0014) [0.0318]	0.0006 (0.0012) [0.0079]	-0.0024** (0.0011) [-0.0416]	-0.0023** (0.0011) [-0.0252]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		0.4944*** (0.0821)		0.5578*** (0.0834)		0.2257*** (0.0855)		0.1956** (0.0840)		0.6872*** (0.0775)		-0.0803 (0.0577)
Observations	3,103	3,103	3,103	3,103	3,103	3,103	3,103	3,103	3,102	3,102	6,303	6,303
R-squared		0.1906		0.1939		0.2195		0.2018		0.1401		0.1156

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 LPM: Linear Probability Model ME: Marginal Effects Exp: Expenditure
Standardized coefficients in square brackets Regional fixed effects represent dummy variables for the ten regions in Ghana

Table 2: Financial Inclusion, child learning and schooling outcomes (IV results)

	(1)	(2)	(3)	(4)	(5)	(6)
	Learning outcomes					Schooling Outcome
Variables	Read English/ French	Write English/ French	Read native language	Write native language	Do written calculation	Late enrolment
Financial inclusion index	0.1402** (0.0592) [0.6542]	0.1660** (0.0670) [0.9027]	0.1727*** (0.0653) [0.9504]	0.1601*** (0.0615) [0.8606]	0.1373** (0.0574) [0.7882]	-0.0862*** (0.0289) [-0.9493]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
First Stage						
Distance to bank (km)	-0.0440*** (0.0158)	-0.0440*** (0.0158)	-0.0440*** (0.0158)	-0.0440*** (0.0158)	-0.0440*** (0.0158)	-0.0461*** (0.0108)
<i>F-Statistic (Cragg-Donald)</i>	17.80	17.80	17.80	17.80	17.80	18.15
Observations	3,103	3,103	3,103	3,103	3,102	6,303

Robust standard errors adjusted for heteroskedasticity in parentheses *** p<0.01, ** p<0.05, * p<0.1
Standardized coefficients in square brackets IV – instrumental variables estimation

4.1 Children's learning and schooling outcomes: gender and location dimensions

We now conduct subsample analyses for boys and girls and for rural and urban children which are in line with the SDGs key objective of “leaving no one behind” in equitable development. Panels A and B of **Table 3** present 2SLS results for boys and girls respectively. In Panel A (Columns 2 and 3), a standard deviation increase in financial inclusion is associated with 0.6189 and 0.6270 standard deviations increase in a boy's ability to write in English/French and read in a native (Ghanaian) language, respectively. In Panel B (Columns 1, 3 and 4), a standard deviation increase in a parent's financial inclusion is associated with an increase in learning outcomes between 0.1412 and 0.9189 standard deviations for girls. Also, a standard deviation increase in a parent's financial inclusion is associated with a 0.0380 standard deviation decline in late enrolment of girls. Comparatively, improvements in parent's financial inclusion enhances four out of five learning outcomes for girls while it does so for only two learning outcomes for boys. Impliedly, enhanced financial inclusion for parents is more likely to enhance learning and schooling outcomes for girls than for boys. With late enrolment being common phenomenon in Ghana (Seshie-Nasser & Oduro, 2016), it is worthy to consider financial inclusion as policy to help curb this menace.

In **Table 4**, Panels A and B report 2SLS results for rural- and urban-located children respectively. In Panel A (Columns 1 and 2), a standard deviation increase in a parent's financial inclusion is associated with 0.1745 and 0.1880 standard deviations increase in a rural-located child's ability to read and write in English/French and increase of 0.4333 and 0.3209 standard deviations in ability to read and write in a native language, respectively. In Column 5, a standard deviation increase in a parent's financial inclusion is associated with a 0.5093 standard deviation increase in a child's ability to do written calculation. In panel B (Columns 3 and 4), a standard deviation increase in a parent's financial inclusion is associated with 0.5232 and 0.5087 standard deviations increase in an urban-located child's ability to read and write in a native (Ghanaian) language respectively. In Column 6, a standard deviation increase in a parent's financial inclusion is associated with a 0.8908 standard deviation decrease in late enrolment. With regard to learning outcomes, improved financial inclusion is significant in enhancing more of the learning outcomes for rural than urban children. In Columns 3 and 4, where it was significant for both rural and urban children, improved financial inclusion is seen as being likely to enhance learning outcomes more for urban than rural children. On the contrary, increased financial inclusion for parents and its

negative link with late enrolment is more likely to be of benefit to urban children. Since urban children in Ghana exhibit better reading skills (GSS, 2018), parents' financial inclusion can help to bridge this gap.

Table 3: Financial Inclusion, child learning and schooling outcomes for gender of child (IV results)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Learning outcomes					Schooling Outcome
	Read English/ French	Write English/ French	Read native language	Write native language	Do written calculation	Late enrolment
<i>Panel A: Boys sample</i>						
Financial inclusion index	0.1354 (0.0835) [0.5591]	0.1953* (0.1088) [0.6189]	0.1435* (0.0823) [0.6270]	0.1080 (0.0669) [0.2646]	0.1257 (0.0767) [0.6295]	-0.0853 (0.0532) [-0.9082]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
<i>First Stage</i>	-0.0403** (0.0206)	-0.0403** (0.0206)	-0.0403** (0.0206)	-0.0403** (0.0206)	-0.0403** (0.0206)	-0.0340** (0.0149)
<i>F-Statistic (Cragg-Donald)</i>	13.84	13.84	13.84	13.84	13.84	15.19
Observations	1,682	1,682	1,682	1,682	1,682	3,310
<i>Panel B: Girls sample</i>						
Financial inclusion index	0.1580* (0.0939) [0.9189]	0.1476 (0.0901) [0.7402]	0.2125* (0.1135) [0.3940]	0.2243* (0.1207) [0.5906]	0.1635* (0.0970) [0.1412]	-0.0910*** (0.0337) [-0.0380]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
<i>First Stage</i>	-0.0464** (0.0236)	-0.0464** (0.0236)	-0.0464** (0.0236)	-0.0464** (0.0236)	-0.0464** (0.0236)	-0.0597*** (0.0157)
<i>F-Statistic (Cragg-Donald)</i>	13.56	13.56	13.56	13.56	13.56	14.40
Observations	1,421	1,421	1,421	1,421	1,420	2,993

Robust standard errors adjusted for heteroskedasticity in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standardized coefficients in square brackets

IV – instrumental variables estimation

Regional fixed effects represent dummy variables for the ten regions in Ghana

Table 4: Financial Inclusion, child learning and schooling outcomes for location of child (IV results)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Learning outcomes					Schooling Outcome
	Read English/Write French	Write English/French	Read native language	Write native language	Do written calculation	Late enrolment
<i>Panel A: Rural child</i>						
Financial inclusion index	0.1787* (0.0961) [0.1745]	0.2284** (0.1159) [0.1880]	0.1349* (0.0728) [0.4333]	0.1203* (0.0665) [0.3209]	0.1964* (0.1013) [0.5093]	-0.1666 (0.1412) [-0.5999]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
<i>First Stage</i>						
Distance to bank (km)	-0.0362** (0.0170)	-0.0362** (0.0170)	-0.0362** (0.0170)	-0.0362** (0.0170)	-0.0362** (0.0170)	-0.0168* (0.0100)
<i>F-Statistic (Cragg-Donald)</i>	14.56	14.56	14.56	14.56	14.56	11.87
Observations	2,226	2,226	2,226	2,226	2,226	4,281
<i>Panel B: Urban child</i>						
Financial inclusion index	0.0472 (0.0365) [0.9811]	0.0389 (0.0353) [0.7546]	0.1961** (0.0888) [0.5232]	0.1934** (0.0896) [0.5087]	0.0195 (0.0292) [0.4432]	-0.0639*** (0.0191) [-0.8908]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
<i>First Stage</i>						
Distance to bank (km)	-0.0795** (0.0367)	-0.0795** (0.0367)	-0.0795** (0.0367)	-0.0795** (0.0367)	-0.0795** (0.0367)	-0.1112*** (0.0216)
<i>F-Statistic (Cragg-Donald)</i>	14.68	14.68	14.68	14.68	14.68	26.39
Observations	877	877	877	877	876	2,022

Robust standard errors adjusted for heteroskedasticity in parentheses *** p<0.01, ** p<0.05, * p<0.1
Standardized coefficients in square brackets IV: instrumental variable estimation
Regional fixed effects represent dummy variables for the ten regions in Ghana

5. Robustness checks

5.1 Lewbel 2SLS

Following previous studies (Awaworyi Churchill & Marisetty, 2020; Koomson et al., 2021; Martey et al., 2022), the robustness of our standard 2SLS estimates are assessed using the Lewbel (2012) 2SLS technique which employs heteroskedasticity in the data to generate internal instruments for the 2SLS regression. The Lewbel (2012) method also allows for a combination of internal and external instrument and has been applied in previous studies (Awaworyi Churchill & Marisetty, 2020; Koomson et al., 2021; Koomson & Danquah, 2021).

Table 5 presents results from the Lewbel 2SLS method. Panel A reports findings from the regressions that used only internal instruments while Panel B reports findings from the regressions

that combine distance to the nearest bank with internally generated instruments. The reported Hansen J statistic in **Table 5** (Columns 1-6) indicates that we fail to reject the null hypotheses of valid instruments. Put differently, the instrument validity assumption for the Lewbel (2012) method is satisfied. In Panel A (Column 1), we observe that a standard deviation increase in a parent's financial inclusion is associated with a 0.0576 standard deviation increase in a child's ability to read in English/French. In Columns 2 and 3, a standard deviation increase in a parent's financial inclusion is associated with 0.1062 and 0.1267 standard deviations increase in a child's ability to read and write in a native language respectively. Finally, a standard deviation increase in a parent's financial inclusion is associated with a 0.0477 standard deviation decrease in late enrolment.

In Panel B (Column 1), we observe that a standard deviation increase in a parent's financial inclusion is associated with a 0.0690 standard deviation increase in a child's ability to read in English/French. From Columns 3 and 4, a standard deviation increase in a parent's financial inclusion is associated with 0.1193 and 0.1389 standard deviations increase in a child's ability to read and write in a native language respectively. Lastly, a standard deviation increase in a parent's financial inclusion is associated with a 0.0591 standard deviation decline in late enrolment.

Overall, findings from the Lewbel 2SLS estimates are consistent with those from the baseline and the externally instrumented results in Tables 1 and 2 respectively. A critical look at the results show that the coefficient of the Lewbel 2SLS estimates in Panels A and B of Table 6 are much closer to, but a bit higher than, those of the LPM. The Lewbel 2SLS estimates that combine internal and externally generated instruments are also slightly higher than those that use only internal instruments, which is in consonance with most studies that have employed this technique (Awaworyi Churchill & Marisetty, 2020; Koomson et al., 2021; Koomson & Danquah, 2021).

Table 5: Financial Inclusion, child learning and schooling outcomes (Lewbel 2SLS)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Learning outcomes					Schooling Outcome
	Read English/Write French	English/French	Read native language	Write native language	Do written calculation	Late enrolment
<i>Panel A: Internal instruments</i>						
Financial inclusion index	0.0049** (0.0023) [0.0576]	0.0024 (0.0025) [0.0272]	0.0094*** (0.0031) [0.1062]	0.0109*** (0.0031) [0.1267]	0.0017 (0.0020) [0.0219]	-0.0043** (0.0022) [-0.0477]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
<i>F-Statistic</i>	22.86	22.86	22.86	22.86	22.87	32.33
<i>J P-value</i>	0.1368	0.1679	0.1377	0.1889	0.4074	0.5223
Observations	3,103	3,103	3,103	3,103	3,102	6,303
<i>Panel B: Internal and external instruments</i>						
Financial inclusion index	0.0058** (0.0023) [0.0690]	0.0035 (0.0025) 0.0406	0.0106*** (0.0031) [0.1193]	0.0119*** (0.0031) [0.1389]	0.0027 (0.0020) 0.0347	-0.0054** (0.0022) [-0.0591]
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
<i>First Stage</i>						
Distance to bank (km)	-0.0355** (0.0169)	-0.0355** (0.0169)	-0.0353** (0.0168)	-0.0353** (0.0168)	-0.0353** (0.0168)	-0.0446*** (0.0108)
<i>F-Statistic (Cragg-Donald)</i>	21.21	21.21	21.21	21.21	21.21	31.17
<i>J P-value</i>	0.1039	0.1214	0.2100	0.3415	0.0923	0.2258
Observations	3,103	3,103	3,103	3,103	3,102	6,303

Robust standard errors adjusted for heteroskedasticity in parentheses *** p<0.01, ** p<0.05, * p<0.1
Standardized coefficients in square brackets 2SLS: Two stage least squares
Regional fixed effects represent dummy variables for the ten regions in Ghana

5.2 Potential channels

In Subsection 2.1, we discuss several potential channels through which financial inclusion can influence children's learning outcomes and late enrolment. Out of the many potential channels, we follow a two-step approach to empirically examine the roles of parents' ability to pay for extra classes and expend on books and school supplies due to data availability. This approach is consistent with what has been applied in previous studies (Awaworyi Churchill & Smyth, 2020; Koomson et al., 2022; Koomson & Danquah, 2021). The first step is to confirm that expenses on extra classes and books and school supplies are significantly associated with financial inclusion. We use the same variables as displayed in Table 1 but drop household expenditure per capita to avoid reverse causality. From Table 6 (Columns 1 and 2), the results show that a standard deviation

increase in financial inclusion is associated with 0.0420 and 0.0688 standard deviations increase in expenses on extra classes and on books and school supplies. We can also see that financial inclusion has a significantly positive association with all learning outcomes with the exception of written calculations so written calculation is excluded in the next stage (from Columns 3 to 7). In the second step, we separately include expenses on extra classes and on books and schools supplies as covariates in the learning outcome models which are respectively displayed in Panels A and B of Table 7.

In Panels A and B of **Table 7**, we find that expenses on extra classes and on books and school supplies are associated with an improvement in all four learning outcomes. Specific to Panel A, we also find that the inclusion of expenses on extra classes as an additional covariate reduces the magnitude of all the previously estimated coefficients on financial inclusion from Columns 1 to 4 (compared with those in Columns 3 to 6 in Table 6) which implies that expenses on extra classes or private tutoring is a potential channel through which financial inclusion influences children’s learning outcomes. In Panel B, we see that the inclusion of expenses on books and school supplies as an additional covariate reduces the magnitude of the coefficients of financial inclusion in Columns 1 and 4 and makes it statistically insignificant in Columns 2 and 3 (compared with those in Columns 3 to 6 in Table 6). This again indicates that expenses on books and school supplies is a potential channel through which financial inclusion influences children’s learning outcomes.

Table 6: Effects of financial inclusion (potential channel analysis)

Variables	(1) Expenses on Extra class	(2) Expenses on books & school supplies	(3) Read English/ French	(4) Write English/ French	(5) Read native language	(6) Write native language	(7) Do written calculation
Financial inclusion index	0.0151*** (0.0048) [0.0420]	0.0180*** (0.0031) [0.0688]	0.0034*** (0.0013) [0.0400]	0.0030** (0.0013) [0.0349]	0.0037** (0.0015) [0.0421]	0.0044*** (0.0015) [0.0513]	0.0006 (0.0012) 0.0079
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,087	6,070	3,103	3,103	3,103	3,103	3,102
R-squared	0.1758	0.2419	0.1906	0.1939	0.2195	0.2018	0.1401

Robust standard errors adjusted for heteroskedasticity in parentheses *** p<0.01, ** p<0.05, * p<0.1

Standardized coefficients in square brackets

Regional fixed effects represent dummy variables for the ten regions in Ghana

Table 7: Effects of extra classes and books and school supplies (potential channel analysis)

Variables	(1) Read English/ French	(2) Write English/ French	(3) Read native language	(4) Write native language
<i>Panel A: Extra Classes</i>				
Financial inclusion index	0.0032*** (0.0010)	0.0027* (0.0017)	0.0030* (0.0018)	0.0040** (0.0018)
	[0.0325]	[0.0329]	[0.0350]	[0.0479]
Log(expenses on extra classes)	0.0203*** (0.0045)	0.0241*** (0.0046)	0.0215*** (0.0059)	0.0180*** (0.0059)
	[0.0856]	[0.0995]	[0.0943]	[0.0818]
Child characteristics	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes
Observations	2,118	2,118	2,118	2,118
R-squared	0.2071	0.2107	0.2013	0.1773
<i>Panel B: Expenses on book supplies/stationary</i>				
Financial inclusion index	0.0033** (0.0016)	0.0022 (0.0017)	0.0022 (0.0018)	0.0036* (0.0018)
	[0.0370]	[0.0239]	[0.0261]	[0.0433]
Log(expenses on books and school supplies)	0.0598*** (0.0080)	0.0629*** (0.0082)	0.0447*** (0.0083)	0.0328*** (0.0083)
	[0.1778]	[0.1831]	[0.1377]	[0.1050]
Child characteristics	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes
Observations	2,113	2,113	2,113	2,113
R-squared	0.2249	0.2254	0.2085	0.1786

Robust standard errors adjusted for heteroskedasticity in parentheses *** p<0.01, ** p<0.05, * p<0.1

Standardized coefficients in square brackets

Regional fixed effects represent dummy variables for the ten regions in Ghana

6. Conclusion

In this paper, we use data from the Ghana Living Standards Survey to examine the effect of parents' financial inclusion on children's learning and late school enrolment. We use a multidimensional financial inclusion index generated by applying multiple correspondence analysis on 15 binary indicators. The indicators cut across four broad dimensions—ownership of financial products, use of financial products, access to credit and receipt of financial remittance. Children's learning outcomes are measured using five binary indicators that depict ability to read English or French; write English or French; read native language; write native language; and ability to do written calculation. The schooling outcome is late enrolment which is a binary variable indicating a child who entered primary school after age six. We instrument for financial inclusion

using distance to the nearest bank in an instrumental variable procedure. We also perform robustness checks using Lewbel 2SLS to ensure consistency in findings.

Our overall finding suggests that improvements in parents' financial inclusion has the capability to enhance children's learning and schooling outcomes, with varied outcomes for boys and girls and rural-urban children. Specifically, while financial inclusion positively influences only two out of five learning outcomes for boys, it has an effect on four out of five learning outcomes for girls in addition to showing the capacity to reduce late enrolment for girls. This implies that parent's financial inclusion shows signs of improving learning and schooling outcomes more for girls than boys. This finding can be linked to the evidence that Ghana has almost achieved gender parity in school enrolment and out-of-school rates over the past 20 years, with girls' enrolment rate outpacing that of boys during the same period (UNESCO, 2022). The significant effect of financial inclusion in reducing late enrolment among girls but not for boys suggests that financial inclusion can contribute to the achievement of the gender parity in the timing of enrolment rate, which is crucial for a smooth progression in school. Similar to the boy-girl dimensions, financial inclusion has a positive influence on all five learning outcomes for rural-located children but not on late enrolment. On the contrary financial conclusion shows signs of having a positive influence on two out of five learning outcomes and also has the capability to reduce late enrolment for urban children. By implication, parent's financial inclusion can reduce learning poverty and late enrolment more for urban than rural children. We identify parents' ability to spend on extra classes and on books and school supplies as potential channels through which financial inclusion influences learning and schooling outcomes. These findings are robust to other means of addressing endogeneity and across different indicators of children's learning outcomes. Linking our finding to the World Bank's five pillars of system improvement needed to enhance children's learning outcomes (World Bank, 2019), we can infer that financial could help to achieve the pillar which aims to foster a strong school-parent partnership that promote the acquisition of effective literacy skills.

Apart from financial inclusion having the potential to reduce poverty and vulnerability to poverty for households in general (Koomson, et al., 2020), it has shown signs of being able to help in reducing learning poverty and late enrolment. Enhanced financial inclusion can provide society with the optimism of deriving long-term benefits from well-skilled members capable of contributing meaningfully to the growth of their local and national economies through productive

capacities. These findings provide ample support for international policies such as the 2010 Maya declaration and the World Bank's target of achieving universal financial access by 2020—all targeted at reducing poverty and enhancing welfare in general.

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Appendices

Table A1: Indicators used in generating the FI index

Financial Inclusion indicators	Units	Mean	Std. Dev.
Dim 1: Ownership of Financial Products			
Ownership of mobile money account	binary	0.068	0.251
Ownership of current or cheques account	binary	0.013	0.113
Ownership of investment account	binary	0.004	0.060
Ownership of savings account	binary	0.101	0.302
Ownership of susu account	binary	0.001	0.038
Ownership of fixed deposit account	binary	0.001	0.039
Ownership of E-zwich account	binary	0.004	0.063
Ownership of insurance policy	binary	0.223	0.416
Dim 2: Use of Financial Products			
Transact using cheque book	binary	0.074	0.262
Transact using ATM	binary	0.029	0.167
Transact using E-zwich card	binary	0.004	0.061
Transact using E-banking	binary	0.004	0.065
Transact using any other financial product	binary	0.036	0.187
Dim 3: Access to credit	binary	0.026	0.160
Dim 4: Receipt of financial remittance	binary	0.173	0.379
Financial inclusion Index	continuous	0.038	0.851

Source: Authors' computation using GLSS7 data **Std Dev:** Standard Deviation **Dim:** Dimension

Susu: A form of mutual savings scheme widely used in Ghana **Z-zwich:** National Switch and Smart card payment system in Ghana that offers deposit-taking financial institutions (i.e., universal banks, rural banks and savings and loans) a platform to interoperate. **ATM:** Automated teller machine **E-banking:** Electronic banking

Table A2: Multiple correspondence analysis: Burt/adjusted inertias

Dimension	Principal inertia	Percent	Cumulative percent
Dim 1	0.01518	62.43	62.43
Dim 2	0.00185	7.62	70.05
Dim 3	0.00089	3.64	73.69
Dim 4	1.7E-05	0.07	73.76
Dim 5	8.64E-06	0.04	73.8
Dim 6	4.90E-06	0.02	73.82

Source: Computed using the GLSS7 Dim: Dimension

Table A3: Description and summary statistics of variables

Variable	Description	Mean	SD
Read English/French	Binary variable equals 1 if the child can read English or French	0.7254	0.4464
Write in English/French	Binary variable equals 1 if the child can write in English or French	0.6980	0.4592
Read native language	Binary variable equals 1 if the child can read any native Ghanaian language	0.3187	0.4661
Write in native language	Binary variable equals 1 if the child can write in any native Ghanaian language	0.2881	0.4530
Do written calculation	Binary variable equals 1 if the child can do written calculation	0.7943	0.4043
Late enrolment	Binary variable equals 1 if the child enrolled late at primary school	0.5187	0.4998
Financial inclusion index	Continuous variable for financial inclusion	0.038	0.851
Distance to the nearest bank	Average distance to the nearest bank measured in kilometres	12.8439	6.0755
Age of child	Age of child in years	13.0271	1.7990
Female child	Binary variable equals 1 if child is female	0.4579	0.4983
Distance to school (mins)	Minutes spent in going to and from school	19.2652	14.1057
Free meal	Binary variable equals 1 if child benefits from free meal at school	0.2075	0.4056
Any disability	Binary variable equals 1 if child has any form of disability	0.0045	0.0670
Age of head	Age of the household head	47.6996	10.8192
Household size	Number of persons in the household	7.0732	3.3900
Household size squared	Number of persons in the household squared	61.5179	72.3836
Female household head	Binary variable equals 1 if household head is female	0.2604	0.4389
Rural	Binary variable equals 1 if household is located in a rural area	0.7174	0.4504
Educated head	Binary variable equals 1 if household head is educated	0.3252	0.4685
Married head	Binary variable equals 1 if household head is married	0.7583	0.4282
Per capita household expenditure	Continuous variable for per capita household expenditure	1927.055	2008.962
Unemployed	Binary variable equals 1 if household head is unemployed	0.0841	0.2776
Retired/inactive	Binary variable equals 1 if household head is retired/inactive	0.0841	0.2776
Employee	Binary variable equals 1 if household head is an employee	0.1502	0.3573
Self-employed	Binary variable equals 1 if household head is self-employed	0.6816	0.4659
Expenses on Extra class	Per capita expenditure on extra classes	34.9021	98.3808
Expenses on books & school supplies	Per capita expenditure on books and school supplies	64.6979	98.8415

SD: Standard deviation Edu.: Education

Table A4: Financial inclusion and child learning and schooling outcomes (Baseline results)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Learning Outcome										Schooling outcome	
	Read English/French		Write English/French		Read native language		Write native language		Do written calculation		Late enrolment	
	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM	Probit (ME)	LPM
Financial inclusion index	0.0045*** (0.0016) [0.1030]	0.0034*** (0.0013) [0.0400]	0.0037** (0.0016) [0.0806]	0.0030** (0.0013) [0.0349]	0.0032** (0.0014) [0.0700]	0.0037** (0.0015) [0.0421]	0.0037*** (0.0013) [0.0835]	0.0044*** (0.0015) [0.0513]	0.0012 (0.0014) [0.0318]	0.0006 (0.0012) [0.0079]	-0.0024** (0.0011) [-0.0416]	-0.0023** (0.0011) [-0.0252]
Age of child	0.0334*** (0.0042) [0.1241]	0.0377*** (0.0044) [0.1521]	0.0305*** (0.0043) [0.1076]	0.0347*** (0.0046) [0.1361]	0.0202*** (0.0042) [0.0712]	0.0192*** (0.0041) [0.0739]	0.0211*** (0.0041) [0.0766]	0.0199*** (0.0040) [0.0791]	0.0250*** (0.0039) [0.1037]	0.0284*** (0.0041) [0.1263]	0.0482*** (0.0027) [0.1372]	0.0495*** (0.0028) [0.2142]
Female child (0/1)	0.0206 (0.0144) [0.0765]	0.0192 (0.0145) [0.0214]	0.0217 (0.0148) [0.0767]	0.0211 (0.0150) [0.0229]	0.0188 (0.0148) [0.0662]	0.0214 (0.0150) [0.0228]	0.0183 (0.0145) [0.0665]	0.0225 (0.0147) [0.0248]	-0.0130 (0.0134) [-0.0538]	-0.0138 (0.0136) [-0.0170]	-0.0054 (0.0117) [-0.0153]	-0.0048 (0.0117) [-0.0048]
Distance to school (mins)	0.0001 (0.0005) [0.0005]	0.0002 (0.0005) [0.0077]	0.0001 (0.0005) [0.0003]	0.0002 (0.0005) [0.0048]	-0.0006 (0.0005) [-0.0022]	-0.0005 (0.0005) [-0.0166]	-0.0003 (0.0005) [-0.0012]	-0.0002 (0.0005) [-0.0074]	-0.0001 (0.0005) [-0.0002]	0.0001 (0.0005) [0.0013]	0.0001 (0.0004) [0.0002]	0.0001 (0.0004) [0.0019]
Free meal (0/1)	-0.0911*** (0.0174) [-0.3386]	-0.1154*** (0.0220) [-0.1049]	-0.0919*** (0.0181) [-0.3243]	-0.1138*** (0.0223) [-0.1005]	-0.0341 (0.0216) [-0.1201]	-0.0239 (0.0179) [-0.0208]	-0.0420* (0.0216) [-0.1526]	-0.0300* (0.0173) [-0.0268]	-0.0666*** (0.0161) [-0.2763]	-0.0871*** (0.0207) [-0.0874]	0.0162 (0.0149) [0.0461]	0.0161 (0.0155) [0.0144]
Any disability	-0.1743 (0.1061) [-0.6475]	-0.2107 (0.1493) [-0.0316]	-0.1956* (0.1116) [-0.6902]	-0.2422* (0.1459) [-0.0354]	-0.2961** (0.1376) [-1.0424]	-0.1908*** (0.0573) [-0.0274]	-0.2555* (0.1308) [-0.9284]	-0.1644*** (0.0552) [-0.0243]	-0.1173 (0.0983) [-0.4869]	-0.1304 (0.1417) [-0.0216]	0.0243 (0.1111) [0.0690]	0.0193 (0.1154) [0.0020]
Age of head	0.0007 (0.0007) [0.0026]	0.0007 (0.0008) [0.0172]	0.0006 (0.0007) [0.0023]	0.0006 (0.0008) [0.0142]	0.0009 (0.0008) [0.0031]	0.0011 (0.0007) [0.0245]	0.0009 (0.0008) [0.0033]	0.0011 (0.0007) [0.0261]	0.0008 (0.0007) [0.0034]	0.0008 (0.0007) [0.0224]	-0.0006 (0.0006) [-0.0017]	-0.0005 (0.0006) [-0.0116]
Household size	-0.0193** (0.0076) [-0.0717]	-0.0220*** (0.0081) [-0.1667]	-0.0228*** (0.0078) [-0.0805]	-0.0256*** (0.0083) [-0.1887]	-0.0025 (0.0090) [-0.0087]	-0.0024 (0.0085) [-0.0174]	-0.0063 (0.0087) [-0.0227]	-0.0053 (0.0084) [-0.0396]	-0.0289*** (0.0070) [-0.1200]	-0.0303*** (0.0069) [-0.2544]	-0.0014 (0.0064) [-0.0041]	-0.0020 (0.0060) [-0.0133]
Household size squared	0.0007** (0.0003) [0.0028]	0.0008** (0.0004) [0.1308]	0.0009*** (0.0003) [0.0033]	0.0010*** (0.0004) [0.1589]	-0.0001 (0.0004) [-0.0001]	-0.0001 (0.0004) [-0.0003]	0.0002 (0.0004) [0.0006]	0.0001 (0.0004) [0.0238]	0.0011*** (0.0003) [0.0047]	0.0011*** (0.0003) [0.2056]	-0.0004 (0.0003) [-0.0011]	-0.0004 (0.0003) [-0.0544]
Female household head	0.0795*** (0.0250) [0.2954]	0.0791*** (0.0229) [0.0778]	0.0631** (0.0248) [0.2227]	0.0637*** (0.0232) [0.0609]	0.0836*** (0.0228) [0.2944]	0.0935*** (0.0259) [0.0881]	0.0760*** (0.0222) [0.2761]	0.0865*** (0.0255) [0.0838]	0.0673*** (0.0238) [0.2792]	0.0602*** (0.0209) [0.0653]	-0.0422** (0.0191) [-0.1201]	-0.0429** (0.0190) [-0.0362]
Rural (0/1)	-0.1238*** (0.0203) [-0.4601]	-0.1053*** (0.0169) [-0.1063]	-0.1238*** (0.0204) [-0.4368]	-0.1084*** (0.0177) [-0.1063]	-0.0651*** (0.0175) [-0.2291]	-0.0765*** (0.0205) [-0.0739]	-0.0474*** (0.0172) [-0.1721]	-0.0576*** (0.0203) [-0.0572]	-0.0848*** (0.0193) [-0.3521]	-0.0715*** (0.0152) [-0.0796]	0.0512*** (0.0145) [0.1456]	0.0512*** (0.0145) [0.0486]
Educated head (0/1)	0.1778*** (0.0191) [0.6608]	0.1552*** (0.0163) [0.1629]	0.1714*** (0.0192) [0.6050]	0.1531*** (0.0171) [0.1562]	0.1391*** (0.0165) [0.4898]	0.1668*** (0.0207) [0.1677]	0.1290*** (0.0163) [0.4687]	0.1557*** (0.0205) [0.1610]	0.1442*** (0.0187) [0.5984]	0.1226*** (0.0148) [0.1421]	-0.1160*** (0.0144) [-0.3298]	-0.1181*** (0.0146) [-0.1157]
Married head	0.0295 (0.0251)	0.0283 (0.0225)	0.0261 (0.0250)	0.0258 (0.0229)	0.0495** (0.0223)	0.0612** (0.0258)	0.0496** (0.0217)	0.0606** (0.0252)	0.0304 (0.0237)	0.0238 (0.0203)	-0.0411** (0.0187)	-0.0400** (0.0188)

Household per capita exp.	[0.1095] 0.0542*** (0.0067) [0.1845]	[0.0271] 0.0559*** (0.0067) [0.1901]	[0.0922] 0.0607*** (0.0071) [0.2006]	[0.0241] 0.0599*** (0.0068) [0.1981]	[0.1742] 0.0531*** (0.0082) [0.1730]	[0.0562] 0.0408*** (0.0064) [0.1329]	[0.1802] 0.0497*** (0.0077) [0.1665]	[0.0573] 0.0393*** (0.0061) [0.1318]	[0.1261] 0.0462*** (0.0056) [0.1736]	[0.0252] 0.0524*** (0.0062) [0.1967]	[-0.1168] -0.0554*** (0.0057) -0.1707	[-0.0333] -0.0503*** (0.0052) -0.1552
Employed status head (Base=unemployed)												
Retired/inactive	-0.0376 (0.0329) [-0.1419]	-0.0415 (0.0381) [-0.0258]	-0.0541 (0.0347) [-0.1900]	-0.0623 (0.0392) [-0.0377]	-0.0480 (0.0420) [-0.1663]	-0.0355 (0.0340) [-0.0211]	-0.0632 (0.0416) [-0.2230]	-0.0493 (0.0334) [-0.0302]	-0.0561* (0.0317) [-0.2312]	-0.0659* (0.0365) [-0.0453]	0.0536* (0.0309) [0.1515]	0.0567* (0.0314) [0.0291]
Employee	-0.0020 (0.0321) [-0.0079]	0.0034 (0.0301) [0.0027]	0.0074 (0.0331) [0.0272]	0.0093 (0.0312) [0.0072]	-0.0248 (0.0364) [-0.0849]	-0.0197 (0.0341) [-0.0151]	-0.0491 (0.0359) [-0.1720]	-0.0442 (0.0338) [-0.0349]	-0.0095 (0.0305) [-0.0420]	-0.0052 (0.0288) [-0.0046]	0.0042 (0.0264) [0.0120]	0.0053 (0.0265) [0.0041]
Self-employed	-0.0364 (0.0241) [-0.1376]	-0.0321 (0.0268) [-0.0336]	-0.0340 (0.0253) [-0.1209]	-0.0305 (0.0276) [-0.0310]	-0.0453 (0.0322) [-0.1566]	-0.0380 (0.0266) [-0.0380]	-0.0608* (0.0319) [-0.2144]	-0.0501* (0.0261) [-0.0516]	-0.0276 (0.0231) [-0.1182]	-0.0276 (0.0258) [-0.0318]	0.0234 (0.0222) [0.0668]	0.0243 (0.0229) [0.0233]
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		0.4944*** (0.0821)		0.5578*** (0.0834)		0.2257*** (0.0855)		0.1956** (0.0840)		0.6872*** (0.0775)		-0.0803 (0.0577)
Observations	3,103	3,103	3,103	3,103	3,103	3,103	3,103	3,103	3,102	3,102	6,303	6,303
R-squared		0.1906		0.1939		0.2195		0.2018		0.1401		0.1156

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 LPM: Linear Probability Model ME: Marginal Effects Exp: Expenditure
Standardized coefficients in square brackets Regional fixed effects represent dummy variables for the ten regions in Ghana