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Impact of microfinance on education demand: An empirical analysis of WAEMU countries

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Abstract

This paper studies the impact of microfinance on education dynamics within a sample of eight developing countries in West Africa (WEAMU) over the period 1996-2020. This article addresses an important issue that has received little attention in the literature, the role of microfinance in the private financing of education in Sub-Saharan Africa. The results show that access to microcredit through the increase in the number of active borrowers improves income for the poor and reduces inequalities in education access within the region. They also draw attention to the perverse effects that a high level of lending could have on education. The large loans that borrowers prefer increase the opportunity cost of sending children to school and thus the risk of these children being taken out of the education system to serve as labor for their parents. It is therefore important to make borrowers and lenders aware of the consequences of child labor.

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1. Introduction

While the link between education and poverty has generally been seen from the supply side, in developing countries, the more relevant question involves demand, specifically the levers that can be used to stimulate educational demand among the poorest. In developing countries, many households forgo sending their children to school for reasons essentially linked to their low income. The question we pose in this study is thus whether helping these households through better access to microfinance could improve children's enrollment and long-term retention in the education system. The microfinance sector, introduced in 1970[1], has been seen as a beacon of hope for improving the lives of the world's poorest populations. Over the years, the number of microfinance institutions (MFIs) has significantly grown (Daley-Harris, 2006, Hermes and Lensink, 2007). This increase in MFI activity in developing countries has led to a growing number of theoretical and empirical studies assessing its impact on beneficiaries. A number of studies have looked at the links between microfinance and poverty (Imai et al., 2012; Hermes, 2014), inequality (Bangoura et al., 2016), health (Morduch and Haley, 2002), and access to energy (Boutabba et al., 2020).

However, having explored all the theoretical and empirical literature on the link between microfinance and development, we conclude that the question of educational demand is not sufficiently addressed. There are also very few studies on the role of microfinance in the demand for education. Thus, the contribution of this article is to provide an answer to that crucial question.

We use a panel approach to analyze the relationship between microfinance and education within a sample of the eight countries of the West African Economic and Monetary Union - WAEMU. This approach allows us to identify the key information for each country that policymakers can use to improve microfinance targeting strategies and better succeed in their fight against low school enrollment.

Our results show a positive impact of microfinance on education. They indicate that school enrollment rates and school life expectancy tend to increase with the number of clients in microfinance institutions. In other words, children in microfinance client households tend to attend school and stay in school longer. They also draw attention to the perverse effects that a high level of lending could have on education. The large loans that borrowers desire increase the opportunity cost of sending children to school and thus the risk of these children being taken out of the education system to serve as labor for their parents. It is therefore important to make borrowers aware of the consequences of child labor.

The rest of the paper is organized as follows. The next part gives an overview of programs in WAEMU countries oriented toward school enrollment; the third part provides a literature review on the link between microfinance and education; and the fourth part presents the methodology and the data we use, followed by the estimation results. The final section presents the conclusion.

[1] The *Grameen Bank*, the first financial institution specialized in microfinance, was founded in 1976 in Bangladesh by Muhammad Yunus, winner of the 2006 Nobel Peace Prize.

2. Poverty and education demand: what do we know?

Many studies maintain that family poverty and the direct and indirect costs of sending children to school are real obstacles to the demand for education in poor countries (Filmer and Pritchett, 1999; Lloyd and Hewett, 2003; Maldonado and González-Vega, 2008; Patrinos et al., 1997; Psacharopoulos, 1997; Lopez-Acevedo, 2002; Levinson et al., 2001). In all these studies, child labor appears to be a key determinant of low levels of schooling. For example, in 2009, the International Labour Organization (ILO) estimated that 10% of children in Latin America work[2].

A number of microfinance programs have been set up to combat poverty and child labor. The PROGRESA program in Mexico and the BOLSA ESCOLA program in Brazil, for example, have made a considerable and positive contribution to encouraging education. These programs offer financial assistance as an incentive for poor households to keep their children in school (Amin and Arends-Kuenning, 2004).

These programs did, however, have some perverse effects. For example, among poor farmers, access to additional land through microfinance programs tended to increase the opportunity cost of children's education and thus negatively affect education (González-Vega et al., 2003).

In the WAEMU countries, education has been one of the main goals to be achieved since independence (Lange, 1991). In spite of this, public support has not been forthcoming; education thus remains a major challenge. Studies by the French NGO "Aide-et-Action", based on survey data from eight countries including 6 in the WAEMU (Benin, Burkina Faso, Mali, Niger, Senegal, Togo, Madagascar, and India), show that demand for schooling is twice as low for the poorest 20% of households. They also show that the risk of dropping out of school increases very significantly with poverty (UNESCO, 2010)[3].

3. Literature review on the link between microfinance and education

In the empirical literature on the impact of microfinance, there is little research on its effects on access to education, nor are there studies on this subject in the WAEMU area. However, microfinance is considered as an effective tool for improving access to financial services and therefore access to other services such as education (Hossain and Knight, 2008; Odell, 2010; Pitt and Khandker, 1998). We thus feel it is important to explore this unresolved issue.

There are contrasting results within the existing literature (Van Rooyen et al., 2012). On the one hand, some studies reveal a positive impact of microfinance programs on education: children of microfinance clients are more likely to attend school and stay there longer (Néponen 2003; Littlefield et al., 2003; You and Annim, 2014). For example, Dunn and Arbunkle (2001) and Barnes et al. (2001) study Zimbabwe and reveal a positive impact of household participation in the microcredit program on school attendance for boys in the household aged six to sixteen. No impact was found for girls.

Pitt and Khandler (1998) find, however, that participation in a microfinance program increases the likelihood of girls attending school. Similar results were also obtained by Odero (2018), who shows that obtaining funds through microfinance has a direct and indirect positive impact on children's education and literacy rates. Analyzing the transmission channels between microfinance and poverty, Boussetta (2021) concludes that education levels improve when the microfinance sector grows.

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[2] Source OIT.

[3] UNESCO Education-for-All Report 2010.

On the other hand, Coleman (1999) controls for participation endogeneity using a quasi-experimental design. He finds a small effect on education expenditures, which may be seen as a proxy for either access to or quality of education. Adjei et al. (2009) show that participation in microcredit programs contributes to increased household spending on children's education in Ghana. Likewise, Lacalle et al. (2008) obtain similar results for beneficiaries of the Spanish Red Cross microcredit program in Rwanda. However, participation in a longer microcredit program has not always been accompanied by an increase in the positive effects on educational expenditure. In this case, it reduces the level of schooling. In the same vein, Bhuiya et al. (2019) reveal a positive and significant impact of participation in microcredit programs on school attendance but without effects on either school enrollment or grade attainment.

Other studies show less convincing results. For example, Gubert and Roubaud (2005) find that the impact of the ADéFI microfinance program on school attendance in Madagascar is not very clear, despite a slight improvement in average primary school attendance rates in the Antananarivo agglomeration. Similarly, Brannen (2010) shows a marginal positive impact of the VSLA program on household-level education expenditure in Zanzibar, Tanzania. He finds contradictory effects of spending on children's education.

Other groups of studies focusing on the impact of microfinance on education show mixed results. For example, Nanor (2008) finds both negative and positive effects of microfinance on education spending, highlighting regional specificities that influence the causality between microcredit and education.

All these results regarding the relationship between microfinance and educational expenditure are challenged by the work of Barnes et al. (2001), and Shimamura and Lastarria-Cornhiel (2009). The study by Barnes et al. (2001) on households in Uganda reveals that children of microfinance clients have a higher dropout rate than children of non-clients. Client households were unable to pay their children's tuition fees for at least one term. Similarly, the analysis of Shimamura and Lastarria-Cornhiel (2009) on households in Malawi shows that primary school attendance among children of microfinance clients decreases significantly compared to children of non-microfinance clients, leading to a repetition of primary classes among young boys and delays for young girls.

These varied results also depend on parents' choices regarding their children's schooling. For example, Thomas (1997) highlights the phenomenon of gendered preferences in Brazil. Mothers like to invest more in the health and education of their daughters, while fathers prefer to direct more resources to improving the nutritional status and schooling of their sons. Kabeer's (2001) study shows that among male loan-recipient households in Bangladesh, gross enrollment rates were, on average, higher for boys than for girls, while the opposite pattern occurred among female loan-recipient households. Although these results are surprising at first glance, they confirm the findings of previous research, which indicate that mothers' and fathers' preferences for investing in boys and girls may differ. In their study, Kandulu et al. (2020) estimate the causal influence of microcredit participation on enrollment using the propensity score matching (PSM) technique. They show that microcredit participation significantly influences school enrollment for girls but not for boys. In addition, microcredit income has had a stronger influence on the enrollment of girls and younger children. In attempting to assess the impact of microfinance institutions on enrollment rates, Martinez (2016) finds that microfinance penetration has a positive influence on secondary school enrollment rates, particularly among women, but insignificant effects on primary school enrollment.

However, a few studies have not found a clear effect of microfinance on education. Holvoet (2004) explores the potential impact of the borrower's gender on microfinance programs involving children's education in South India. She shows that, in the case of direct bank-borrower credit, the gender of the borrower has no impact on their children's education. The regression analysis also suggests that direct individual bank-borrower lending has no effect at

all on children's educational inputs and outputs. A study by Banerjee et al. (2015) finds no discernible effect of microcredit on education. Karlan and Zinman (2010) obtain similar results, supporting the conclusion that microcredit has no observable impact on education.

All these contradictory results on the effectiveness of microfinance programs suggest that they should be interpreted with great caution. Although these programs can reduce poverty levels and contribute to the development of rural economies, they can also have unexpected negative effects on areas such as children's school attendance.

4. Methodology and data

We analyze the impact of microfinance intensity (both the number of active borrowers from MFIs (N_{it}) and the volume of loans ($Loans_{it}$)) on education access within WEAMU countries. To assess the transmission channels between microfinance and education, we analyze the following relationship, using a predictive regression approach:

$$Educ_{it+1} = \alpha.\frac{N_{it}}{Active_{Pop_{it}}} + \beta.\frac{Loans_{it}}{GDP_{it}} + \gamma.X_{it} + \varepsilon_{it} \quad (1)$$

In this equation we focus on two microfinance intensities; the first one ($MI\_N_{it} = \frac{N_{it}}{Active_{Pop_{it}}}$) captures the impact of microfinance access and the second ($MI\_L_{it} = \frac{Loans_{it}}{GDP_{it}}$) captures the impact of revenues given to borrowers.

In summary, the impact of microfinance is assessed using two indicators of intensity.

- The microfinance penetration rate (MI_N_{it}), measured by the number of active beneficiaries of MFI products and services, relative to the country's working population. The access of the working population to microfinance is reflected by this indicator.
- The economic importance of microfinance (MI_L_{it}) is measured by the average value of loans relative to national GDP. This indicator assesses the relative weight of the microfinance sector in the country's economy.

As these microfinance intensities might be endogenous, given that education level is one of the main determinants of access to microcredit, we have accounted for this endogeneity by using instrumental variables (IV) estimations. Endogeneity may also be an issue for some of our control variables like poverty (Henaff and al., 2009).

The main difficulty in IV techniques is to identify the appropriate instruments. When selecting these instruments, we proceed in two steps. We first estimate the dependent variable (school enrollment ratios) with potential instruments and select those that are not significantly correlated with the dependent variable. But to be valid, these instruments must fulfill several conditions. The main condition for verification is the identification hypothesis (cf. Baum et al., 2007). The first test we use is the over-identification test. The resulting statistic is the p-value of the Sargan (1988) test. The null hypothesis for that test is that the instruments are valid, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. Under the null, the test statistic is distributed as chi-squared in the number of (L-K) overidentifying restrictions. A rejection casts doubt on the validity of the instruments (Baum et al., 2007).

The second test is Anderson's underidentification test (1951)[4]. This is an LM test of whether the equation is identified, i.e., if the excluded instruments are "relevant", or correlated with the endogenous regressors. The null hypothesis for this test is that the equation is underidentified.

[4] STATA journal: http://www.stata-journal.com/sjpdf.html?articlenum=st0030_3

A rejection of the null indicates that the model is identified, which means that we have a sufficient correlation between the endogenous regressors and the excluded instruments.

The final step is to ensure that the instruments are not weak. "Weak identification" arises when the excluded instruments are weakly correlated with the endogenous regressors, making estimators perform poorly. We use the Stock and Yogo (2005) test statistic.

In this paper, we determine the impact of microfinance on education using a sample of the eight WAEMU countries over the period from 1995 to 2020. The data we use are as follows:

- The enrollment rate in primary school (% gross[5]). This is our main variable of interest as primary education provides children with basic skills to ensure the appropriate development process.
- The enrollment rate in secondary school (% gross). This variable is also of huge interest for policymakers. Secondary education completes the basic education that began at the primary level, laying the foundation for lifelong learning and human development by offering more subject- or skill-oriented instruction from more specialized teachers (WDI, 2019).
- The school life expectancy measures indicate the number of years a person of school entrance age can expect to spend within the specified level of education (primary and secondary).

We also add three variables measuring the level of poverty and/or vulnerability in the countries studied.

- Access to electricity (% of population). We consider the percentage of people with electricity access to account for how lack of access to electricity might affect educational success.
- Wage and salaried workers (% of total employment), which measures the percentage of workers who have paid employment jobs with explicit (written or oral) or implicit employment contracts that provide basic remuneration.
- Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population), which is the percentage of the population living on less than $1.90 a day at 2011 international prices.
- Gross national expenditure (% of GDP): Gross national expenditure (formerly domestic absorption) is the sum of household final consumption expenditures (formerly private consumption), general government final consumption expenditures (formerly general government consumption), and gross capital formation (formerly gross domestic investment).

5. Estimation results

Our estimations are done on a panel of 8 West African (WAEMU) countries. Table 1 in Appendix presents the descriptive statistics of the variables; Table 2 shows the IV estimation results, and to go beyond the statistical significance of the estimated coefficients, we also present the economic magnitude of the estimated effects (Table 3). To measure the economic magnitude of the estimated effects, we normalize the independent variables so that the coefficients can be interpreted as the effect of a one standard deviation increase in X on the dependent variable Y. We then compare these coefficients to the distribution of Y by calculating two measures: (i) the effect as a fraction of the standard deviation of Y, and (ii) the effect as a

[5] Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.

fraction of the mean of Y. This allows us to assess whether the estimated effects are not only statistically significant, but also economically significant. Finally, for a robustness check, we also present results on OLS (Table 4), Panel Fixed Effects (Table 5) and Panel Random Effects (Table 6).

The instruments we end up using are lags of endogenous variables and a set of additional instruments: GDP growth and IMF deposits. The endogeneity test presented in the table confirms the need to use the instrumental variables. It is important to note that the null hypothesis of exogeneity is strongly rejected for three variables, which are the two microfinance indices and the poverty rate.

The main results presented in Table 2 for the four scenarios are in line with our expectations. The results for the number of borrowers variable (MI_N) show a positive and significant relationship between this indicator and all the education variables. This means that the greater the number of borrowers, the higher the number of children enrolled in school, and the higher the school life expectancy in both primary and secondary education. The results reported in Table 4 show precisely that a one-unit increase in the standard deviation of the number of microfinance beneficiaries (standard deviation of MI_N) increases the standard deviation of the primary school enrollment rate by 0.37, which represents approximately 11.6% of its mean. Microfinance seems to lead to higher and longer school enrollment in WAEMU countries. Children's access to education is greater in geographical areas with higher microfinance penetration rate. This result is close to that obtained by Lacalle et al. (2008) and Adjei et al. (2009), who showed a positive impact of access to microfinance on households' ability to finance school-related expenses.

All schooling indicators have a strongly negative and significant relationship with the second microfinance intensity variable (MI_L). This outcome suggests that the size of the loan has a negative impact on education. School enrollment indicators are better in countries where the size of loans granted by MFIs is smaller. In primary education, for example, we find that a one-unit increase in the standard deviation of the amount granted (standard deviation of MI_L) corresponds to a decrease in the standard deviation of the primary school enrollment rate of 0.44, which represents approximately 13.8% of its average. This result corroborates those of González-Vega et al. (2003), who explain this negative link between the two variables as follows: a high amount of credit granted can increase child labor by offering rural people the opportunity to acquire new agricultural land. It may also enable them to finance other investments, leading to more work and children dropping out of school to work or look after younger siblings.

In the context of our study, this result can also be explained by a well-known reality in microfinance: the fungibility of credit. This consists in diverting part of the loan to other uses different from its initial purpose. We therefore believe that in the WAEMU region, microfinance programs that grant fairly large loans to households are subject to a high degree of fungibility towards inefficient consumption (financing religious celebrations or family ceremonies) or towards other productive activities that have not been appraised by the lending institution, leading to an increase in the risk of bankruptcy and a negative impact on school enrollment rates. These results support Mbow's (2013) thesis that microfinance has a positive impact on poverty and education in the WAEMU countries via the number of reached people, rather than through the amount of distributed credit.

The results for the poverty level indicators (phc190, Elect and Salaried) fit well with those for the second microfinance intensity variable, credit size or volume (MI_L). We first obtain a significant and negative link between monetary poverty (phc190) and the schooling variables.

The other two deprivation-approach poverty variables (Elect and Salaried) are significantly and positively correlated with all education variables except for access to electricity (Elect) on the primary education variable. These results indicate that low school enrollment is directly linked to a high level of poverty. The relative electricity access variable (Elect) has a positive impact on school enrollment only at the secondary level. This demonstrates its ability to influence the school life expectancy of children from poor households. We also find that WAEMU countries with a higher proportion of salaried workers have a higher school enrollment rate. Indeed, children from these households are more likely to go to school and stay there longer.

We find a negative impact of the level of public spending on secondary school enrollment. Even though this impact is not very significant, this result seems surprising to us insofar as this variable is usually positively linked with school enrollment. In our opinion, this can be explained by the misappropriation of public funds, which is very common in most WAEMU countries. In short, the results of this study show that microfinance has a significant impact on school enrollment in WAEMU countries.

To assess whether the estimated coefficients differ significantly between WAEMU countries, we performed a heterogeneity test based on the Pooled Regressions (OLS). For each dependent variable, we estimated separately for each country an OLS regression of the dependent variable on the explanatory variables. The coefficients are then compared, assuming that they are equal ($\beta_{1,1} = \beta_{1,2} = \ldots = \beta_{1,8}$). Rejection of this null hypothesis would therefore indicate significant heterogeneity in the effects of the explanatory variable considered between countries. The table 7 presents the results of this test, which reveal heterogeneity between WAEMU countries. In other words, the degree of impact varies from country to country.

This heterogeneity is not surprising. Indeed, the averages of microfinance intensity indicators (see Table 8) allow the WAEMU countries to be classified into two groups. The first group comprises five countries where the microfinance sector is highly developed and well integrated into the economy, with a high penetration rate among the working population: Togo, Benin, Senegal, Burkina Faso, and Mali. The second group comprises three countries where microfinance plays a more limited role, with a weak presence in the economy and a lower penetration rate: Côte d'Ivoire, Niger, and Guinea-Bissau. We therefore estimated again the relations by separating the two samples. The results, presented in Table 9, show that the trends observed at the WAEMU level are mainly driven by the five countries with strong microfinance activity.

6. Conclusion

This article sheds light on an essential yet understudied aspect of the link between education and poverty in developing countries: the demand for education among the poorest households. While microfinance has been widely regarded as a promising tool for improving the lives of the impoverished, its potential impact on educational demand has not been adequately explored.

This study uses a macroeconomic approach in conducting a panel analysis in eight West African developing countries to demonstrate a generally positive impact of microfinance on education. Increased access to microfinance correlates with higher school enrollment rates and school life expectancy, indicating a potential avenue to stimulate educational demand among the poorest.

However, the findings also raise important concerns about the potential negative consequences of large loans. While they may be desired by borrowers, these loans can lead to increased opportunity costs for education, potentially resulting in child labor and withdrawal from the education system. As such, it is crucial to couple these loans with robust support and awareness

campaigns to mitigate the risks associated with child labor and ensure children's continued education.

The article highlights the need for policymakers to consider microfinance as a tool for enhancing educational outcomes, and it provides valuable insights for designing effective microfinance targeting strategies. Moreover, it calls for more attention to and research on the role of microfinance in stimulating educational demand in developing countries.

Ultimately, this study contributes to the broader literature on microfinance's impact and calls for a more holistic approach to poverty alleviation, recognizing the pivotal role of education in breaking the cycle of poverty. Through a better understanding of the link between microfinance and education, policymakers can develop targeted interventions to empower individuals and communities to achieve a brighter future through education.

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Appendix

Table 1 : Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max	Obs.
School enrollment, primary (% gross)	84.3	26.4	27.8	132.5	208

School enrollment, secondary (% gross)	31.5	16.4	4.2	64.9	208
School life expectancy, primary, both sexes (years)	5.1	1.7	1.7	7.9	208
School life expectancy, secondary, both sexes (years)	2.1	1.1	.4	4.7	208
MI_N (Active borrowers in % active pop.)	16.2	15.2	.8	66.45	208
MI_L (Loans in % of GDP)	1.4	1.3	.0	6.5	208
Access to electricity (% of pop.)	31.1	19.7	3.6	86.2	208
Wage and salaried workers, total (% of total employment)	15.4	7.1	4.3	37.1	208
Poverty headcount ratio at $1.90 a day (2011 PPP) (% of pop.)	52.1	15.5	21.6	96.1	208
Gross national expenditure (% of GDP)	108.9	7.5	85.2	123.7	208

Table 2: Instrumental variables (IV) estimation results (main sample)

Variables	School enrollment, primary (% gross)	School enrollment, secondary (% gross)	School life expectancy, primary, both sexes (years)	School life expectancy, secondary, both sexes (years)
MI_N	0.645***	0.467***	0.039***	0.033***
	(0.150)	(0.096)	(0.009)	(0.007)
MI_L	-8.713***	-3.809***	-0.511***	-0.226***
	(1.485)	(1.092)	(0.090)	(0.077)
phc190	-0.754***	-0.273***	-0.045***	-0.020***
	(0.064)	(0.051)	(0.004)	(0.004)
Elect	-0.045	0.597***	-0.001	0.033***
	(0.111)	(0.109)	(0.007)	(0.007)
Salaried	1.223***	0.553**	0.072***	0.047**
	(0.396)	(0.275)	(0.024)	(0.020)
GN_expend	0.004	-0.220**	-0.006	-0.015**
	(0.142)	(0.099)	(0.009)	(0.007)
Observations	168	168	168	168
R-squared	0.628	0.820	0.625	0.813
Number of id	8	8	8	8
F	41.98	94.64	42.33	91.84
Weak identification test (p-value)	45.15	45.15	45.15	45.15
Hansen J statistic (p-value)	0.673	0.254	0.701	0.197
Underidentification LM statistic (p-	1.69e-06	1.69e-06	1.69e-06	1.69e-06

value)				
GMM distance test of endogeneity (p-value)	0.000492	0.101	0.000762	0.0757

Note: Significance levels based on robust standard errors are ***(1%), **(5%), *(10%).

Table 3: Instrumental variables (IV) estimation results (Economic significance)

Y	indepvar	coef(β)	tstat	pval	β / sd(Y)	100*β / mean(Y)
School enrollment, primary (% gross)	MI_N_std	9,78	4,31	0,00	0,37	11,60
	MI_L_std	-11,65	-5,87	0,00	-0,44	-13,81
	phc190_std	-11,72	-11,78	0,00	-0,44	-13,90
	Elect_std	-0,90	-0,41	0,68	-0,03	-1,06
	Salaried_std	8,63	3,09	0,00	0,33	10,23
	gnexpend_std	0,03	0,03	0,98	0,00	0,03
School enrollment, secondary (% gross)	MI_N_std	7,07	4,86	0,00	0,43	22,47
	MI_L_std	-5,09	-3,49	0,00	-0,31	-16,18
	phc190_std	-4,24	-5,39	0,00	-0,26	-13,49
	Elect_std	11,77	5,49	0,00	0,72	37,43
	Salaried_std	3,90	2,01	0,04	0,24	12,41
	gnexpend_std	-1,65	-2,23	0,03	-0,10	-5,26
School life expectancy, primary, both sexes (years)	MI_N_std	0,59	4,33	0,00	0,36	11,46
	MI_L_std	-0,68	-5,66	0,00	-0,42	-13,34
	phc190_std	-0,70	-11,43	0,00	-0,43	-13,70
	Elect_std	-0,02	-0,16	0,88	-0,01	-0,42
	Salaried_std	0,51	2,96	0,00	0,31	9,87
	gnexpend_std	-0,04	-0,63	0,53	-0,03	-0,82
School life expectancy, secondary, both sexes (years)	MI_N_std	0,50	4,95	0,00	0,46	23,98
	MI_L_std	-0,30	-2,94	0,00	-0,28	-14,44
	phc190_std	-0,31	-5,55	0,00	-0,29	-14,98
	Elect_std	0,66	4,63	0,00	0,60	31,32
	Salaried_std	0,33	2,37	0,02	0,30	15,77
	gnexpend_std	-0,11	-2,16	0,03	-0,10	-5,40

Table 4: OLS Estimation results (Pooled)

VARIABLES	School enrollment, primary (% gross)	School enrollment, secondary (% gross)	School life expectancy, primary, both sexes (years)	School life expectancy, secondary, both sexes (years)
MI_N	0.558***	0.395***	0.033***	0.027***
	(0.197)	(0.092)	(0.012)	(0.005)
MI_L	5.972***	2.557***	0.368***	0.259***
	(2.046)	(0.971)	(0.126)	(0.059)
phc190	-0.017	0.168	0.003	0.004

	(0.189)	(0.119)	(0.013)	(0.006)
Elect	0.023	0.275**	-0.001	0.023***
	(0.215)	(0.122)	(0.014)	(0.007)
Salaried	-0.091	0.251	0.007	-0.006
	(0.487)	(0.252)	(0.031)	(0.014)
GN_expend	-0.595**	-0.331**	-0.039**	-0.025***
	(0.237)	(0.138)	(0.015)	(0.007)
Constant	134.392***	38.526***	8.113***	3.352***
	(22.174)	(13.847)	(1.429)	(0.793)
Observations	188	188	188	188
R-squared	0.319	0.507	0.284	0.670
F	28.74	60.17	27.97	96.13

Note: Significance levels based on robust standard errors are ***(1%), **(5%), *(10%).

Table 5: Random Effect estimation results

VARIABLES	School enrollment, primary (% gross)	School enrollment, secondary (% gross)	School life expectancy, primary, both sexes (years)	School life expectancy, secondary, both sexes (years)
MI_N	0.604	0.395*	0.035*	0.027*
	(0.379)	(0.239)	(0.018)	(0.016)
MI_L	-0.751	2.557	-0.190	0.259
	(3.840)	(3.102)	(0.169)	(0.186)
phc190	-0.480*	0.168	-0.036**	0.004
	(0.278)	(0.346)	(0.014)	(0.017)
Elect	-0.057	0.275	0.003	0.023
	(0.334)	(0.246)	(0.017)	(0.015)
Salaried	0.094	0.251	0.017	-0.006
	(1.409)	(0.875)	(0.074)	(0.046)
GN_expend	-0.019	-0.331	-0.005	-0.025
	(0.540)	(0.424)	(0.033)	(0.022)
Constant	105.752	38.526	7.110	3.352
	(68.480)	(43.416)	(4.341)	(2.414)

Observations	188	188	188	188
Number of id	8	8	8	8
r2_w	0.558	0.640	0.621	0.702
r2_b	0.0176	0.203	0.00172	0.489
chi2	43.31	120.3	18.45	221.2

Note: Significance levels based on robust standard errors are ***(1%), **(5%), *(10%).

Table 6: Fixed-effects estimation results

VARIABLES	School enrollment, primary (% gross)	School enrollment, secondary (% gross)	School life expectancy, primary, both sexes (years)	School life expectancy, secondary, both sexes (years)
MI_N	0.556	0.330*	0.033*	0.024
	(0.296)	(0.172)	(0.016)	(0.013)
MI_L	-6.112**	-1.644	-0.365**	-0.071
	(2.479)	(1.413)	(0.142)	(0.113)
phc190	-0.758***	-0.216**	-0.045***	-0.016**
	(0.117)	(0.069)	(0.008)	(0.005)
Elect	0.225	0.734**	0.015	0.043**
	(0.302)	(0.221)	(0.018)	(0.016)
Salaried	0.413	0.236	0.026	0.024
	(1.141)	(0.590)	(0.069)	(0.043)
GN_expend	-0.169	-0.278	-0.015	-0.018
	(0.424)	(0.188)	(0.026)	(0.014)
Constant	129.429*	46.260	8.336**	3.165
	(55.346)	(26.397)	(3.391)	(1.991)
Observations	188	188	188	188
R-squared	0.648	0.836	0.651	0.828
Number of id	8	8	8	8
r2_w	0.648	0.836	0.651	0.828
r2_b	0.00363	0.0549	0.00905	0.222
F	20.98	97.00	15.39	115.6

Note: Significance levels based on robust standard errors are ***(1%), **(5%), *(10%).

Table 7: Test of heterogeneity of effects between countries

Y	X	chi2	pvalue
School enrollment, primary (% gross)	MI_N	153	0,000
	MI_L	20	0,006
	phc190	114	0,000
	Elect	93	0,000
	Salaried	137	0,000
	gnexpend	18	0,013
School enrollment, secondary (% gross)	MI_N	112	0,000
	MI_L	80	0,000
	phc190	8834	0,000
	Elect	42	0,000
	Salaried	973	0,000
	gnexpend	19	0,007
School life expectancy, primary, both sexes (years)	MI_N	215	0,000
	MI_L	25	0,001
	phc190	744	0,000
	Elect	101	0,000
	Salaried	189	0,000
	gnexpend	20	0,007
School life expectancy, secondary, both sexes (years)	MI_N	111	0,000
	MI_L	88	0,000
	phc190	3328	0,000
	Elect	46	0,000
	Salaried	482	0,000
	gnexpend	20	0,006

Table 8 : Descriptive stats of microfinance intensities

Variable	Country	Mean	Std. Dev.	Min	Max
MI_N (Active borrowers in % active pop.)	GNB	1,53	0,69	0,97	2,73
	NER	3,40	2,34	0,95	9,78
	CIV	8,79	4,93	0,78	17,41
	MLI	12,71	6,23	1,96	22,70
	BFA	15,47	7,96	3,16	29,69
	SEN	23,98	16,62	1,91	51,67
	BEN	25,85	12,40	5,70	47,22
	TGO	30,77	22,09	3,91	66,41
MI_L (Loans in % of GDP)	GNB	0,02	0,02	0,00	0,05
	NER	0,34	0,15	0,06	0,66
	CIV	0,43	0,32	0,03	1,17
	MLI	1,17	0,33	0,40	1,57
	BFA	1,36	0,53	0,42	2,35
	BEN	1,65	0,45	0,83	2,54
	SEN	1,80	1,07	0,20	3,52
	TGO	3,46	2,04	0,31	6,45

Table 9 : Instrumental variables (IV) estimation results (Sub-samples)

Variables	Y1	Y2	Y3	Y4	Y1	Y2	Y3	Y4
	Sub-sample 1: GNB, NER, CIV				Sub-sample 2: MLI, BFA, BEN, SEN, TGO			
MI_N	0.294	-0.030	0.004	0.014	0.818***	0.595***	0.050***	0.042***
	(0.238)	(0.137)	(0.014)	(0.009)	(0.149)	(0.102)	(0.009)	(0.007)
MI_L	16.799***	20.126***	0.596*	1.701***	-6.548***	-3.775***	-0.375***	-0.223**
	(5.800)	(3.202)	(0.358)	(0.210)	(1.746)	(1.329)	(0.105)	(0.093)
phc190	-0.750***	-0.074	-0.043***	-0.007**	-0.952***	-0.287**	-0.060***	-0.019**
	(0.106)	(0.047)	(0.007)	(0.003)	(0.119)	(0.114)	(0.008)	(0.008)
Elect	0.002	0.826***	0.022**	0.043***	-0.013	0.496***	-0.003	0.027***
	(0.131)	(0.102)	(0.009)	(0.006)	(0.140)	(0.114)	(0.008)	(0.007)
Salaried	1.899***	-0.230	0.116***	-0.016	-0.345	0.300	-0.021	0.031
	(0.508)	(0.214)	(0.034)	(0.015)	(0.528)	(0.400)	(0.032)	(0.027)
GN_expend	0.002	-0.144	0.003	-0.015*	-0.546***	-0.423***	-0.034***	-0.033***
	(0.220)	(0.123)	(0.014)	(0.008)	(0.190)	(0.134)	(0.011)	(0.009)
Observations	56	56	56	56	112	112	112	112
R-squared	0.890	0.943	0.889	0.940	0.686	0.832	0.695	0.830
Number of id	3	3	3	3	5	5	5	5
F	41.32	155.9	47.13	158.7	39.58	81.68	39.68	82.22
Weak identification test (p-value)	14.61	14.61	14.61	14.61	31.62	31.62	31.62	31.62
Hansen J statistic (p-value)	0.930	0.0254	0.917	0.0102	0.487	0.410	0.643	0.340
Underidentification LM statistic (p-value)	0.00140	0.00140	0.00140	0.00140	1.70e-05	1.70e-05	1.70e-05	1.70e-05
GMM distance test of endogeneity (p-value)	0.0857	0.117	0.201	0.0401	0.237	0.0341	0.0746	0.0329

Note: Significance levels based on robust standard errors are ***(1%), **(5%), *(10%).