Saving Goat and Cabbages?

Enrollment and grade achievement after the introduction of free primary education in Tanzania

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Johannes Hoogeveen*

Mariacristina Rossi**

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* World Bank and Twaweza, Dar es Salaam, Tanzania

** Department of Economics, University of Turin and Collegio Carlo Alberto, Italy

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Abstract

Effective January 2002 the Government of Tanzania eliminated all primary school fees, thus marking the start of the ambitious Primary Education Development Program (PEDP). This program aimed not only to enhance access to primary education but also the quality of teaching. This paper examines the effects of the introduction of free primary education on school enrollment and grade achievement.

Data from the 2001 Household Budget Survey, collected just before the reform and the 2007 Household Budget Survey, collected 5 years into the program are employed to examine these effects. This is done by running a difference in difference comparison using a before after comparison for age cohorts that did and did not benefit from the reform.

School fee elimination is found to have enhanced enrollment rates significantly with girls, and children from poorer families benefiting most. The impact of the reform on grade achievement, however, is found to have been negative. At the margin, and relative to children who entered primary school just before PEDP was introduced, the reform reduced grade achievement by between 1.5 years to almost 3 years.

1. Introduction

Tanzania has a long history of trying to reduce illiteracy. The latest major effort in this area started in 2002 with the implementation of the Primary Education Development Program (PEDP). This ambitious program aimed to deliver sustainable, basic education of good quality to all by making education affordable by abolishing school fees and all other mandatory parental contributions. It was envisaged that by offering free education all parents (rich and poor) would send their children (boys and girls) to school in time (i.e. at the age of 7).

At the time of its introduction, about 3 million school aged children were not receiving primary education and it was expected that the abolishment of school fees would lead to a huge influx of students. The PEDP program being ambitious, it aimed to enhance enrollment and strived to improve educational quality. Hence PEDP did not choose between increasing enrollment and enhancing quality. Instead the program set aside significant resources for teacher recruitment and training, classroom rehabilitation and construction to support increased enrollment, and allocated considerable funds to improving the quality of teaching and learning (BEDC 2001).

The objective of this paper is to examine the impact of PEDP's policies, particularly with reference to enrollment and grade achievement. Did the program succeed to save both goat and cabbages? We use the gender and income dimensions to understand whether school reform affected boys and girls differently and whether richer households reacted to the policy differently from poorer groups of population. We also allow the location of where a child lives to influence on impact. Regarding data, we make use of two cross sectional, nationally representative surveys, one which was implemented in 2001 just before PEDP was introduced and the other in 2007, five years into the program.

This paper contributes to a small literature on the impact of the introduction of free primary education in Africa. Grogan (2008) demonstrates for Uganda how the abolition of school fees increased the probability of enrollment by the age of 9 by 3%. Another paper on Uganda by Deininger (2003) shows that there were substantial increases in overall enrollment rates in Uganda following school fee elimination, and that there were noticeable reductions in the quality of education following the influx of UPE entrants.

The remainder of the paper is organized as follows. Part 2 provides background information to the PEDP program, part 3 gives a brief description of the type of data used whereas parts 4 and 5 present descriptive and empirical analyses respectively. The last section of the paper, part 6, provides conclusions.

2. Background to PEDP

Ever since Julius Nyerere assumed power in 1962, Tanzania has consistently adopted policies to reduce human ignorance and to develop human capital for the purpose of sustainable economic growth and development. Despite these efforts, by 2001 only 4.5 million out of 7.5 million children of primary school going age were enrolled (URT 2010). Three million children aged 7-12 were not in school. This clearly did not conform to national goals as well as internationally agreed objectives such as Education For All that aims to give all children access to quality primary education. To address this and effective January 2002 at the start of the school year, the five year Primary Education Development Program was introduced. The program aimed to ensure that no child would be denied the opportunity to participate in education because of poverty, gender, disability, or because of a lack of school uniform, fees or other parental contributions, or because of a lack of school facilities, materials or teachers.

When PEDP was initiated its primary aim was to increase gross and net enrollment of girls and boys and to improve the quality of primary education. Several approaches were followed to ensure that the targets would be met. The abolition of school fees and all other mandatory parental contributions was an important component. Recruitment of more teachers, improved teacher training; relaxation of the uniform requirement, and construction of new and rehabilitation of additional classrooms and schools were other elements of the program.

It was realized that with three million children not going to school yet, the education system might become overwhelmed if all these children were admitted in the first year of the program when necessary human and physical capital might not be in place yet. To avoid this a mechanism was designed that would ensure that children enrolled gradually. Students were admitted based on year of birth, with priority given to those who were seven years old in 2002. Over time the school system would open up to absorb children older than 7. The approach was designed such that children aged 10 and below in 2002 would all be able to benefit from free primary education. Those aged 11 in 2002 who had not yet started in school became locked out. The precise admission criteria are reflected in Table 1.

Table 1: Admission criteria for admission into primary school under PEDP

2002	All 7-year-olds and as many as possible 8 year olds
2003	All 7-year-olds of 2003, all remaining 8 year olds of 2002, and as many as remaining 9 year olds of 2002 (now 9 and 10 years old)
2004	All 7-year-olds of 2004 and all remaining 9-10 year olds of 2002 (now 11-12 years old)
2005 and 2006	All 7-year-old children are admitted

Source of information: Basic Education Development Committee (2001)

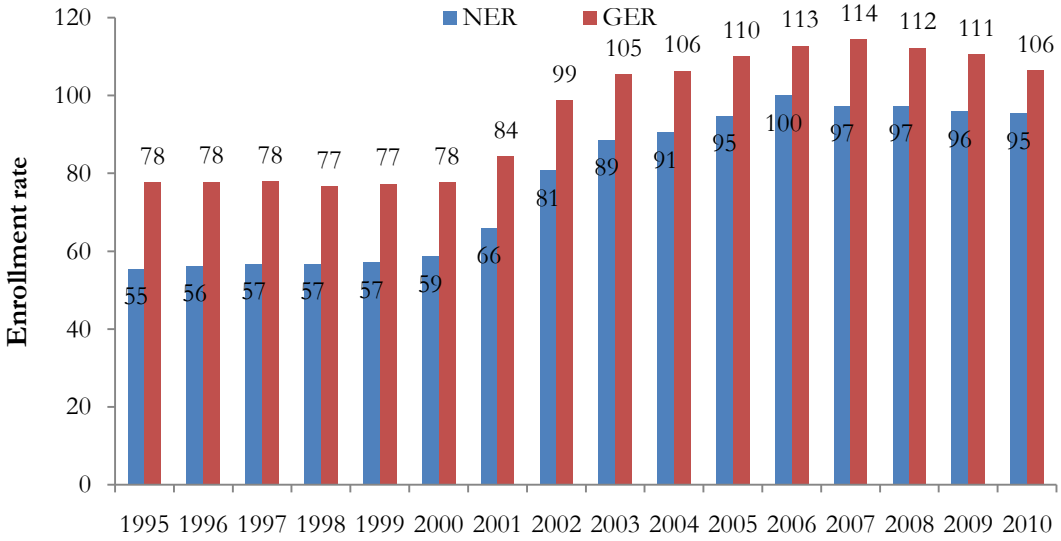
Once school fees were eliminated, remarkable increases in the primary school enrollment were recorded. Both survey and administrative data sources reveal how enrollment rates increased significantly between 2001 and 2007. According to the Basic Education Development Committee (2006) by the year 2005, a total of 7,541,208 children were enrolled in primary schools, 10.1 percent over the target. In grade one, 1,348,437 children were enrolled, a 29.5 percent excess over the target.

With so many children enrolled, the administratively recorded net enrollment rates went up from 66.0 percent in 2001 to 97.3 percent in 2007; the gross enrollment rate followed a similar pattern (Figure 1). Survey data also show a huge increase in enrollment rates. According the Household Budget Surveys for 2001 and 2007 gross and net enrollment rates increased from 85 percent to 117 percent and from 59 to 84 percent respectively.

Despite such positive response, delayed enrollments and low grade achievement remained a challenge. Figure 1 illustrates this through the persistent difference between gross and net enrollment rates. The difference between the two ratios is due to the inclusion of children aged 14 and above in the gross enrollment rate, suggesting that many children remain in primary school beyond the age of 13. Why? Do children enter school late (after the age of 7) and consequently finish late? Is the efficiency of education low so that children who enter when they are 7 take more than 7 years to complete primary school? A combination of both factors is also possible.

The remainder of paper considers these issues with a specific focus on age at entry and educational efficiency (by considering grade achievement). The paper also considers any differential impact the reform may have had by gender and wealth status of the household.

Figure 1: Primary school net and gross enrollment rates (1995-2010)



Source of data: URT, Basic Education Statistics (various issues)

3. Data

This study draws its data from two comparable (sub)-nationally representative Household Budget Surveys (HBSes) one which was carried out just before the introduction of PEDP (in 2000/1) and one carried out just after the completion of PEDP (in 2007)[i], permitting a before-after comparison. These HBS surveys collected information about household composition and detailed information on the education of the household members, economic activities, assets ownership and household consumption. Some of the education related variables contained in the data sets include: whether a member of household currently attends school, the grade of school currently attended and the highest level of education attained by each member of the household.

Interviews for the 2001 wave were held between May 2000 and May 2001, before the school reform was implemented (January 2002). This characteristic is particularly useful for our analysis as we can assume that the school achievements of children surveyed in 2001 were not affected by the policy intervention while this was the case for children surveyed in in 2007. Interviews in 2007, took place between January and December. The number of interviewed households was about 22,000 in 2001 to decrease to about 10,000 in 2007. To ensure comparability and avoid having to deal with increases in grade achievement between the end and the start of the new school year, we exclusively use data covering the January to May period in both surveys(that is January- May 2001 and January- May 2007).

4. Descriptive Analysis

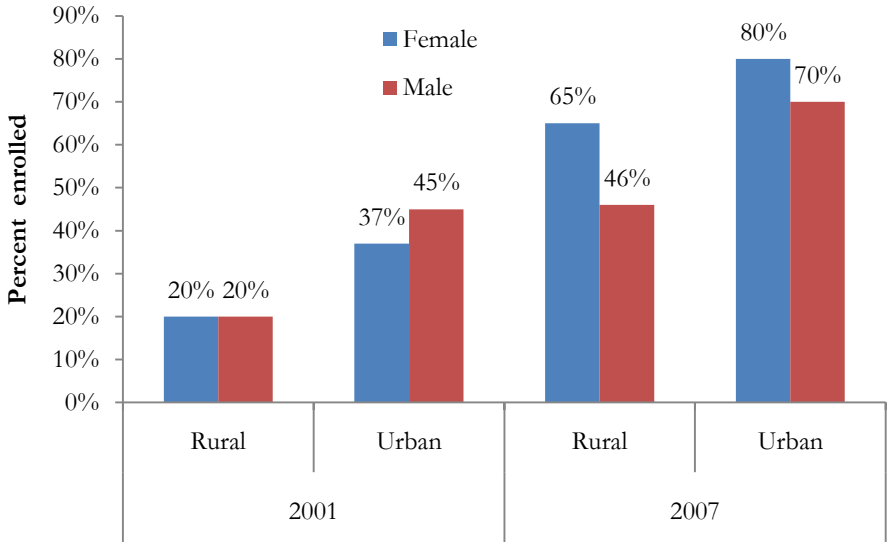
In Tanzania, delays in school entry are common. It is a costly practice as children are likely to enter school at an age when they may be less receptive to learning. It also implies that for any given school achievement, children who start late, will enter the labor force later. Using data from North-Western

Tanzania, Alderman, Hoogeveen and Rossi (2009) estimate that the cost of delay is approximately 5% of lifetime earnings. Earlier school entry would thus generate a non-negligible economic gain.

Of the targets PEDP aims to achieve, full enrollment of all children at the age of 7 is one. Figure 2 reveals that PEDP succeeded in reducing delayed enrollment for girls as well as boys in rural areas as well as urban areas. In rural areas, enrollment at age 7 more than tripled for girls (from 20% to 65%) and more than doubled for boys (from 20% to 45%). In urban areas, considerable increases were also observed from 37% for girls in 2001 to 80% in 2007 and from 46% for boys in 2001 to 70% in 2007.

Though the improvements are impressive, Figure 2 also reveals that delays in school entry remain common. Even five years into the reform program, a large fraction of children aged 7 is not in school: in rural areas as much as 54% of boys do not go to school at the age of 7.

Figure 2: Percent of 7 years olds enrolled in primary school, by location and gender

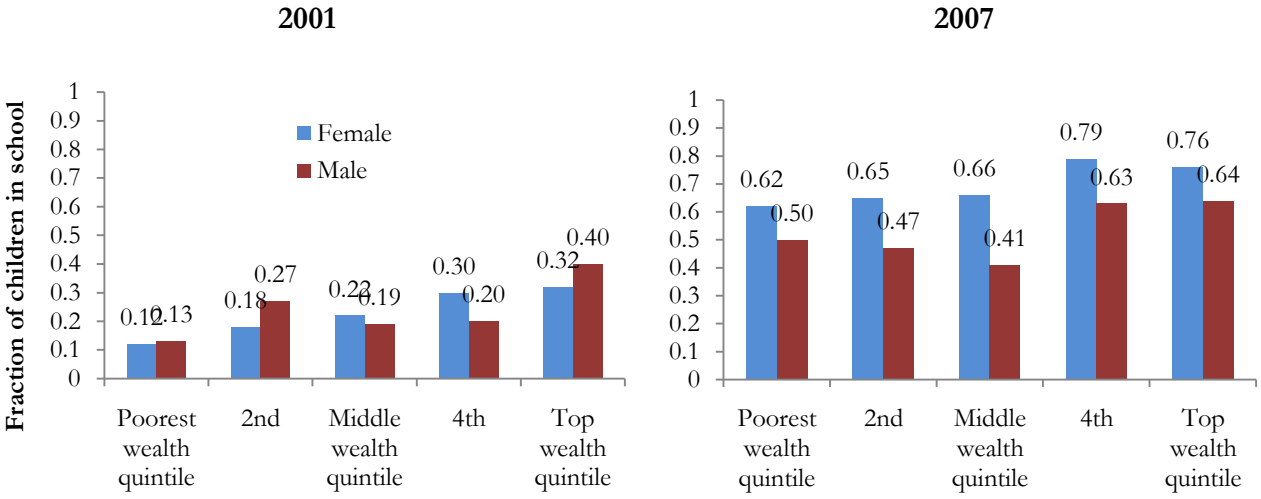


Source of data: HBS 2001 and 2007.

A remarkable aspect of the abolishment of school fees is the reversal of the likelihood of going to school at age 7 between boys and girls. Whereas in 2001 boys aged 7 had a (slightly) larger probability to attend school than girls, in 2007 this reversed in favor of girls. Thus the reform was not gender neutral but favored access to schools for girls. It is equally noteworthy that the absolute size of the increase in enrollment was similar for rural and urban areas (about 20 percentage points).

Figure 3 considers enrollment by the same age group, those aged 7, but now focusing on the wealth of the child's household. Again, the graph illustrates the reversal in enrollment probabilities between girls and boys. The graph also demonstrates that by 2007 wealth differences were considerably less associated with enrollment than they were in 2001. For instance in 2007 the fraction of boys aged 7 from the poorest families attending primary school was 50% against 64% for boys from the wealthiest families, a difference of 14 percentage points. In 2001, the difference was twice as large, 27 percentage points (13% versus 40% for boys from the wealthiest families). It suggests that not only did the reform favor girls, it was pro-poor as well.

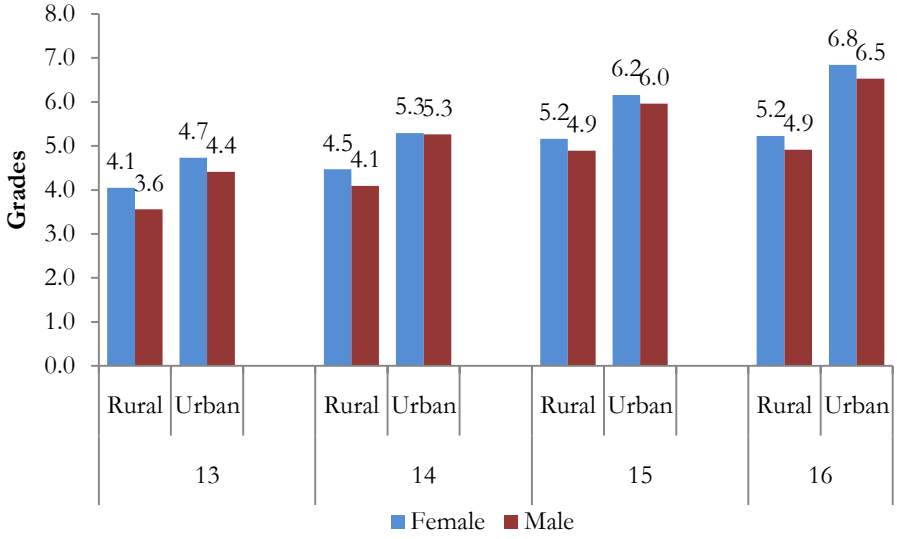
Figure 3: Percent of children of age 7 enrolled in primary school, by wealth quintile and gender



Source of data: HBS 2001 and 2007

Looking closer at the gender dimension, we find that after the reform girls are not only more likely to enroll at age 7, during their school career boys do not make up for their late start. This is illustrated in Figure 4 which shows grade completion in 2007 for children of different age cohorts. In all cohorts, girls complete more grades than boys, in rural as well as urban areas.

Figure 4: Grades completed in 2007 for different age cohorts, by location



Source of data: HBS 2001 and 2007.

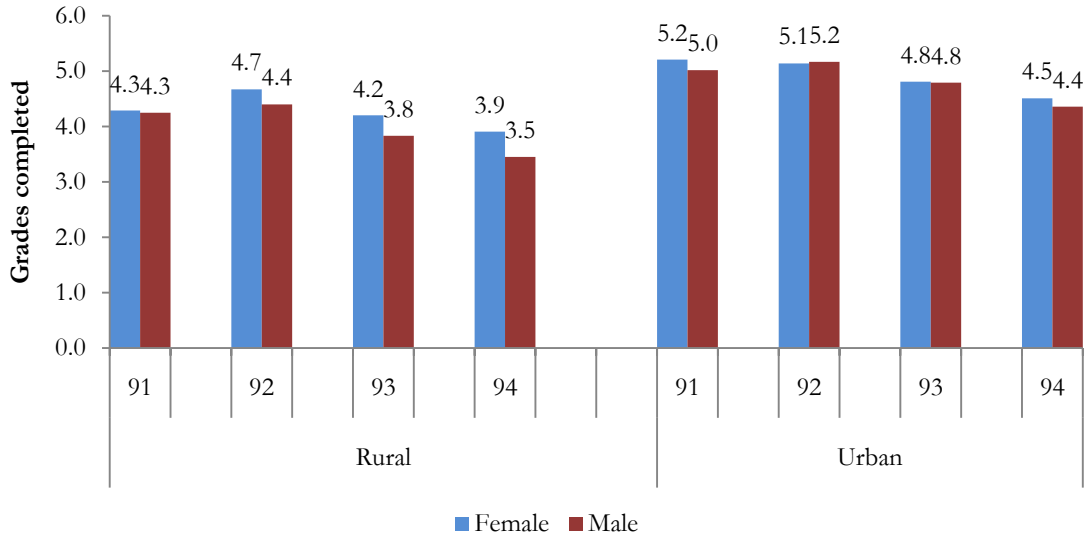
So far we have revealed that following the introduction of PEDP overall enrollment as well as enrollment at age 7 increased, and that girls and children from poorer households improved their enrollment more. Tempting as it is to attribute these changes to the reform, strictly speaking this cannot be done as we lack a counterfactual. And as the HBS does not ask at what age a child first

enrolled in school we do not know how to construct a counterfactual for enrollment. Consequently our evidence on enrollment remains suggestive, even though the size of the change and the absence of any other shocks to the education system make it highly likely that these changes should be attributed to the reform.

For grade achievement it is possible to construct a counterfactual out of the HBS data. As PEDP gradually phased in children of different ages (Table 1) children older than 10 in 2002 were left outside the reform. Consequently children aged 10 in 2001 were not eligible for PEDP, and their grade cannot be attributed to PEDP.[ii] Conversely children born in 1992 were eligible to benefit from the reform program and their grade achievement is likely to have been influenced by the reform. Comparing children of these consecutive cohorts, who do not differ in any other aspect than eligibility to the reform, is one way to assess the impact of the reform on grade achievement.

The time difference between the two surveys is six years, so the maximum difference in grades completed is six. Comparing the first cohort affected by the reform with those aged one year more (1992 versus 1991) gives a first estimate of the average effect of the school reform (Figure 5).

Figure 5: Number of grades completed between 2001 and 2007 by different age cohorts.



Source of data: HBS 2001 and 2007.

As the figure demonstrates children born in 1992 (who benefitted from PEDP) completed more years of education on average than their peers who were not eligble (urban girls being the exception). The greatest increase observed is for rural girls born in 1992 who accomplished nearly half a year more than their one year older female peers (4.7 versus 4.3). As for younger children, those born after 1992, the number of years accomplished is less than that of their colleagues born in 1991. In other words, based on this descriptive analysis, the average impact of PEDP on grade achievement is not immediately evident.

5. Empirical analysis and estimation results.

5.1 Enrollment and school delay

We observed that since the start of PEDP girls are more likely to attend school when they are 7 than boys. This is different from what prevailed prior to the reform. In this section we run a multivariate regression to control for any confounding factors to further investigate the likely impact of the reform. We do so by estimating the determinants of school enrollment for children aged 7.

Table 2. Probability of attending school at age 7, by year and location; marginal effects.

Regressors	year2001, rural	year2001 urban	year2007, rural	year2007 urban
Grade of the head	0.009***	0.027***	0.008	0.015***
	(0.003)	(0.003)	(0.008)	(0.005)
D-Male	-0.019	-0.065*	-0.232***	-0.041
	(0.035)	(0.037)	(0.075)	(0.048)
Number of adults	-0.004	-0.006	-0.003	-0.011
	(0.006)	(0.007)	(0.017)	(0.010)
Number of children	0.025**	-0.003	0.009	0.002
	(0.011)	(0.017)	(0.032)	(0.025)
Number of male children 7-10	0.014	0.037	-0.024	0.035
& D-female	(0.027)	(0.033)	(0.055)	(0.055)
Number of male children 7-10	-0.033	0.003	-0.041	-0.197***
& D-male	(0.033)	(0.039)	(0.081)	(0.068)
Number of female children 7-10	-0.028	0.008	-0.049	-0.002
& D-male	(0.031)	(0.033)	(0.069)	(0.044)
Number of female children 7-10	-0.051	0.021	-0.029	0.070
& D-female	(0.033)	(0.033)	(0.065)	(0.056)
Number of male children 0-2	-0.039	-0.058*	0.002	-0.045
& D-male	(0.024)	(0.031)	(0.053)	(0.039)
Number of female children 0-2	-0.032	-0.087***	-0.016	-0.018
& D-male	(0.021)	(0.027)	(0.050)	(0.037)
Distance to primary school	-0.006	0.001	0.002	-0.015
	(0.005)	(0.012)	(0.003)	(0.014)
Log(household expenditure)	0.029	0.095***	0.019	0.054*
	(0.018)	(0.020)	(0.052)	(0.031)
Observations	1083	1747	435	647

Note: * significant at 10%, ** at 5%, *** significant at 1%

Findings presented in Table 2 reveal that demographic variables are almost never significant in explaining school attendance at age 7 and that girls have higher chances to go to school than boys. One explanation for this is that as the opportunity cost for girls going to school are lower than for boys (especially in rural areas), when fees were abolished since 2002, more girls than boys ended up going to school. Another reason might be that girls of this age are physically and mentally more ready to attend

school. In 2007 rural boys aged 7 had an approximately 23 percentage point lower probability than girls to be enrolled.

Other variables such as education of the household head and expenditure are less important in explaining attendance in 2007 than in 2001, revealing that school attendance became relatively more important irrespectively of wealth levels: expenditure is significant only in 2007 in urban areas with a coefficient that is half of that before the reform.

5.2 Marginal impact of PEDP on grade achievement

In this second part of the empirical analysis we use a difference-in-difference approach, or a pre-post design with a control group (see Yip and Eggleston 2001, 2004) to assess the impact of the reform on grade achievement. One critical measure of school performance against which PEDP can be assessed is whether, at the margin and after the reform the numbers of grades completed by pupils changed. If PEDP was successful, one expects grade achievement to have increased following the introduction of the program.

By following a difference-in-difference approach, we identify at the margin, the change in number of grades achieved. To this end, we consider age-cohorts that are of school age in both waves of the survey. This allows us to control for (unobserved) determinants of grade achievement, as the same cohorts are analyzed. For this purpose we selected children born between 1991 and 1994, using the 1991 cohort as control group, as the reform was designed such that children born in that year did not benefit from the reform (Table 1). Cohorts born between 1992 and 1994 are the treatment group.

The change in grades gained due to PEDP can now be given by the following expression:

$$\Delta \text{ grades btw 2001-2007} = E[\text{grade in 2007} \mid Y] - E[\text{grade in 2001} \mid Y] -$$

$$(E[\text{grade in 2007} \mid O] - E[\text{grade in 2001} \mid O])$$

Where Y stands for young cohorts, i.e. those born in 1992 or later and O stands for Older cohorts, i.e. those children born in 1991 or earlier.

In order to take into account that educational attainment varies with age we follow Patrinos and Psacharopoulos (1997) and define our dependent variable, grade-for-age, as follows:

$$\text{Grade-for-age: } Grade*100/[Age-7]$$

Grade for age is defined for children aged 8 or higher (school starts at the age of 7). The measure is 100 when a pupil completed the expected years of education and zero when the child completely falls behind. We exclude from the analysis children who exhibit a grade for age of less than 300: as they are likely to have never enrolled in school. Symmetrically, we also exclude those children who are extremely ahead and show a grade for age greater than 300[iii].

In Tanzania, and certainly at the time under consideration, only a small fraction of children who completed primary school continued to go to secondary school. For instance in 2007, there were 816,000 children in grade 7, of which 419,000 passed their primary school leaver exam of which 396,000 were selected to join secondary school (URT 2008). In other words, less than 50% of children

who get to grade 7 in primary school enter secondary school. At the time of the 2001 HBS, only around 20% of children who reached grade 7 made the transition to secondary school.

To avoid that children in older cohorts are recorded as underperforming (i.e. they get a grade-for-age score of less than 100) because they did not enter secondary school, we impute the value of 100 to children who finished primary school, independently of their age: primary school corresponds to full achievement.[iv]

To operationalize the difference in difference approach, we estimate the following equation:

$$Y_{it}=\alpha+\beta X_{it}+\gamma_1 R_{it}+ \gamma_{21}\text{born1992}+\gamma_{22}\text{born1993}+\gamma_{23}\text{born1994}+ \gamma_{31}R_t^* \text{ born1992}+\gamma_{32}R_t^* \text{ born1993}+\gamma_{33}R_t^* \text{ born1994}+\varepsilon_{it}$$

where Y is the outcome variable (grade for age), i refers to individuals, t to time, X is a matrix of socio demographic regressors, R is a dummy variable taking the value of one for the years after the reform (i.e. 2007) has taken place, born1992-born1994 is a dummy variable equal to one if the child was born in that year, and thus treated by the policy reform, and the coefficient referring to the interaction terms -R_{ht}* born1992-1994- are the difference-in-difference estimator and measure the effect of the reform on the outcome of interest.

As an illustration we show the predicted difference in years of a child born in 1991 and 1992 in 2001 and 2007, excluding all other explanatory variables for simplicity:

$$\text{EY2007-EY2001}|\text{born in 1991}=\boldsymbol{\gamma_1}; \quad \text{EY2007-EY2001}|\text{born in 1992}=\gamma_{1+}\gamma_{31}$$

γ_{31} is common to those affected by the reform only, while γ_1 is common to both treated and untreated group. For subsequent generations, the coefficient measuring the effectiveness of the reform is γ_{32} and γ_{33}

The regression results demonstrate that younger cohorts (those born in 1992, 1993 and 1994) achieve more grades on average.[v] In both rural and urban areas the reform dummy, as well as the cohort dummies are positive and significant. So in rural areas, children born in 1992, compared to those born in 1991, exhibit in 2007 a grade for age of 39 point higher, the sum of a time effect (132), a cohort effect (51) and the interaction term due to the policy intervention (-144).

The interaction of cohort dummies and reform years on the other hand, which measures the marginal impact of the reform effort, indicates that *as a result of the reform* grade marginal achievement declined between 2001 and 2007 by about one grade and half. For children born in 1993 and 1994 the situation is worse: as a result of the reform, their grade achievement declined by 2.4 respectively 2.9 grades.

Finally the coefficients for gender and household expenditure are worth considering. They show that in both rural and urban areas, boys do worse than girls, confirming the earlier observation about boys not catching up. Moreover, children from wealthier families are more likely to complete more grades.

Table 4: Grade for age achieved of children born in 1991-1994

	Rural	Urban
D-reform year	132.051***	142.335***
	(22.577)	(10.977)
D-Born in 92	50.997***	31.284***
	(9.580)	(6.274)
D-Born in 92 and D-reform year	-143.741***	-116.121***
	(27.845)	(15.386)
D-Born in 93	130.001***	82.553***
	(8.534)	(5.695)
D-Born in 93 and D-reform year	-240.863***	-202.366***
	(24.221)	(13.808)
D-Born in 94	207.077***	140.412***
	(7.575)	(5.074)
D-Born in 94 and D-reform year	-289.243***	-267.071***
	(24.138)	(12.492)
Grade of the head	1.989***	4.992***
	(0.610)	(0.405)
D-Male	-7.007	-13.398***
	(8.920)	(5.032)
Number of adults	-0.272	0.102
	(1.365)	(0.941)
Number of children [3-6]	2.110	0.248
	(3.211)	(2.281)
Number of male children 7-10 & D-female	14.966	-3.089
	(10.756)	(6.100)
Number of male children 7-10 & D-male	1.782	-4.737
	(7.903)	(6.164)
Number of female children 7-10 & D-male	-1.607	1.575
	(9.146)	(6.056)
Number of female children 7-10 & D-female	2.522	7.322
	(9.872)	(5.987)
Number of children 0-2 & D-male	-13.807***	-9.882**
	(4.910)	(4.044)
Number of children 0-2 & D-female	-7.231	-10.384***
	(6.419)	(3.848)
Distance to primary school	1.005*	-1.076
	(0.568)	(1.382)
Log (household expenditure)	7.996	15.507***
	(1.806)	(1.710)
Constant	-279.322***	-294.840***
	(40.215)	(27.079)
Observations	1256	3819

Notes: * significant at 10%, ** at 5%, *** significant at 1%

6. Conclusion

Low school enrollment and low grade achievement were amongst the biggest challenges facing the education sector in Tanzania at the start of the century. The introduction in 2002 of the Primary Education Development Program was meant to address this by ensuring that all children of school going age would receive an education, regardless of their sex and family wealth. The reform program also aimed to improve the quality of education.

Using survey data collected before and after the reform, we demonstrate that enrollment rates went up significantly, that many more children enroll at the appropriate age, and that even though all children benefitted, girls and children from poorer families benefited most.

But all is not well. A careful consideration of grade achievement after the introduction of PEDP suggests that children who attended school during the reform program, completed slightly nore years of schooling than those went to school just prior to the reform program. However, probably due to the large influx of additional students, the education system came under so much stress that grade achievement deteriorated at the margin. The impact is quite striking. Our estimates suggest that at the margin, due to the reform grade achievement declined by 1.5 to almost 3 years. It forces children to spend more years in school to complete the same number of grades and government to spend more to achieve the same level of learning.

This paper is not the first to suggest that PEDP's enrollment achievements do not carry over into other areas. A learning assessment carried out by Uwezo in 2010 amongst about 43,000 children using a grade 2 test approved by the Ministry of Education and Vocational Training showed that, instead of the expected 100%, only 8% of children in grade 3 were able to pass the English test; 18% in grade 3 passed the numeracy test and 33% the Kiswahili test. Probably more chilling is the fact that 32% of children in grade 7 were unable to pass the grade 2 numeracy and English test while 19% was unable to pass the Kiswahili test. While the Uwezo test was never implemented before the introduction of PEDP, it does show that the quality primary education remains dismal.

So while at PEDP's inception policy makers believed it would be feasible to enhance enrollment and quality this paper concludes that this expectation was not realistic. While enrollment went up and grade achievement increased on average, grade achievement attributable to the reform declined at the margin. Unfortunately goat and cabbages can not be saved at the same time.

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Annex : Summary statistics of variables used in the regressions

Variables	2001		2007	
	Mean	Std Deviation	Mean	Std Deviation
Completed	.7553994	1.210433	5.289418	2.13419
Grade of the head	6.944516	4.796108	6.626489	4.479334
D-Male	.5021335	.5000168	.4854006	.4998452
Number of adults	3.572684	2.10995	3.976407	2.041773
Number of children [3-6]	.9425013	.9599632	.6708713	.8340389
Number of male children 7-10 & D-female	.1324859	.3390328	.1817332	.4762126
Number of male children 7-10 & D-male	.1503156	.3573958	0	0
Number of female children 7-10 & D-male	.1354718	.3422414	.178463	.4538656
Number of female children 7-10 & D-female	.137178	.3440498	.1775286	.4511352
Number of children 0-2 Number of male	.248763	.5483692	.2095305	.5380501
children 0-2 female	.2606211	.5722892	.2258818	.5396807
Distance to primary school	1.160517	2.101777	1.879845	5.655835
Log(household expenditure)	9.474968	.7127415	9.921056	.6186086
Observations	11,722		4,281	

[i] A previous wave of the HBS in Tanzania, not exploited in this study, was run in 1991.

[ii] This assumption does not hold when there are spillover effects.

[iii] We tested whether dropping this restrictions matter to find that results do not change. We also checked whether including all data points, including those collected in 2000 between May and December would change the results: it did not.

[iv] Because children who reach grade 7 are given the highest score, and as children in the counterfactual are one year older, the might bias the results slighly downward.

[v] A tobit regression censoring grade for age at -300 and 300 does not alter the results.