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DOES EDUCATION EMPOWER GIRLS?
Evidence from Mali

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Abstract

This paper brings new evidence on the importance of school interventions that target the wider environment of girls (school teachers, parents and community faith leaders) as the enabling mechanism to their empowerment. We show how supporting schooling promotes girls' empowerment by illustrating the short-term impact of the 'Girls Can' project, a four-years intervention in Southern Mali which aimed to increase girls' school retention rates and transition rates from the primary to the secondary cycle of school through a wide range of girl-friendly activities.

Using original data collected at the end of the project, instrumental variables are applied to control for the potential endogeneity between project participation and girls' empowerment after identifying comparable groups of 'treatment' and 'control' girls through coarsened exact matching.

We find that the project has a statistically significant impact on girls' empowerment, and that the intervention was an economically affordable investment at USD67 per girl per year. In addition to the effect on the aggregate measure of empowerment, and on achieving a higher transition rate to secondary school. the evaluation identifies the key domains of impact: girls' awareness of the risks of early pregnancy, their ability to stay on track in school, their confidence in reporting acts of violence perpetrated on their peers, and girls' positive perception of being part of an environment supporting their schooling.

JEL Classification: C14, D04, I24
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Introduction

This paper analyses the impact of investments in education on adolescent girls' empowerment. Empowerment in the gender and economic literature has received increasing attention in development policy. Kabeer (2005) referred to empowerment as a process by which those who have been denied the ability to make choices acquire it. This conceptual definition, which emphasizes the links between agency (the process that enables to make choices), resources (the mean to exercise agency), and achievements (the manifestation of agency) motivates this paper: understanding what type of investment in education (resource) can effectively achieve adolescent girls' empowerment, the intended outcome.

The idea of women's empowerment – the main topic of this paper - is even more relevant in the context of a poor country like Mali. Duflo (2012) reviews extensively the links between poverty and disempowerment, offering extensive evidence that the two go hand in hand. Gender inequality – of which disempowerment is an obvious manifestation- is often greater among the poor, for whom the inability to meet basic needs rules out the capacity to make meaningful choices to transform power relations. The absence of choice is likely to affect women and men differently, because gender-related inequalities often intensify the effects of poverty. Often, women and girls represent the most vulnerable within poor households and head the poorest households.

Education, in this sense, can be an effective conduit to bring about changes in individuals' cognitive ability to question, reflect on, and act on the conditions of their lives by gaining access to knowledge, information. The first target under the education goal of the United Nations' Sustainable Development Goals is to ensure that by 2030 all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. According to UNESCO (UNESCO, 2015), although gaps in education have closed in almost all countries, especially at the primary level, primary and secondary school enrolment rates remain much lower for girls than for boys in many Sub-Saharan African countries and in large parts of South Asia (UNESCO 2015).

The 2016 United Nations Population Fund report (UNDP, 2016) opens with a bold statement about the critical role that 10 years old girls – who represent 48 percent of the Sustainable Development Generation - have in shaping the *demographic dividend of our future*. Girls at this age are systematically disadvantaged relative to boys in several ways: they reportedly participate less in formal schooling and in its completion, particularly at the secondary and tertiary levels. They have poorer health, both physical and mental, engage less in formal employment, benefit of fewer legal rights, and are more likely to have their childhood interrupted by early marriage and childbearing. For this reason, adolescent girls are considered a key demographic target group to break the cycle poverty across the developing world (Levine et al. 2008). Adolescence is also a period when two important changes concur: girls become fertile, and human capital investments that are critical to future careers take place, or not. Economic empowerment and control over the body interact in a powerful way during adolescence, therefore interventions targeting girls at this stage of their life cycle might have higher returns than later timed interventions.

But what level of education is most effective to shape girls' agency, and is schooling a sufficient enabler for social and economic empowerment? The empirical evidence (ICRW, 2005) suggests the greatest payoff for the empowerment potential of women is associated with making it through secondary and higher levels of education. It is at these higher stages of schooling that young women acquire a stronger control of their own destiny and can influence more effectively change in their own communities. Higher levels of education – six years or more –are also more likely to be associated with girls' and women's ability to understand the costs of risky sexual behaviour and even to understand effective refusal tactics. On the other hand, in their review of the existing literature, Malhotra and co-authors (2003) suggest that the positive power changes associated with education are conditioned by the social relationships that schooling embodies and promotes. Where women's role in society is defined purely in reproductive terms, education may limit girls by equipping them to become better wives and mothers. These aspirations, although legitimate, do little to encourage girls and women to question the world around them, and the subordinate status assigned to them. Social inequalities can often reproduced through interactions within the school system, where teachers' approach to gender equality in the classroom is manifested by their gender stereotyping the attention given to boys and girls, which can in turn affect regressively empowerment. Education alone, therefore, is unlikely to make a difference: the social and economic constraints in the environment where girls reside often have a multiplier (or dampening) effect by shaping how educated adolescent girls power through life-long opportunities created by successful performance at school (Baird et al., 2013). In general, it is uncontroversial that the effects of education are greatly influenced by the social context, the rules or norms governing the environment in which women live.

The existing empirical literature brings some compelling evidence of the empowering nature that school interventions can empower adolescent girls. Bandiera and co-authors (2015), for example, show that interventions featuring a combined provision of vocational and life skills can critically jump-start young women's empowerment. Their study examines the impact of a program rolled out in Uganda that offered vocational skills to start small-scale income generating activities, and setup girls' after school clubs to explain life skills to enable informed choices about sex, reproduction and marriage. A key feature of the Uganda-based program was that it operated outside of schools, therefore reaching out to drop out girls, a critical group that is often missed out by schools-based interventions. This intervention was suggestive in showing the synergy between investment in girls' education, social change and empowerment.

Other evidence shows the effectiveness of "girl-friendly schools" in increasing access to schooling and reducing gender gaps in enrolment and test scores; building schools within villages (Burde and Linden 2013; Jacoby and Mansuri 2011; Kazianga et al. 2013), building girls' secondary schools (Andrabi, Das, and Khwaja 2013), building schools with girl-friendly amenities (Kazianga et al. 2013), or providing safe transportation for girls (Muralidharan and Prakash 2014). Many factors compete for girls' time in developing countries, increasing the opportunity cost of schooling both in absolute terms and relative to boys. For example, caring for younger siblings competes with school time, and opening community day-care centers can increase school attendance among girls 10–15 years old (Martinez, Naudeau, and Pereira 2012). All these examples illustrate effective interventions to promote positive outcomes for girls' schooling.

This paper situates itself in the body of literature outlined above and brings new evidence on how and what kind of investment in education empowers adolescent through a case study that evaluates the impact of the project 'Girl Can' implemented by Oxfam GB in Mali between 2011 and 2015 (Vigneri and Lombardini, 2016). The main contribution of the paper is to document the significant (although unplanned) effect of the project on girls' empowerment in schools in rural Mali. The paper makes three contributions. First, it tests the theory outlined above on the positive links between education and empowerment. Second, using non-experimental, end of project data, it illustrates an econometric strategy to navigate effectively around endogeneity issues and different sources of selection bias. Third, it shows the value for money of the project; with a three-year budget of 735,000CFA (U$740,000) for a target population of 3,752 girls, the short-term effect of the project was found to be positive and significant, suggesting the importance and financial viability of intervention such as this one, which target a larger network of families, elderly in the village, school teachers and governors to support girls retention and progress in their school life.

The rest of the paper is organized as follows: section 2 presents the project and puts it in the context of the larger efforts undertaken in Mali to promote investment in girls' education. It also explains the notion of empowerment used as the central measure of impact in this work, and how it relates to the project logic. Section 3 describes the research design, sampling procedure, and the evaluation method adopted. This section also includes a discussion about girls attriting out of the sample over the life of the project, and how this affects the results of the evaluation. The findings are presented in section 4 where we return to explain them in relation to the underlying question of the paper: does promoting girls' continued education empower adolescents? What are the strongest conduits between schooling and empowerment? Section 5 concludes the paper with several discussion points and learning considerations.

2. Mali and the 'Girls Can' Project

2.1. Education in Mali

Children in Mali are expected to attend compulsory education for 9 years, from age 7 to age 15, although many children enter late or held back, creating significant age variation by grade. Compulsory education includes six years in primary school (official school ages are 7 to 12 years) followed by three years in lower secondary school (official school ages are 13 to 15 years) which lead to the attainment of the Diplôme de l'Enseignement Fondamentale (DEF). Primary school net enrolment rates in Mali remain some of the lowest in the world, growing from 44 percent in 1999 to 61 percent in 2015 (UNESCO Institute for Statistics, 2016). There are also marked gender disparities; the percentages of girls enrolled in primary and secondary education in 2011 were respectively 46% and 39%, with a 10.37 % completion rate of girls in lower secondary education in 2006 which increased by less than 3 percentage points over the subsequent decade (13.15% in 2016).

Since 1991, the country has made remarkable efforts to tackle the major barriers to both access and quality education; investing on the quality teaching, poor school infrastructure and cultural

and religious barriers. These efforts have resulted in a number of projects and programmes put in place by the local NGO AADeC (Association d'Appui à l'Auto Développement Communautaire) aiming to reduce poverty and social injustice, and to contribute positively to the realisation of the "Education for All" coalition goals. Despite these efforts, strong inequalities persist in Mali's education system, marked by a clear gender bias, which is particularly evident in the rural areas, where a large share of girls do not complete the primary cycle of compulsory education, fail to move on to the lower secondary cycle due to obstacles they persistently face: the tradition of early marriages, the lack of clean water and good sanitation facilities in schools, and the long distances which make the way to school cumbersome and dangerous.

2.2 The 'Girls Can' project

To address these problems, in October 2011 Oxfam GB teamed up with AADeC and the UBS Optimus Foundation (UBSOF) to launch a three-years project known as 'Girls Can' (Les Filles Peuvent). The main objectives of the project were to increase the number of girls completing primary school, and their transition rate to secondary school in the intervention area. These objectives would be achieved by involving different government partners according to their area of expertise: The Ministry of Education Girls' Unit (SCOFI), the Education Academy of Kati, the Local Education Board of Baguineda (CAP), the coalition for Education for All (EFA)[3], and the AADeC NGO. The intervention covered all pupils (i.e. boys and girls) enrolled in 25 randomly selected schools (16 from the primary cycle, and 9 from the secondary cycle) covering three communes of the Kati Cercle[4]: Baguineda, Mountougoula and Sanankoroba. All pupils from the selected schools would be recipients of the project activities, however the intended direct beneficiaries were 3,752 girls (of which 2,752 from 16 primary schools). The project life was eventually extended to the end of 2015 due to slippages in the initial roll out of activities, and received a $755,000 fund from UBSOF between 2011 and 2014.

The target population also included a number of indirect beneficiaries. Firstly, the project planned to introduce Associations of Pupils' Mothers, and work with them to provide small grants to develop their own mini projects, to demonstrate that capacity strengthening was one of the central component of the intervention. Other indirect beneficiaries included the larger social network defining girls' environment in the village: School Management Committees, Students' Parents Association, school teachers and communities in all 25 villages.

At the onset of the project, Oxfam and UBSOF commissioned a baseline qualitative study to identify the socio-economic and cultural constraints that lead girls to drop out of school. As part of these initial appraisals, it became apparent that between 2010 and 2012 the budget share

[3] The Africa Network Campaign on Education For All was setup in Abuja in 2000, and aimed to promote, enable and strengthen the capacity of African Civil Society to advocate and campaign for Free Education For All.

[4] A *Cercle* is the second level administrative unit in Mali. The country is divided into eight regions and one capital district (Bamako). The regions cover in total 49 cercles, with each of these subdivisions named after their principal city. Cercles are now directly subdivided into rural and urban *communes*, which in turn are divided into villages and encampments in rural areas.

invested locally in education by the Collectivités Territoriales[5] (CTs) increased from 20,05% to 54,20% (Table 1) across the three project rural communes of Sanankoroba, Mountougoula, Baguinéda. However, the entire CTs budget allocated to education had been invested in building and equipping schools, while the portion allocated to promote and retain girls in school was inexistent.

Table 1: Aggregate budget figures for the three project communes: 2010 - 2012

Year	Total Budget	Budget invested in Education	Total Budget	Budget for Education	% to education
	(CFA)	(CFA)	(US$)	(US$)	
2012	3,150,588,184	258,646,000	5,292,988.15	434,525.28	0.082
2011	2,986,510,680	105,997,000	5,017,337.94	178,074.96	0.035
2010	2,653,420,516	204,493,000	4,457,746.47	343,548.24	0.077
Total	**8,790,519,380**	**569,136,000**	14,768,072.56	956,148.48	**0.065**

Source: INAGEF, 2012

The results of the 2012 baseline study also showed that the ratio between boys and girls was balanced enough in primary schools, but that the gender gap would progressively increase from 15% to 20% in secondary school, with promotion rates decreasing dramatically in exam year groups (i.e. 9th grade), where girls were more subject to social constraints. The specific obstacles to girls' transition to secondary school were identified to be heavy family chores, baby-sitting, parents' illiteracy, early marriages and pregnancies (in all secondary schools there were at least 10 girls already pregnant), and parents' inability to support girls' studies. Additional constraints related to girls' freedom of speech in public were also identified; low self-esteem, lack of self-confidence, being emotional, girls' weak participation in public meetings and groups, and their sense of panic and fear to express their opinions.

For this reason, the intervention adopted a new approach to tackling the problem of adolescent girls' schooling by setting up 'girls' friendly' activities to promote a positive environment around the perception of girls' remaining and completing compulsory education. Table 2 below shows the intended outcomes (column 1) and correlated activities (column 2) that featured in the 'Girls Can' project. Operationally, Oxfam and UBSOF created a close involvement of local partners (the SCOFI, Baguineda CAP, and AAdEC) to ensure that any project gains and lessons learned would be integrated into the national strategy for girls' education to guide the government, and ensure financial sustainability of project activities beyond the phase funded by UBSOF.

[5] There are territorial catchment zones that act as decentralized government authorities with the mandate to invest a share of their allocated budget in education policies.

Table 2: Project objectives and activities

(1) Intermediate Outcomes	(2) Activities
Outcome 1: Identify and address the constraints causing girls to abandon school	School management committees (GSM, Comités de Gestion Scolaire) design 25 community-level action plans Create community level activities centred on the importance of parents' engagement in girls' education (through the promotion of community level and school level meetings) Produce and disseminate advocacy guidelines (two for each school)
Outcome 2: Community mobilisation to increase the retention of girls in primary school and their transition to secondary schools	Sensitisation events: use of music and theatre to support girls' education in the village (annual events) Reinforce the capacity of 25 committees for the management of schools School exchanges Support income generating activities within the Mothers-Girls Associations for mothers to support girls' school attendance
Outcome 3: Girls understand and are able to express clearly their rights	The creation of 25 girls' clubs to support girls' school attendance and performances[6].
Outcome 4: Improving the academic perfomance of girls in both primary and secondary schools	The organisation of supplementary catch-up courses to support girls facing difficulties in specific school subjects. The creation of study groups for girls. The collection of girls' test results

The project activities associated with intermediate outcomes 3 and 4 in the table above, were meant to actively involve and reach all girls enrolled in the schools selected by the project. The survey instruments used for the impact evaluation discussed in this paper where therefore designed to capture if and how girls perceived the benefits from these activities through a set of clearly defined questions, as discussed in section 3.1 below.

3 Research Design

3.1 Evaluation design and selection of 'Girls Can' schools

The evaluation presented in this paper investigates whether the 'Girls Can' project increased girls' empowerment through a set of activities intending to promote their transition rate into secondary school. The analysis underlying the evaluation uses Oxfam's measure of women's empowerment as the central variable of interest. This measure builds on the Women's Empowerment in Agriculture Index (WEAI) developed by the International Food Policy Research Institute (IFPRI), and the Oxford Poverty and Human Development Initiative (OPHI) with support from the United States Agency for International Development (USAID). Oxfam developed over the years its own approach to measuring women's empowerment by adapting the WEAI and

[6] Girls were coached and encouraged to express themselves in front of their parents and the whole school community through short performances to publicly showcase sensitive topics such as early marriage, gender based violence, early and unwanted pregnancy, and the need to reduce girls' workload on home chores. The project also proposed the allocation of 'encouragement' prizes to the best three schools ranking in terms of subjects choice, quality of presentation, and confidence on the subject performed.

combing it with a theoretical framework in the literature (VeneKlasen and Miller, 2002; Rowlands, 1997; and CARE, 2009) that considers three different levels where power change can take place: the personal, the relational, and the environmental (Lombardini, Bowman and Garwood, 2017; Bishop and Bowman, 2014). Oxfam GB employs routinely this approach in its effectiveness reviews, and the analysis below is conducted using data collected under and measurement tools developed for the 2016 Mali effectiveness review (Vigneri and Lombardini, 2016). Empirically, there is no single generic set of 'empowerment' characteristics that is applicable to all contexts. In the Mali study site, the index was derived by Oxfam GB in collaboration with project staff, all directors of the project schools, and 17 representatives of mothers' associations that were involved in the project. An initial workshop was held with all actors ahead of the survey to identify an appropriate list of 'empowerment' indicators - relevant and appropriate in the local socio-cultural norms - to populate each level of power change. Table 3 below illustrates the three levels of empowerment (column 1), the four dimensions of change in power (column 2) which feature in Oxfam's analytical framework, and the indicators identified under each dimension (column 3).

Table 3: Characteristics adolescent girls' empowerment

Level	Dimension	Indicators	WEI_UW	WEI_W	WEI_5DE
(1)	(2)	(3)	(4)	(5)	(6)
Personal	**Power from within**	Knowledge of their rights	0.05	0.05	0.04
		Desire to study	0.05	0.06	0.04
		Ambitions	0.05		0.04
		Knowledge of the advantage of education	0.05		0.04
		Knowledge of reproduction health	0.05		0.04
	Power to	Formal education	0.05	0.42	0.04
		Freedom from early marriage or pregnancy	0.05	0.07	0.04
		Self-confidence and personal autonomy	0.05	0.04	0.04
		Good school results	0.05		0.04
		Freedom from gender stereotypes	0.05		0.04
Relational	**Power with**	Leadership	0.05	0.06	0.1
		Group participation	0.05		0.1
	Power over	Freedom from violence	0.05		0.04
		Ability to denounce violence	0.05		0.04
		Not acceptability of sexual violence	0.05		0.04
		Material support from household	0.05		0.04
		Moral support from household	0.05	0.15	0.04
Environmental		Family education	0.05	0.05	0.06
		Favourable environment	0.05	0.05	0.06
		Support from associations	0.05	0.05	0.06

A questionnaire was designed to capture the indicators listed in column (3). For each characteristic, a dummy variable was defined to measure the corresponding empowerment status of each respondent. Table A1 in the appendix illustrated the questions used to measure each empowerment indicator, and how power over each indicator was defined.

Columns (4), (5), and (6) differentiate three different methods of aggregating the indicators into one index of empowerment. Column 4 gives an equal weight to each indicator. This is the format of aggregation currently used by Oxfam GB in the research it carries out on women' empowerment, and throughout the rest of the analysis will be the main index on which our findings will be discussed. The rationale underlying this unweighted index is that it is not possible to establish an objective ranking to different empowerment indicators without introducing an element of discretion in the construction of the measure. This "agnostic" approach is the rationale for using this measure as the main outcome variable, and it represents the proportion of the twenty empowerment indicators on which girls scored positively. Column 5 uses a weighing metric that was generated after the focused group discussion with the 17 mothers during the inception workshop. During this exercise, participants were asked to rank in order of importance the three indicators that in their opinion best captured the key features defining girls' empowerment in the project communities. To carry out this exercise, each mother had three points to assign to her first choice of empowerment indicator, two points to her second choice, and one point to her last (least important) ranked choice. The points were then added up to generate a relative weight for each indicator, which was calculated based on the proportion of points it had received across all 17 mothers. Finally, column 6) uses the weighing system of the five dimensions empowerment index (Alkire et al., 2013) to assign to each indicator a weight proportional to its share in each of the five dimensions of empowerment considered here. The rational for this last index is that if each dimension of empowerment has an equal weight of one fifth, then all indicators that are grouped within each dimension should share in equal measure the quota of one fifth assigned to their dimension.

3.2 Data, Attrition and Econometric Strategy

There were two main challenges in setting up this evaluation exercise. First, in the absence of baseline data on project schools, the evaluation team had to reconstruct the project logic in order to identify a suitable sample of comparison schools. Secondly, as the direct beneficiaries of the project were girls who would transition from one school cycle to another through the course of the intervention, it was necessary to identify an appropriate age cohort of girls to sample that would enable to measure both completion rate of the primary cycle, and the transition rate to the secondary cycle. The first task in the evaluation exercise was therefore to define the appropriate temporal dimension by identifying the cohort of students for the analysis. As noted above, the school system in Mali includes two cycles in the *Einsegnement Fondamental* level; six years in the primary cycle, followed by three years in the secondary cycle. At the end of the *Einsegnement Fondamental* girls obtain the Diplome d'Etudes Fondamentales (DEF), and transfer to the *Secondaire general and technique* level of schooling. The first three years in this secondary school system are called lycée, and can then be further completed with additional two to four years of schooling.

Sampling framework

The sample frame included girls who in 2011 were enrolled in years 3, 4, 5 and 6 of the primary cycle. By the time the project ended (and this evaluation exercise was carried out in January 2016) girls in this cohort of students were expected to either: (i) have dropped out of school; (ii) be in years 7, 8, or 9 of the secondary cycle, or in the first year of lycée (in the *Secondaire general*

and technique level of schooling), and therefore have completed the DEF; or (iii) still be enrolled in primary school, if they had repeated a school year.

Table 4 illustrates the sampling frame used. In order to capture accurately these different outcomes, the survey team requested official school registers from all project schools, and a list was subsequently compiled with all girls who in 2011 were enrolled in years 3 to 6 of all 17 primary schools covered by the project (2,022). From this population, a random sample of 328 girls from project schools was drawn. As anticipated, not all girls who were in school at the beginning of the project were still in school at the time of the evaluation, so particular effort was made to track down even those who had dropped out.

Table 4: Sampling frame for selection of intervention and comparison school group girls

	Enseignement Fondamental Girls completing this order receive the DEF *(Diplome d'Etudes Fondamentales)*							***Enseignement Secondaire*** Girls completing this order achieve the Baccalaureate		
	Primary Cycle *(6 years)*				**Secondary Cycle** *(3 years)*			**Lycée public and private** *(3 years)*		
Grade	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th**
Expected* age of girls	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
	Sample composition @ baseline (2011)				**surveyed girls @ end line (2016)**					

*This is labelled as 'expected 'age as there are girls in the sample who will be older if they repeated one or more years of school, or if they enrolled in school when they were older than the expected age for any school year.

The second stage of the evaluation exercise consisted in the identification of an appropriate number of comparison schools; the following criteria for project participation were applied to identify a suitable group of comparison schools:

1. Be a state school in a rural area.
2. Have at least 200 enrolled pupils.
3. Be within the same CAP (Baguinéda).
4. Not have received similar[7] interventions in the past.

During the inception workshop of the evaluation exercise, 34 primary potential comparison schools were identified that met all the criteria above. These were located in the Baguinéda CAP, and had not received any intervention connected to the Oxfam project 'Girls Can'. In order to validate the selection of an appropriate set of comparison schools, this exercise was carried out with the support of representatives from the pedagogic centre in Baguinéda, with representatives from the Ministry of Education, and with all the 25 school directors involved in project activities. From the initial list of 34 primary schools, the evaluation team then randomly selected 20 schools and gathered the lists of all girls who in 2011 were enrolled therein in years 3 to 6. This enabled the team to randomly select 588 girls to be interviewed for the comparison

[7] 'similar' refers to interventions not centred on providing supplementary school services to girls (e.g. study groups, theatre groups, girls' clubs), or attempting to create a more favourable and supportive environment in the school and with the parents. The area of the project had benefitted by other interventions, but these were exclusively centred on the provision of school equipment (school uniforms, teaching material, class furniture), or in improving the sanitary facilities of the school premises.

group. The schools selected for comparison purposes may have received interventions from other organisations active in the same period, and this was a likely possibility given the number of projects the area has been exposed to since 2000. The idea here was instead to capture schools (and girls therein), who had not been involved in the Oxfam project, and that could therefore be similar enough to the project schools (and their beneficiaries), for everything except than for similar type of education-related interventions received.

The final sample included 914 girls enrolled in years 3 to 6 in 2011; 326 girls beneficiaries of the project (treatment group) and 588 girls from comparison schools (comparison group). The sampling principle applied was to randomly select girls from the complete list of girls registered as enrolled in their expected school year at baseline, and then to track them at the time of the survey regardless of whether they were currently attending school (either in their expected year of schooling, or in a lower one year group had they repeated one or more years since the project started), or had dropped out of school. The enumerators were instructed to replace the respondent only in instances where locating girls was not possible. There were in total 144 girls who were not identified from the original sampling frame of 1085 observation; 124 (86 percent) from non-project schools, and 20 (14 percent) from project schools.

A profile of girls attriting out of the sample

Given the nature of the 'Girls Can' project, and the time elapsed between its onset and the evaluation exercise, the likelihood of attrition – occurring either because girls abandoned their studies or moved elsewhere – was high. The survey instruments used to conduct the evaluation purposely included a number of questions to establish what class girls were attending at baseline, their current location and school enrolment status to assess the possible effect of attrition on both the representative nature of the identified sample, and in relation to the project impact. Interestingly, the majority of girls who dropped out of school and were included in the sample were 15 to 17 years old at the time of the survey, and reported as the top two reasons for leaving school 'a resistance from the family' as the main reason for leaving their studies, or their 'inability to do well in school'. Three girls reported early marriage as the reason for leaving school, and two girls who were 17 years old at the time of the survey said they had dropped out due to having become pregnant. Although these numbers are too small to make wider generalisation about the reality on the ground, they remain suggestive of girls' personal impediments in further pursuing their studies. These impediments persist in the survey area, despite having been identified earlier in the project design phase as important areas for intervention. Finally, of the 35 girls who had dropped out that were surveyed, 27 (77 percent) stated they would re-enrol in schooling had they had the opportunity to do so, and among the eight who declared they wouldn't, two justified their answers on the grounds of being married, and six said they never liked school, and would therefore not return to education for this reason. Table 5, shows a breakdown of girls who were not tracked and surveyed in the original roster of girls to survey, showing the reasons recorded for the inability to locate these respondents.

Table 5: Why not possible to interview girl

Lycée	13	9.03
Migrated	31	21.53
On vacation away	1	0.69
Drop out; married	13	9.03
Not known/ Missing/No show	86	59.72
Total	144	100.00

Out of the 144 girls not identified, 13 were dropouts (only one of which was at baseline in a project school). It is also likely that some part of those who were not identified because they were either unknown in the village, or their location was not known, will also have abandoned school, as it emerged from the additional notes taken by the survey team during the fieldwork.

We conducted a Chi square test to understand whether the incidence of girls' exiting the project affected differently the treated and comparison groups, as that would potentially bias the main findings on the project's impact on girls' empowerment. Table 6 shows the results of the test and suggests a strong association between the variable that defines project treatment and the incidence of attrition and school dropouts. Under the plausible assumption that girls leaving the project are more likely to be less empowered, and given the incidence of attrition and dropouts by treatment status, we can conclude that the estimated difference in empowerment resulting from the project is downward biased, and therefore the incidence of sample attrition and school dropouts reinforces the size of the impact.

Table 6: Attrition and school dropout incidence

School dropout Analysis					**Attrition Analysis**			
	Comparison	*Treatment*	*Total*			*Comparison*	*Treatment*	*Total*
School enrolled	606	336	942		*Non-attrited*	588	326	914
(%)	85.11	97.11	89.04		(%)	82.58	94.22	86.39
School dropouts	106	10	116		*Attrited*	124	20	144
(%)	14.89	2.89	10.96		(%)	17.42	5.78	13.61
Tot Obs.	712	346	1,058		*Observations*	712	346	1,058
Pearson chi2(1) = 34.33 Pr = 0.00					Pearson chi2(1) = 26.81 Pr = 0.00			

3.3 Econometric strategy

Since the purpose of the evaluation was to identify the causal effect of the project on girls' empowerment, the econometric approach adopted to compensate for the absence of baseline data consisted of two steps: first to 'exactly' match a sub-sample of project and non-project girls through Coarsened Exact Matching (CEM) to reduce the selection bias between the treatment and the comparison group. CEM is a non-parametric method that can be highly effective in removing imbalance between treatment and control groups (Iacus et al 2011, 2012, Berta et al. 2016). In causal inference, CEM avoids the need to control for observables covariates, and in an experimental framework it allows researchers to estimate causal effects using a simple mean

difference between the selected groups of individuals. Furthermore, CEM avoids a recurrent problem which features in other matching methods; the persistent imbalance between the treatment and control groups even after matching. Girls in project schools (or "treated") were matched with girls with the same exact characteristics selected by the evaluation team from non-project schools (or "comparison"). Matching was performed using a selection of recall characteristics around households' assets, household composition, as well as based on the school grade in which girls were enrolled at baseline, all essential characteristics to create identical groups of girls in a hypothetical pre-project setting.
The global balance between the treated and control units in the data is measured using the L_1 index (Iacus et al 2011, 2012):

$$L_1 = \frac{1}{2}\sum_{l1\ldots lk \in H(x)} |f_{l_1} \ldots f_{l_k} - g_{l_1} \ldots g_{l_k}| \quad (1)$$

where $f_{l1}\ldots f_{lk}$ and $g_{l1}\ldots g_{lk}$ are the relative frequencies of treated and control observations belonging to the cells with coordinates $l_1\ldots\ l_k$ in the multivariate cross tabulation (H). Conditioning on the coarsening level of the covariates, the empirical distributions before and after CEM are completely separated when $L_1 = 1$ while if the distributions perfectly overlap $L_1 = 0$. A good matching performance is achieved if L_1 of the matched population is less than L_1 of the original population.

The second step of the estimation procedure consisted in the estimation of an Instrumental Variable (IV) model (Angrist 1996, 2001) to net out the causal effect of the project (the treatment effect) on girls' empowerment (the outcome variable of interest), and to overcome the possibility of endogeneity and omitted variables biases affecting the estimation of the causal inference. The IV approach was performed in a Two Stage Least Square (2SLS) framework, and robustness of the chosen instruments was checked by means of including a combination of different instruments and also by looking at the stability of standard errors of the estimates. The Durbin and Wu-Hausman test was also performed for the existence of endogeneity bias.

The IV approach relies on two key assumptions: (i) that the instrument correlates with the endogenous variable, and (ii) that the instrument is not correlated to the errors in the structural model. To evaluate the impact of the project on girls' empowerment, the following baseline equation was estimated:

$$Emp_{is} = \alpha + \sum_k \beta_k\, x_{kis} + \delta T_{is} + u_{is} \quad (2)$$

where Emp_{is} is the level of empowerment for the girl *i* in the school *s*, x_{kis} are the *k*-covariates included in the model and δ is the effect of the treatment *T*, whereas the u_{is} are the school clustered errors. The first stage equation in the 2SLS framework is:

$$T_{is} = \alpha + \sum_k \beta_k\, x_{kis} + \sum_j \gamma_j\, I_{jis} + \varepsilon_{is} \quad (3)$$

where I_{jis} are the *j* instruments included in the model, and x_{kis} includes the following set of covariates: a set of binary variables for whether (i) girls' ambition was to become a military

officer (the most frequently given response to the question about respondents' ambition when adults), (ii) girls' ethnic group was Bambara, (iii) girls' family main income generating activity was classified in the middle-income group, (iv) the respondent was married with or without a child, (v) the girl's household owned a TV, and a continuous variable measuring the age distance between the respondent and her oldest sibling.

The first step of the econometric procedure was to recreate through CEM two comparable groups of girls from project and non-project schools. In order to do this, and mindful of the sample size limitation of the data, we exploited a selection of socio-economic characteristics which girls were asked to recall from 2011, the year preceding the inception of all project activities. The set of variables used for the matching exercise included two different measures defining girls' fathers profile (a binary variable defining those older than 40, and whether they had any formal education), a control for the school year girls were enrolled in at baseline, and quintiles of girls' household wealth at baseline to capture the different economic status of girls to be matched (using a wealth index generated by means of principal component analysis on a list of assets belonging to the respondents' family).

4. Evaluation Findings

This section shows the results of the evaluation process described above, and reports first the outcome of balancing treated and control observations with CEM, and subsequently the outcome of estimating an IV model to test the casual effect of the project on girls' empowerment.

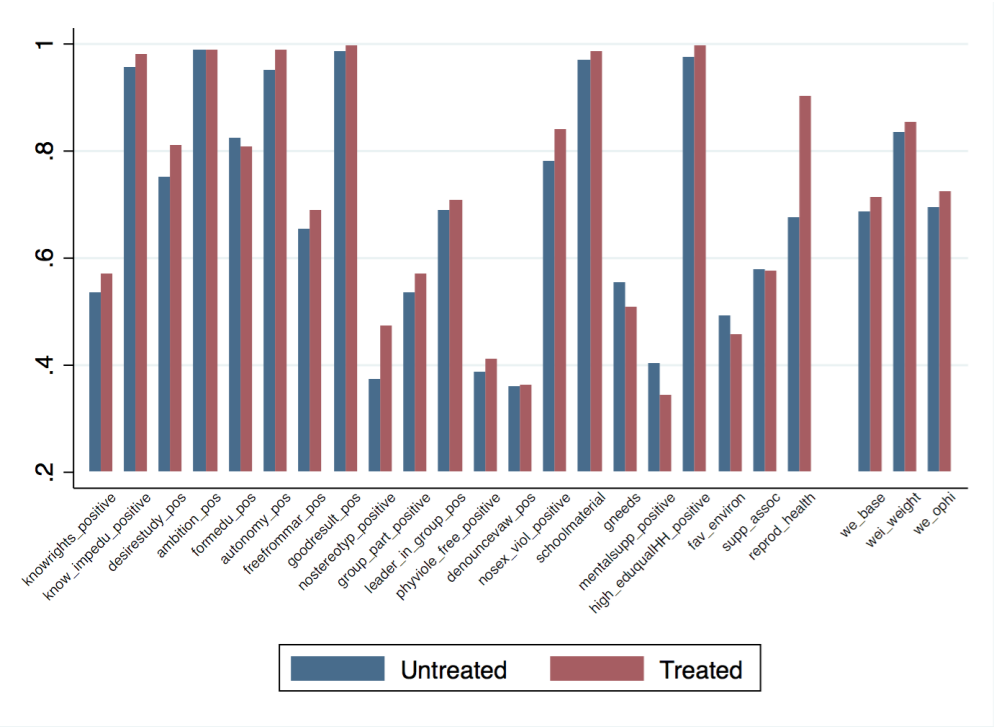
Table 7: CEM Results

	Level of imbalance pre and post matching	
	Before CEM	*After CEM*
Multivariate L1 distance:	0.23	1.652e-15
	Matching Outcome	
Observations	*Comparison*	*Project*
All	588	326
Matched	558	326
Unmatched	30	0

The top part of table 7 shows the power of the CEM procedure in balancing the two observed populations: project school girls and comparison school girls. The role of the CEM in our strategy is to reduce the degree of unbalance in the data to create two groups of girls' identical conditional on the matching characteristics to eliminate the unbalance due to potential selection bias in the sample procedure. The L1 in Table 7 decreases from 0.23 up to 4.83E-16, nearly 0 which would be the value that identifies exact balance between treated and control units. The bottom part of table 7 further shows that after matching the samples across the characteristics, only 56 and 8 observations were dropped respectively in the control and in the treated group.

Figures 1 compares the empowerment indicators after matching. Interestingly, although there is a substantial variation across different empowerment characteristics, for each of these the observed difference between project and non-project school girls was not statistically significant, suggesting that the two sample groups to be well balanced even before matching.

Figure 1: Empowerment indicators: post-matching (CEM) comparison



From this point onward, the binary variable in equation (3) above which identifies project school girls' is referred to as the *Treatment* variable. Table 8 has the descriptive statistics of all variables used in the 2SLS model after matching, while tables 9 and 10, on which the rest of the discussion is developed, present respectively the results from the first-stage and the outcome equations of the model.

Table 8: Descriptive statistics of matched variables

Variables	**Comparison school girls**			**Treatment school girls**		**Δ Stat Sign**
	Mean	*St. Dvn.*		*Mean*	*St. Dvn.*	
Outcome Indicators						
WEI_UW = Empowerment Index Unweighted	0.69	*(0.13)*		0.71	*(0.11)*	***
WEI_W = Empowerment Index Weighted	0.84	*(0.15)*		0.86	*(0.10)*	***
WEI_5DE = 5 Dimension Empowerment Index (WEAI component)	0.70	*(0.15)*		0.72	*(0.14)*	***
Instruments						
School-level average of self reported distance < 10 min (BL)	0.15	*(0.36)*		0.00	*(0.00)*	***
School-level average of self reported distance [10 20] min(BL)	0.66	*(0.47)*		0.69	*(0.46)*	
School-level average of self reported distance > 20 min @ BL	0.18	*(0.39)*		0.31	*(0.46)*	***
School-level average # girls attending revision groups (BL)	0.11	*(0.07)*		0.22	*(0.11)*	***
School-level average # girls in expected grade by age (BL)	0.46	*(0.12)*		0.58	*(0.10)*	***
Empowerment covariates exogenous to treatment						

Dummy =1 if respondent's ambition is to become a military	0.22	*(0.42)*		0.14	*(0.35)*	***
Dummy = 1 if girl's ethnic group is Bambara	0.54	*(0.50)*		0.60	*(0.49)*	
Dummy = 1 if girl's family conducts low income activity	0.72	*(0.45)*		0.74	*(0.44)*	
Dummy = 1 if girl's family conducts medium income activity	0.13	*(0.33)*		0.17	*(0.38)*	*
Dummy = 1 if girl's family conducts high income activity	0.16	*(0.36)*		0.09	*(0.29)*	***
Dummy = 1 if girl is either married or has a child	0.06	*(0.24)*		0.05	*(0.22)*	
Age distance between respondent and older sibling	4.22	*(5.70)*		3.57	*(4.55)*	***
Matching variables						
Age HH head in 2011 less than 40	0.27	*(0.45)*		0.27	*(0.44)*	
HH head in 2011 had no education	0.46	*(0.50)*		0.51	*(0.50)*	
Attending 3rd grade at baseline (2011)	0.36	*(0.48)*		0.39	*(0.49)*	
Attending 4th grade at baseline (2011)	0.30	*(0.46)*		0.36	*(0.48)*	
Attending 5th grade at baseline (2011)	0.22	*(0.42)*		0.14	*(0.35)*	***
Attending 6th grade at baseline (2011)	0.11	*(0.32)*		0.10	*(0.31)*	
1st quartile Wealth Index	0.18	*(0.38)*		0.24	*(0.43)*	***
2nd quartile Wealth Index	0.19	*(0.39)*		0.21	*(0.41)*	
3rd quartile Wealth Index	0.20	*(0.40)*		0.21	*(0.41)*	
4th quartile Wealth Index	0.21	*(0.41)*		0.19	*(0.39)*	
5th quartile Wealth Index	0.22	*(0.42)*		0.15	*(0.36)*	***
Observations		*588*			*326*	

A description by group (i.e. treatment and comparison) of the variables used after matching suggests the persistence of significant differences between girls from project and non-project schools on several characteristics; in particular all empowerment indices are shown to be significantly higher for treatment girls, whereas girls in the comparison group are from better off families, as suggested by both the categorical variable defining higher income activity families, and the top quintile of the wealth index used as a matching variable). The sample composition also shows a higher incidence of 5th graders in the comparison group. The instrumental variables used in the selection equation of the IV model, were selected to be school-level measures constructed from the registers of baseline schools or aggregated up by recall data provided by girls.

Table 9: First stage equation results

Dep. Var.: Treatment = Selection into project schools	**Coefficient**	**Std. Error**
Dummy =1 if respondent's ambition is to become a military	-0.042	(0.031)
Dummy = 1 if girl's ethnic group is Bambara	0.019	(0.036)
^Dummy = 1 if girl's family conducts medium income activity	0.002	(0.040)
Dummy = 1 if girl's family conducts high income activity	-0.083*	(0.046)
Dummy = 1 if girl is either married or has a child	-0.011	(0.065)
Age distance between respondent and older sibling	-0.000	(0.002)
Dummy = 1 if girl's household owns a TV (proxy for exposure to role model)	-0.024	(0.032)
Instruments		
^^Dummy = 1 if school-level average of self reported distance < 10 min @ BL	-0.472***	(0.164)
Dummy = 1 if school-level average of self reported distance [10 20] min @ BL	-0.145	(0.162)
School-level average # girls attending After School Classes (BL)	2.088***	(0.532)
School-level average # girls in expected grade by age (BL)	1.823***	(0.266)
Constant	-0.702***	(0.197)
Observations	870	
R-squared	0.521	

Note: *** sign at 0.001, ** sign at 0.05, * sign at 0.1. ^^ Reference category is distance greater than 18 minutes. ^ Reference category is girl's family conducts low income activity. BL is Baseline; ASC is After school revision classes. All 'BL' variables are recall baseline variables. Robust standard errors are adjusted for 30 clusters, baseline schools.

The three following variables were used as instruments: (i) the school level average walking distance to enrolled girls' homes, (ii) the school level average number of sampled girls attending after school revision classes (ASC), and (iii) the share of girls who in 2011 were attending the correct year based on their age. All three instruments were found to have a statistically significant association with the probability of being included in the project. The 'average walking distance' variable suggests that closer schools (i.e. those located on an average at less than 10 minutes to girls' homes) had a lower probability of being included in the project relative to more far away school (i.e. those on average at more than 18 minutes walking distance from girls' homes). Similarly, schools with on average a higher share of girls on target (i.e. enrolled in the school year expected for their age), and schools with on average a higher number of girls attending ASC were more likely to be selected for the project.

The results of the second stage regression are reported in table 10 where the first two columns compare OLS and IV estimates for the preferred model using the unweighted empowerment index as the outcome variable (WEI_UW), whereas columns 3 and 4 report the same set of OLS and IV estimates in pairs of models estimated with the two alternative empowerment indices as dependent variables; the index with weights derived using the exercise with project school mothers (WEI_W), and the five dimension index adapted from the WEAI methodology (WEI_5DE).

Table 10: Second stage the determinants of girls' empowerment

Dep. Var.: Empowerment Index	**(1)**		**(2)**		**(3)**	
	WEI_UW		**WEI_W**		**WEI_5DE**	
	OLS	**IV**	**OLS**	**IV**	**OLS**	**IV**
Treatment	0.040*	0.057*	0.043*	0.059*	0.043*	0.061*
	-0.016	-0.02	-0.02	-0.027	-0.017	-0.022
Respondent's ambition is to become a	0.029*	0.031*	0.037*	0.039*	0.030*	0.033*
	-0.011	-0.011	-0.013	-0.012	-0.012	-0.012
Girl's ethnic group is Bambara	-	-	-0.026*	-0.027*	-	-
	-0.009	-0.009	-0.014	-0.014	-0.011	-0.011
Girl's family conducts medium income	-0.004	-0.006	-0.002	-0.003	-0.013	-0.014
	-0.014	-0.013	-0.013	-0.013	-0.017	-0.016
Girl's family conducts high income activity	0.046*	0.048*	0.080*	0.082*	0.054*	0.055*
	-0.013	-0.013	-0.012	-0.011	-0.014	-0.014
Girl is either married or has a child	-0.048*	-0.047*	-	-	-0.045	-0.044
	-0.025	-0.024	-0.036	-0.035	-0.028	-0.027
Age distance between resp and older	0.002*	0.002*	0.004*	0.004*	0.002*	0.002*
	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
Girl's household owns a TV	0.045*	0.044*	0.041*	0.039*	0.044*	0.043*
	-0.011	-0.011	-0.024	-0.022	-0.011	-0.011
Constant	0.646*	0.640*	0.783*	0.777*	0.655*	0.649*
	-0.017	-0.016	-0.032	-0.032	-0.017	-0.016
Observations	870	870	870	870	870	870
R-squared	0.127	0.196	0.099	0.123	0.193	0.095
Wald test exogeneity F(1, 27)	0.20 (p = 0.65)		0.17 (p = 0.68)		0.44 (p = 0.51)	

Note: *** sign at 0.001, ** sign at 0.05, * sign at 0.1. Robust standard errors in parentheses adjusted for 30 clusters; baseline schools)

Table 10 reports the results of the second stage regression on the outcome variable of interest; girls' empowerment. The findings are displayed showing different empowerment measures in pairs of columns, where the first one shows the result of the OLS and the second one the IV approach. We begin with the findings in column 1, where the IV model shows that girls from project schools are 5.7 percentage points more empowered than girls from comparison schools. The comparison with the OLS treatment effect estimate suggests that the OLS model underestimates the size impact of the project (with a 4 percentage point difference estimate between the two groups). This could occur for several reasons; the presence of omitted variables positively correlated with project participation but negatively correlated with girls' empowerment, selection bias into project participation, which the IV model corrects for, and possibly the effect of measurement error causing an attenuation of the OLS estimates, which is removed in the IV model. The other covariates included in the model offer additional insights on what explains girls' empowerment net of the project effect. First, there is a strong positive effect of the average level of education in girls' households, which suggests the important influence of the family's education background. Belonging to the Bambara ethnic group is negatively related to empowerment. As expected, being married or having a child has a negative impact on girls' empowerment. The model also included a variable capturing the age distance with the respondent's older sibling which was found to have a positive and significant effect on empowerment, possibly a measure of the positive effect of having less pressure on carrying out home chores when there are much older first-borns in the household. Lastly, the model controlled girls' households owning a TV. This variable was used to proxy the possible effect of girls' exposure to behavioural role models from the media, and the estimated coefficient was found to have a positive association with empowerment. The OLS and IV results in the other columns where the alternative indices of empowerment were employed are largely in line with those discussed above, with a stable size effect of the project of about 6 percentage points regardless of the choice of empowerment index used. We finally note that the selection of instruments used is valid and robust; the test for endogeneity shows that the second stage regression successfully corrects for possible endogeneity bias (the Test F (1, 27) = .20 (p = 0.65) for the unweighted empowerment index (WEI_UW), .17 (p = 0.68) for weighted empowerment index, (WEI_W), and .44 (p = 0.51) for the five dimensions' empowerment index (WEI5_DE)). The statistical power of the selected instruments is also confirmed by the same directional effect and statistically significant level of all other covariates included in both the OLS and IV models.

Table 11: Disaggregating the Empowerment index

Dimension of Power	**Empowerment Indicator (*Outcome variables*)**	**Project Impact (*S.E.*)**
Power from within	Knowledge of reproduction health	0.112** (0.055)
Power To	Formal Education	0.080*** (0.040)
Power Over	Ability to denounce violence	0.103* (0.047)
Environmental	Support from associations	0.356*** (0.062)

Given the composite nature of the empowerment index, the model was also re estimated on each underlying indicator to identify the elements of empowerment which were most affected by the project. The results of this additional analysis are presented in Table 11 above which reports results of the four indicators which were found to be positively and significantly influenced by project activities: i. having received positive encouragement by groups and associations supporting girls' school attendance, ii. girls' positive knowledge of reproductive health, iii. their acquired ability to report episodes of physical and or psychological violence on their peers, and iv. girls' valuing formal education as measured by their current test scores.

These disaggregated results identify the most important agency enablers of adolescent girls aged 13 to 16 years, and are in line with the findings of other studies conducted on similar types of intervention (Ozler, 2016), therefore consolidating the evidence on what are the key aspects of girls' independence and individual affirmation that intervention targeting the school community should be aiming for.

The assumption made throughout this paper is that although empowerment was not an explicit objective of the 'Girls Can' project, the intended objective of the intervention to retain girls in school and promoting their transition to secondary school was implicitly associated to an outcome of girls being empowered because of moving into secondary school, or completing primary school. For this reason, we have run the model in equation (2), using however as dependent variable a dummy to capture girls in the sample who at the time of the survey were in secondary school or moved on to the lycée (i.e. high school) The results of the 2SLS model are in table 12, which reports both findings from a probit and for an Instrumental variable probit.[8]

Table 12: Project impact on transition rate into secondary schools

Dep. var: Dummy = 1 if Girls attending 2nd cycle	**Probit**				**IV Probit**		
	Coeffic ient	*Stand Errors*	*Z-Value*		*Coeff,*	*Stand. Errors*	*Z-Value*
Treatment	0.205	0.250	0.82		0.604	0.305	1.98**
Respondent's ambition is to become a military	0.197	0.174	1.13		0.236	0.172	1.38
Girl's ethnic group is Bambara	-0.181	0.104	-1.74*		-0.186	0.103	-1.80**
Girl's family has medium income activity	0.319	0.151	2.12**		0.268	0.144	1.86**
Girl's family has high income activity	0.793	0.184	4.30***		0.813	0.180	4.51***
Dummy = 1 if girl is either married or has a child	-0.397	0.170	-2.34**		-0.376	0.161	-2.33***
Age distance between girl and oldest sibling	0.002	0.009	0.20		0.004	0.009	0.48
Dummy = 1 if girl's household owns a TV	0.186	0.156	1.19		0.140	0.145	0.96
Constant	0.420	0.208	2.01**		0.273	0.227	1.20
Observations	870				870		
Wald chi2(8)	27.47				31.13		
F test of exogeneity	-				2.53 (p= 0.12)		

Note: *** sign at 0.001, ** sign at 0.05, * sign at 0.1. Robust standard errors in parentheses adjusted for 30 clusters; baseline schools)

[8] The same set of instruments discussed in the 2SLS IV model for empowerment were used in estimating this model to ensure comparability of the results.

The project is found to have a large and statistically significant effect on the transition rate of girls from schools that benefitted from the intervention, which confirms our working hypothesis of a strong and positive correlation between keeping girls in school, and their resulting empowerment status.

5. Conclusion

This paper found compelling evidence of the Oxfam GB project 'Girls Can', which was rolled out in the Koulikoro region of Southern Mali between 2011 and 2015, having a positive and statistically short term impact on girls' empowerment. Specifically, the analysis found that girls from project schools were 5.7 percentage points more empowered than girls from control group schools. The impact evaluation analysis also showed significant evidence of the project's success in its direct objective; promoting girls transition into secondary school.

A number of important lessons can be drawn out of the evaluation findings. First, in terms of the evaluation design, the project did not intend to generate girls' empowerment as one of its intended objectives, and the context in which the intervention was implemented was not considered conducive to analysing empowerment. The concept was initially considered as alien to the local context by parents and project participants, possibly a potentially risky notion 'imported' from western cultural values. This was felt to be the case especially in relation to the direct beneficiaries of this project; adolescent girls aged 9 to12 years at the time the intervention started, who represent an age group for whom talking about 'empowerment' was considered particularly sensitive. Despite this initial hesitation, however, the merit of anchoring the possible effects of project activities to a locally acceptable notion of girls' empowerment was soon recognised; we therefore took the opportunity to use project data to purposely conduct an evaluation of the intervention to test the theory on the positive association about higher education attainments, and girls' empowerment. Secondly, the evaluation identified which areas the project had been most impactful on; these were in the dimensions of 'Power to', 'Power from within' and 'Power over': specifically, we found that the project was most effective in generating a strong family and community support for girls to continue studying, girls' ability to report episodes of violence, their being on track in school, and girls' awareness around reproduction health issues.

The more general learning point emerging from this case study is about the social utility and financial viability of similar interventions in countries and socio-economic contexts similar to those in which the 'Girls Can' project was implemented. The UBS Optimus Foundation provided funding for three years to finance this project with an equivalent of USD 750,000. A simple cost-benefit calculation shows that with $67 per girls per year the intervention was successful to empower project girls in the short run. Although the current study cannot speak to the sustainability of the project effect om empowering its intended beneficiaries who are now young women, the results suggest that if the observed impact was sustained in Mali where the population of girls aged between 10 and 14 years is estimated at nearly 1,300,000, scaling up the project would require an investment of $ 87mln (corresponding to 0.7% of Mali's GDP) to keep adolescent girls in school. If the empowerment effect observed in the aftermath of the

'Girls Can' project carries on into women's lives, then the financial commitment required to scale up the intervention would be both economically viable and socially desirable.

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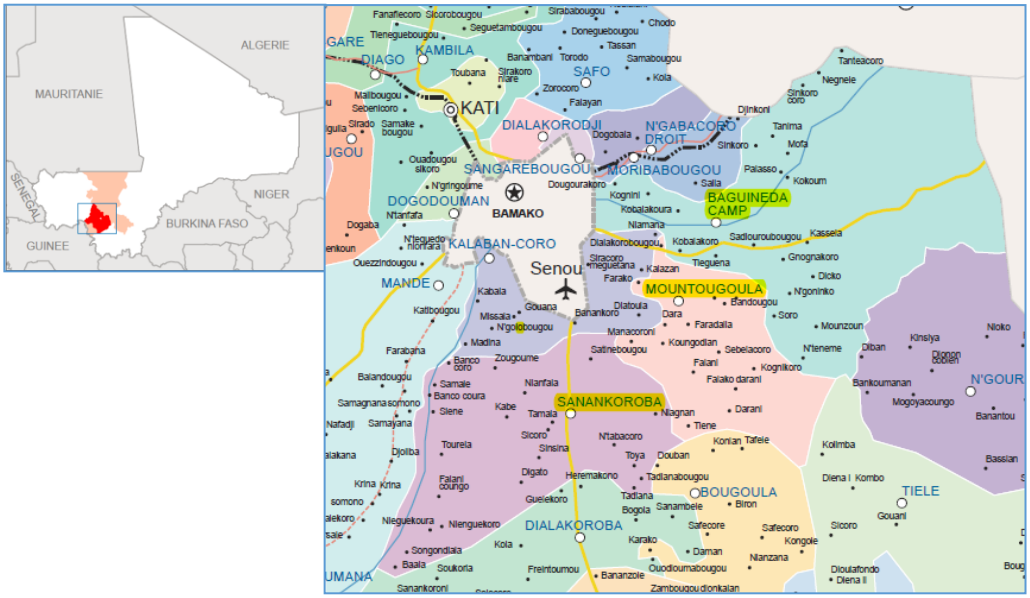
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Figure A1 Intervention Area of the project "Girls Can"



Source: Union des Banques Suisses (UBS), Project Partner.

Table A.1: Definition and measurement of empowerment indicators

Dimension	Indicator	Definition and Measurement
Power from within	Knowledge of their rights	Measures if a girl knows her rights and is able to value them. The indicator was = 1 if respondents agreed with **both** of the following statements: I believe I should be able to decide by myself when to get married. My parents will take into account my opinion when it comes to marriage.
	Desire to study	Measures the desire a girl has to be enrolled at school. Respondents currently enrolled in school were asked if they considered themselves happy in school, while respondents currently not enrolled in school were asked whether if they had the opportunity they would like to be re-enrolled in school. The indicator was = 1 if different respondents answered yes to the above.
	Ambitions	Measures the level of aspiration a girl has in relation to school achievement. The indicator was = 1 if respondents stated that if it was up to them they would like to reach a secondary school grade or university education level.
	Knowledge of the advantage of education	Measures if a girl is aware of the advantages of achieving good school grades. The indicator was = 1 if respondents agreed with the following statement: Education will allow me to become a respected member of society.
	Knowledge of reproduction health	Measures if a girl is aware of the risk of early pregnancy and she knows how to avoid it. Respondents were asked if having a baby during their school years would have a negative impact on their life. If she responded affirmatively, the respondent was asked to indicate what measures she would undertake in order to avoid this. The indicator was = 1 if respondents agreed with the first statement, and gave as possible answers to second question: i. stay away from boys, ii. do not have sex, iii. use contraception measures.
Power to	Formal education	Measures whether respondents obtained any formal education. The indicator was = 1 if the girl was currently enrolled in school or – if aged 15 or older -had completed the second cycle of primary school and obtained the Diplome d'Etudes Fondamentales.
	Freedom from early marriage or pregnancy	Measures the extent to which girls regard themselves as free from early marriage and early pregnancy. The indicator was = 1 if the girl was less than 16 years old and not married, or enrolled in school; otherwise if older than 16 was = 1 if currently in school or completed some years in the secondary cycle of primary school.
	Self-confidence and personal autonomy	Measures the extent to which a girl has the capacity to take actions for herself. To measure personal autonomy respondents were asked to indicate who in the household normally takes the decision on whether the respondent can personally participate in community groups or activities in their village or community. The indicator was = 1 if the girls answered it was them, alone or together with someone else in the household, to take these decisions
	Obtain good school results	Measures whether girls enrolled in school are achieving good grades. The indicator was = 1 if the girls were enrolled in school and reported the last achievement grade obtained was the expected one, based on their schooling year.
	Don't take into account stereotypes	The indicator was = 1 if girls disagreed (fully or partly) to **both** the following statements: • At school, girls should sit at the back of the class, while boys sit at the front. • It is OK for girls of my age to clean boys' and girls' latrines while boys are playing.
Power with	Leadership	Measures the extent to which a girl has decision-making power in the groups she is involved in. The respondents were asked to what extent they were involved in making important decisions in the groups they regularly attended, and the indicator is a count variable that measures the number of groups respondents had decision making power in.
	Group participation	Measures the extent to which a girl participates in groups – assuming that such participation brings benefits, such as the ability to interact with other people outside the family, and supporting her in school achievements. Respondents were asked to indicate if they regularly attended meetings from a given list, such as afterschool clubs, girls' playgrounds, homework groups, sports groups, cultural groups or other. The indicator counts the number of groups respondents are members of.

Power over	Freedom from violence	Measures the extent to which a girl is free from violence. Respondents were asked whether they knew that someone may have done any of the following things to a girl close to them: Said something to humiliate her in front of others. Threatened to hurt or harm her or someone she cares about. Insulted her or made her feel bad about herself. Pushed her, shaken her, slapped or punched her or thrown something at her. Physically forced her to have sexual intercourse with him when she did not want to. This indicator was = 1 if girl answered NOT knowing anyone that had been subject to ANY of the 5 incidents of GBV above.
	Ability to denounce violence	Measures the extent to which the girl considers herself able to denounce violence. Respondents were asked what they would do in the case of their being exposed to episodes of violence. The indicator is = 1 if girls said they would: i. talk to their mother, ii. talk to their teachers, or iii. talk to a friend.
	Non-acceptability of sexual violence	Measures the extent to which a girl considers violence against women acceptable. The indicator is = 1 if girls disagreed (strongly or partly) with **both** the following statements: It is acceptable for a boy to have sex with a girl of their age without her consent. It is acceptable for a boy to have sex with a girl of their age without contraceptives if she did not want to.
	Material support from household	Each respondent was asked if her family provides her with the following items: books, school kit, appropriate clothes, underwear, feminine hygiene materials, make-up and toiletries, jewellery, food or money for food at school during the break. Because not all girls in the sample are enrolled in school, this indicator has been split into investment in school expenses and investment in girls' needs. The corresponding indicators were set = 1 if girls received **all** the items listed in each category from their families.
	Moral support from household	The indicator is = 1 if girls agreed with at least one of the following statements: My parents often encourage me to go to school and perform well at school. My parents often explain the advantages of education.
Environmental	Family education	Measures the level of education of the family the girl lives with. Despite not being an indicator that can be influenced by the project, mothers felt that it should be included as it describes the characteristics of girls' empowerment. The indicator is = 1 if the highest level of education in the girls household was completion of secondary school.
	Favourable environment	Measures the extent to which girls are studying/living in an environment that is free from violence, and favourable for their education. The indicator is = 1 if girls had not experienced in school **any** episode of GBV.
	Support from associations	Measures the extent to which girls perceive that they live in an environment where there are associations that are supporting them. The indicator is = 1 if girls agreed with the following statement: In my village/school there are groups and associations supporting girls like me to go and study.