Subsidy to Promote Girls' Secondary Education: The Female Stipend Program in Bangladesh

Khandker, Shahidur and Pitt, Mark and Fuwa, Nobuhiko

World Bank, Brown University, International Rice Research Institute, Chiba University

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By

Shahidur R. Khandker
World Bank

Mark M. Pitt
Brown University

and

Nobuhiko Fuwa
International Rice Research Institute and
Chiba University

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Abstract

Secondary school enrollment rates in the developing countries are usually lower for girls than boys, especially in rural areas. In the mid 1990's a female school stipend program was introduced to subsidize girls' secondary education in rural Bangladesh. Although all of rural Bangladesh was eventually covered by this program, it was not introduced at the same time in all areas and to all class cohorts. This variation in timing is the source of parameter identification in the analysis. Using two different datasets and school/village-level fixed effects, we estimate the effects of this stipend program on school enrollments. The analysis based upon two cross-sectional household surveys covering a common set of villages finds that the female stipend program increased girls' secondary education substantially, but had no discernable effect on the schooling of boys. The analysis performed with an annual panel of school-level data also finds a significant effect of the stipend program on girl's enrollment and reduced the enrollment of boys in coeducational secondary schools.

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1. Introduction

Gender disparity in adult literacy, school enrollment and attainment is severe in Africa, the Middle East, and South Asia. Although this disparity in schooling exists for all ages, it is more pronounced at the secondary school than at the primary level (Herz and others 1991). The situation in Bangladesh is not atypical. The country's literacy rate was only 22 percent for females in 1989, compared to 47 percent for males (World Bank 1992a).[1] In 1991 only 5 percent of rural girls completed the 10^{th} grade compared to 12 percent of boys (Khandker and Samad 1995).

Gender disparities in schooling persist in many societies despite the fact that economic returns to education may be higher for women than for men in many low income countries (King and Hill 1993; Schultz 1987). In addition, higher women's education has been shown to be strongly related to reduced fertility and greater human capital investment in children, and these effects are more pronounced for secondary than for primary education of women. Girls' schooling may suffer from the higher costs of educating girls than boys in many developing countries (Herz and others 1991; Mannan 1988). Cultural practices dictate that parents may pay more for clothing and transportation for girls than for boys. There is evidence that gender disparity is an inferior good, becoming less pronounced as income rises (Herz and others 1991; King and Hill 1993; Schultz 1987).[2] Nonetheless it would take many years for income growth to greatly reduce gender disparity in most of the developing world. An important question is whether there are government interventions that might more quickly reduce this gender disparity.

Governments in some developing countries have intervened in various ways to promote the schooling of girls.[3] One such intervention that has been implemented is a subsidy for girl's school attendance. In Pakistan, a female fellowship program at the

[1] Things have improved somewhat since then. In 1998, the adult literacy rate was 29 percent among females and 51 percent among males (World Bank 2000)

[2] While economic growth reduces gender disparity, Dollar and Gatti (1999) find that female education, especially at the secondary level, promotes economic growth.

[3] A detailed discussion of these measures appears in Herz and others (1991).

primary school level was found to increase the school enrollment of both girls and boys (Kim, Alderman, and Orazem 1999). In Colombia, school voucher programs targeted to girls are found to increase enrollment rates of both girls and boys (King, Orazem, and Wohlgemuth 1999). The World Bank has argued that programs targeted at girls can increase both girls' and boys' schooling (World Bank 2000). There is, however, no clear evidence as yet on the effect of school subsidies for girls on the schooling of boys.[4]

In early nineties, the Government of Bangladesh (GOB) sought to increase rural female enrollment at the secondary school level by launching a female secondary stipend program. Four separate projects, covering different *thanas* (districts), were begun with donor support: Female Secondary School Assistance Project (FSSAP) funded by IDA (118 thanas), Female Secondary Stipend Project (FSSP) funded by GOB (282 thanas), Secondary Education Development Project (SEDP) funded by the Asian Development Bank (ADB) (53 thanas), and Female Secondary Education Project (FSEP) funded by NORAD (7 thanas). These projects introduced a similar nationwide stipend program targeted to girls in grades 6 through 10 in 460 rural thanas (districts) starting in 1994[5].

The stated objectives of this program are to: (i) increase school enrollment among secondary-aged girls; (ii) improve the secondary schooling completion rate for girls; and (iii) increase female age at marriage. The program introduced a uniform stipend and tuition subsidy program for each girl attending a secondary school in rural areas who satisfy the following eligibility criteria: (i) attend 75 percent of school days; (ii) attain some level of measured academic proficiency (45 percent of class-level test scores)**;** and (iii) remain unmarried. Once a school participates in the program, all female students satisfying these criteria receive a specified amount of stipend and other allowances as prescribed for each grade. The girl's school is directly paid all of her tuition by the project. The amounts of stipend and other allowances paid to eligible female students are specified in Table 1. The stipend was expected to cover as much as

[4] The Food for Education (FFE) program subsidizes the primary school education of both boys and girls in Bangladesh and has been found to increase the schooling of both (Ravallion and Wodon 2000).
[5] In fact, the origin of the stipend program dates back to 1982 when a local NGO started a pilot project in a single thana.

50 percent of the costs of textbooks, uniforms, stationary, transportation, exam fees, and miscellaneous direct educational expenses. The stipend is paid directly to an account in the girl's name in the nearest Agrani Bank, a state agricultural bank with branches all over rural Bangladesh.

In addition, these stipend programs also have been complemented with other components such as curriculum reforms and instructional materials development, teacher training, recruitment of female teachers, improvement of school infrastructure, awareness programs at the community level, and institutional capacity building. These additional project components, however, differ across thanas depending on the agency funding the stipend program (i. e., Asian Development Bank, World Bank, NORAD and GOB).

The combined stipend and tuition subsidy for each girl is Tk. 906 for non-government schools and Tk. 847 for government schools. The stipend itself accounts for two-thirds of the total outlay used to support the program. The female subsidy is about 6 percent of Bangladesh's per capita income. Supporting over 2 million girls each year under this program has evolved into a major expenditure obligation for the government. The stipend budget alone accounts for more than 60 percent of the country's secondary school development budget and 13 percent of the education sector budget (World Bank 1997).

Various reports, including the World Bank's mid-term review, suggest the success of this program in reducing gender disparity in secondary education. There has been a marked increase in the secondary school enrollment among girls in recent years. Aggregate statistics suggest that girls' school enrollment has increased at a rate of 13 percent per year since 1994, while the rate of increase of boys has only been 2.5 percent per year.[6] Household surveys over a period of seven years (between 1991 and 1998) also indicate remarkable gains for girls.[7] To date, there has been no systematic study measuring how much of this increase in girls' secondary school enrollments is due to the

[6] In addition, there has been a marked decline in the proportion of girls marrying at early age.
[7] The average performance of girls exceeded that of boys in the national post-secondary school level examination (Secondary School Certificate) of 1998.

stipend program. The Government of Bangladesh and donors are favorably disposed to extend the program, and there is mounting public pressure to extend the program to cover both boys and schools in urban areas. As resources are limited, targeting by other attributes besides gender may be worth considering, but without an impact assessment, it is difficult to ascertain whether the stipend program is worth continuing or how it might best be targeted.[8]

This paper estimates the impact of the female secondary stipend program on girls and boys using both school and household survey data. A key feature of the program that we rely on to identify its effects on school enrollment is the varying times at which it was instituted across the *thanas* (districts) of Bangladesh. Recognizing that the timing of the program's placement across Bangladesh may be endogenous, perhaps based on the outcome of the perceived educational needs or demand's of communities, we make use of community fixed-effects methods to sweep out unobserved community-level heterogeneity. Our results suggest that, after controlling for time trend, and school and village-level observed and unobserved characteristics, the female stipend program has increased girls' secondary education substantially, and had no significant effects on boys' schooling. Parameter identification rests on the limited variation in program duration across the villages in our household sample. Our results are strengthened our confirmatory results from an analysis based on a very different school-level data set. Although these data have there own limitations, taken together our results strongly suggest that the stipend program increased girl's secondary school enrollment and provides mixed evidence of their effects on that of boys.

The paper is organized as follows. Section two describes the program's achievements in terms of aggregate secondary school statistics and MIS data from the World Bank funded FSSAP project. Section three describes the household data used for the analysis. Section four discusses the econometric model to be used to estimate the program effect with household-level data collected jointly by the Bangladesh Institute of

[8] The World Bank has already approved an IDA loan of $120 million to continue the FSSAP project in March 2002.

Development Studies (BIDS) and the World Bank. Section five discusses the estimated program effects based on household survey data. Section six presents the impact estimates based on the MIS data from the FSSAP project. Section seven discusses the issues of targeting. And finally, the concluding section summarizes the results with policy implications.

2. Bangladesh's achievements in female secondary education

Two data sources are used to examine Bangladesh's recent achievements in female secondary education after the introduction of the female stipend program. The first is the Management Information System (MIS) of the World Bank funded Female Secondary School Assistance Project (FSSAP), which provides enrollment data for FSSAP schools by grade and sex since the stipend program was introduced in 1994. The second source is the published government statistics on nationwide school enrollment collected by the Ministry of Education.

All the secondary schools participating in any of the female secondary stipend programs are required to regularly provide the project offices with school and recipient information using a uniform MIS format. This required information includes student enrollment by gender and by class, information on school facilities (e.g., class room size, availability of tube wells, latrines, etc.), attendance and examination record of the stipend recipients, and other school information needed for administering the stipend program. The FSSAP-MIS information on enrollment and other school characteristics is relatively well organized. While all the other stipend program offices maintain essentially the same set of information under the same MIS format, the MIS data from other project offices were either not available, in some case because it had not yet been computerized, or was not well enough organized to be accessible.[9] Consequently, our analysis makes use only of the FSSAP data available from 118 thanas (out of 460) in rural Bangladesh. Furthermore, since male-only schools are not eligible for the program, the FSSAP-MIS data include only female-only schools and coeducational schools. These data thus reveal

[9] We requested that the project directors of the FSSP and SEDP programs provide similar MIS data. Despite repeated requests, we failed to obtain such data. We would like to thank Dr. Lutfur Rahman, the project director and his colleagues at FSSAP for releasing the MIS data for this study to us.

the pattern of enrollments over time in schools in which girl's receiving FSSAP tuition and stipend support can enroll, and not the overall pattern of enrollments. These FSSAP school enrollment increase are probably only slightly inflated in the initial years by the transfer of girls from non-FSSAP schools to FSSAP schools. By 1998, 98 percent of all rural secondary schools that enroll girls were part of this program. Aggregate data on girl's school enrollment (shown in Table 3) also demonstrate very large rates of increase during this period.

Even with their deficiencies, aggregate FSSAP-MIS data reveal changes in the pattern of enrollments that are consistent with the program altering behavior. Table 2 provides class-wise total enrollment each year from 1994 through 1998, by gender, in schools that appear in the MIS database continuously since 1994.[10] Looking across the rows of the table, which are restated as index numbers in the bottom panel, demonstrates a marked pattern of increased enrollments in higher classes. For example, at the onset of the program in 1994, the tenth grade had only 36.0 percent of the female students as the sixth grade. In 1998, this proportion had increased to 59.2 percent. Figure 1 graphs these relative class size index numbers by year. Although there is some variations over the years, all of the class distributions after 1994 lie entirely above the 1994 distribution. No such pattern exists for male schooling in the same schools – examination of Table 2 reveals that there is no discernible pattern to male relative class enrollments from 1994 through 1998. Figure 2 demonstrates that the timing of increases in class sizes for girls coincided with the introduction of the FSSAP program. Class 7 saw a large jump in 1995, class 8 in 1996, class 9 in 1997, and class 10 in 1998.[11]

[10] There were 3,391 schools that joined the program in 1994 and provided MIS reports in that year. The number of schools appearing in the MIS database without any missing entry between 1994 and 1998 is 2,764. The fact that some of the schools 'dropped out' of the school-level database in the MIS does not mean that those schools dropped out of the program. No school has reportedly dropped out of the program and individual-level recipient data (rather than school-level data) are presumably reported and maintained in the MIS database. The main reason for the attrition of school-level data in MIS appears to be the fact that while the individual recipient-data are critical in administering the project school-level data are not directly used in administering the project and thus are not as closely monitored as the recipient data.

[11] This data series begins with the 1994 introduction of the FSSAP program. To see the impact of the program on class 6 enrollments requires data from 1993, which are unavailable.

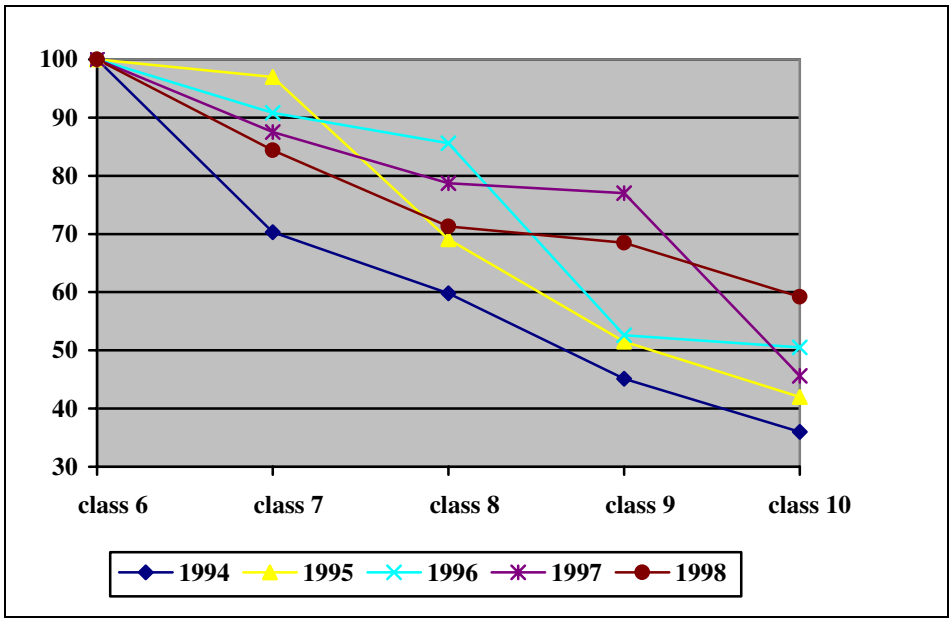

Figure 1: ~~National level g~~Girls' class size index ~~among~~ FSSAP schools by year (class 6=100)

(Source: FSSAP-MIS data ~~Bangladesh Statistical Yearbook, 1998~~)

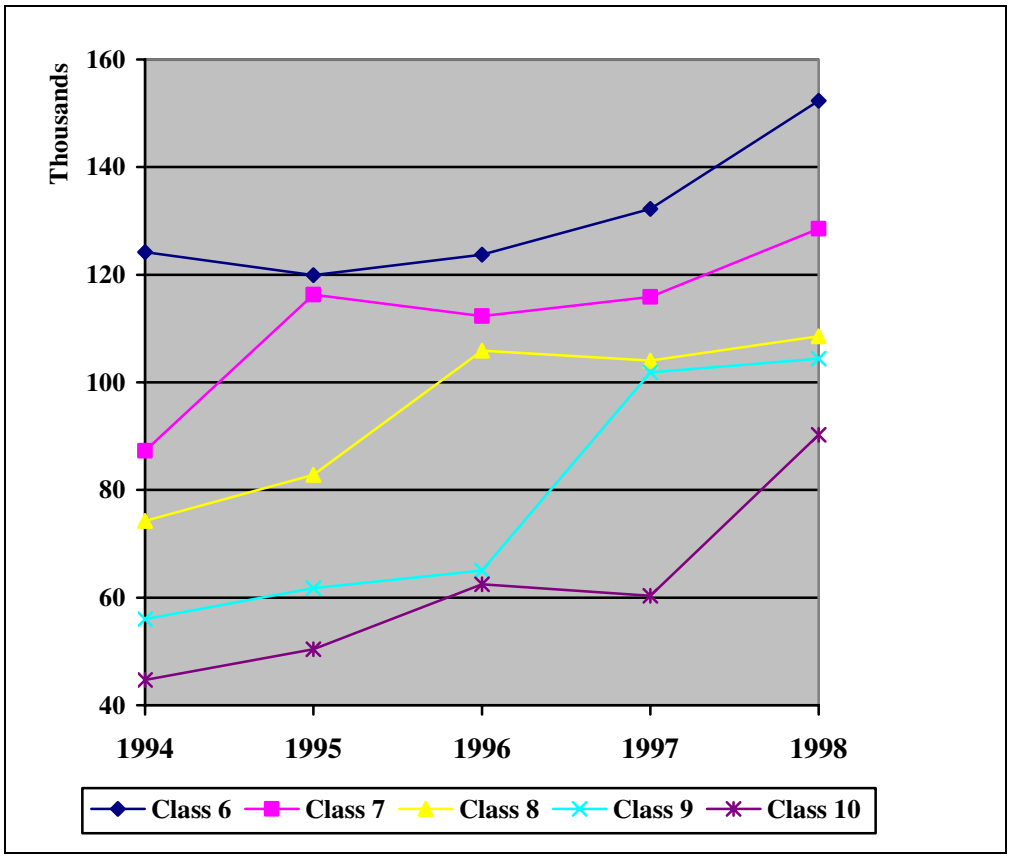

Figure 2: ~~National level~~ Girl's class enrollment among FSSAP schools by year

(Source: FSSAP-MIS data~~Bangladesh Statistical Yearbook, 1998~~)

A nationwide picture of the changes in the secondary school enrollment of both boys and girls is shown in table 3, and presented in figures 3-5.[12] Figure 3 depicts the steady upward trend in enrollment of both boys and girls attending secondary schools. The dramatic upward trend in the country's female secondary school enrollment since the early nineties, the period in which school subsidies for girls were first introduced, were followed by greatly reduced gender disparity in school enrollment (figure 4). Since

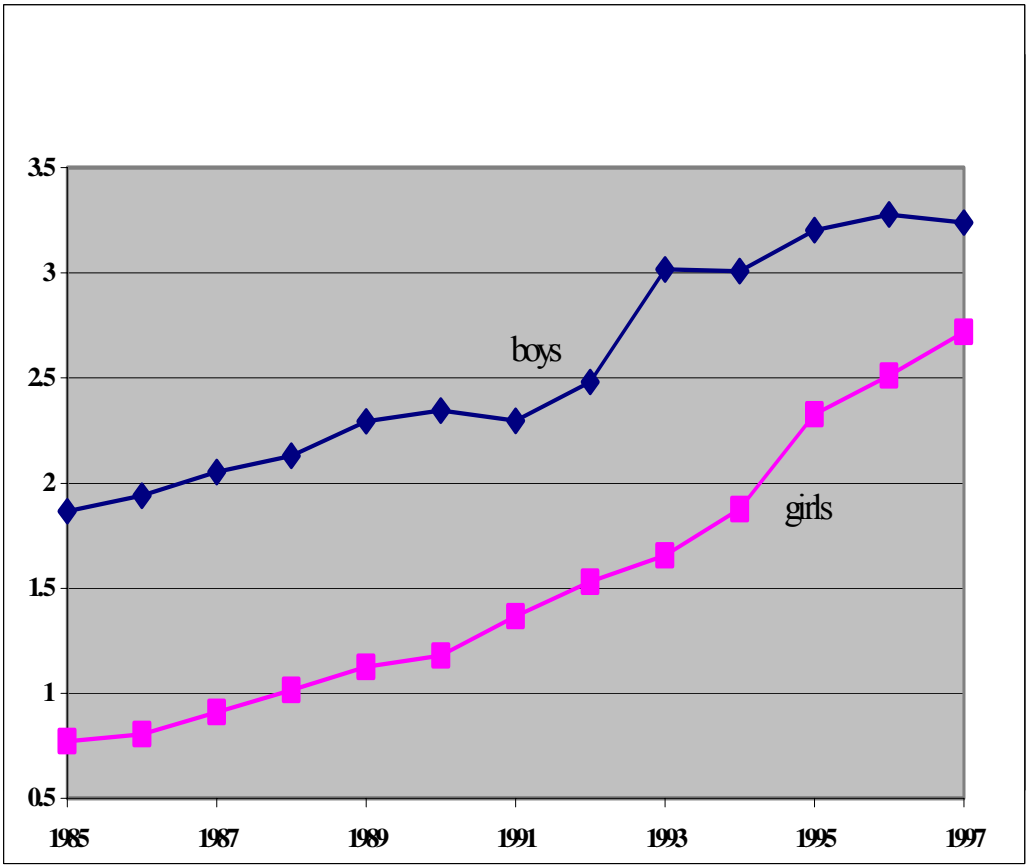

Figure 3: National level total secondary enrollment by year

(Source: Bangladesh Statistical Yearbook, 1998)

[12] The data covers both rural and urban area schools, with less than one quarter of the total secondary students representing urban schools.

the FSSAP program operates only in rural areas, overall student enrollment would be expected to grow much faster in rural areas as compared with urban areas. Figure 5 confirms this notion.[13]

The female share of secondary enrollment was only 17 percent in 1970, 26 percent in 1980, 33 percent in 1990, and 38 percent in 1994, the initial year of the program intervention (table 3). The share of female secondary school enrollment

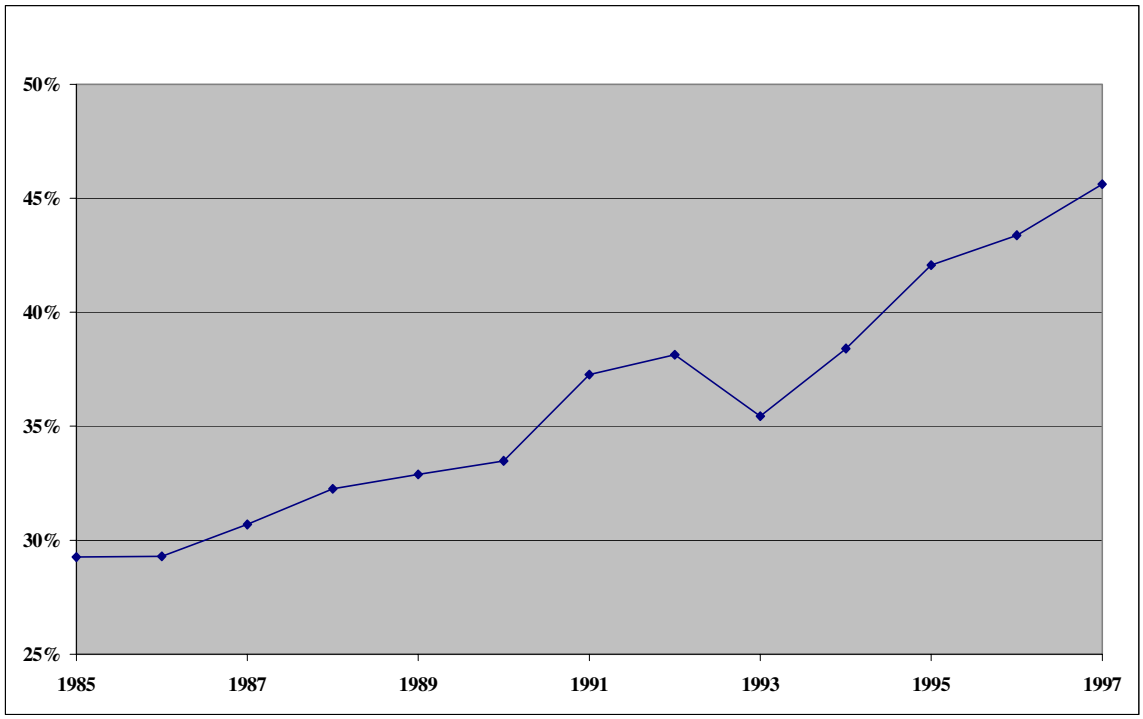

Figure 4: National level share of female secondary enrollment by year
(Source: Bangladesh Statistical Yearbook, 1998)

increased to 42 percent in 1995 just one year later. While the average growth in female school enrollment was only 8 percent during 1985-90, it increased to 12 percent during 1991 and 1993, and to 15 percent after 1994. The rapid rise in rural school enrollments beginning with 1992, pictured in figure 5, may reflect, in part, the introduction in 1992-93 of a government tuition subsidy for girls attending grade six to eight only in rural areas. This predecessor to the FSSAP program is likely to have increased the number of

[13] Unfortunately, information is not available on enrollment by gender in either rural or urban areas.

girls "at risk" for continued secondary schooling at the time the FSSAP program was being introduced.

This has two ramifications for our econometric analysis. First, we estimate the effect of the FSSAP program above and beyond the effect of the predecessor programs on increasing the number of girl's eligible for secondary schooling.

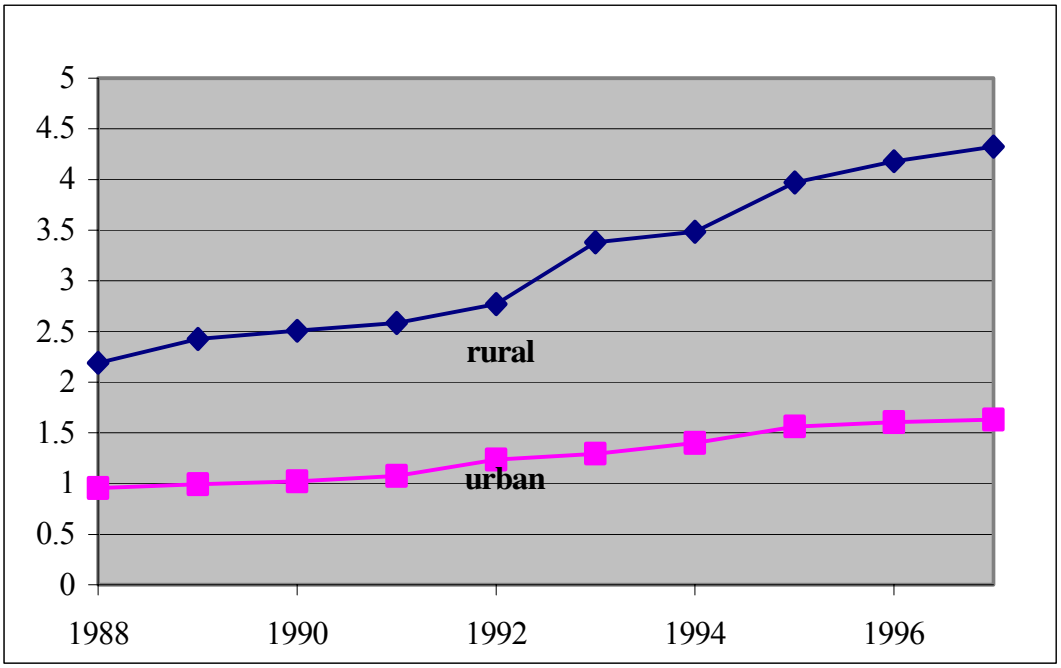

Figure 5: National secondary enrollment in rural and urban area by year (millions)
(Source: Bangladesh Statistical Yearbook, 1998)

Consequently, the effect we estimate is certainly an underestimate of the full effect of school subsidy programs at all levels of schooling on secondary school enrollments during the period under study. Second, households may have anticipated the broadening of this predecessor program to other grades and kept their daughters in school. Again, this will result in an underestimate of the programs effect since enrollments in at the onset of the FSSAP program in 1994 will be larger as a consequence of these anticipations.

What is the effect of a girl's schooling subsidy on boys schooling? Changes in

the price of schooling girl's arising from the stipend program will affect their schooling and that of their brothers through the usual income and substitution effects. In the absence of the stipend, parents, who derive utility from the schooling of both girls and boys, will choose the level of schooling for boys and girls given by point X in figure 6.

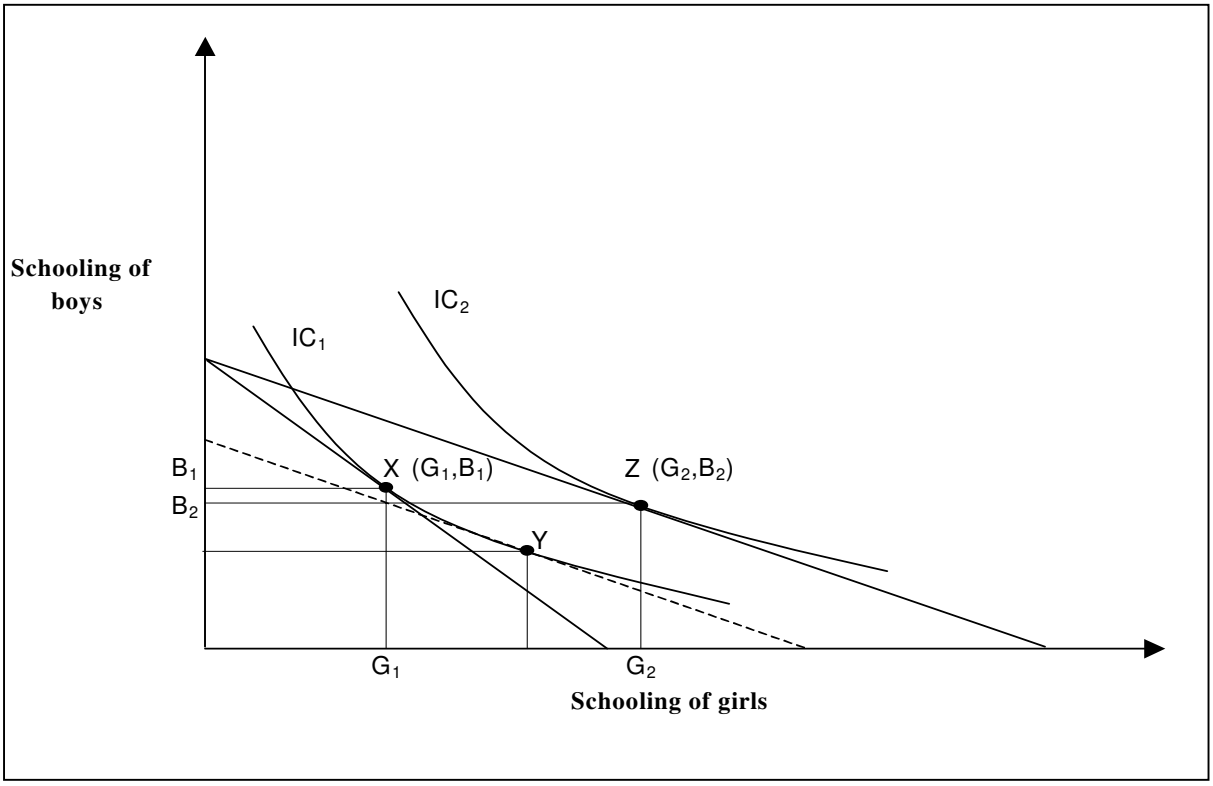

Figure 6. The demand for schooling of girls and boys

The introduction of a female-only stipend will cause the relative price of girls' schooling to decline, moving the budget constraint out to a point such as Z. The substitution effect is represented by the movement from point X to point Y, and the income effect is the movement from Y to Z, which assumes that schooling is a normal good. Figure 6 illustrates the case where, with a fixed budget for schooling, a fall in the price of girl's schooling induces a negative cross-price effect on boy's schooling larger in absolute value than the positive income effect on boys schooling.

The subsidy to female secondary school enrollment may also change the sex-specific school enrollment rate in lower grades. Girl's must complete primary school in order to gain entrance to secondary school, and hence forward looking parents will take into account the relative cost of future schooling in deciding current enrollments of their children.

3. Data and its characteristics

The household survey data used comes from two recent surveys carried out by the Bangladesh Institute of Development Studies (BIDS) with funding from the World Bank (WB). The BIDS-WB micro-credit project surveyed households and schools in 32 randomly drawn thanas (sub-districts) throughout Bangladesh (out of 460 thanas convered by the FSSAP, FSSP and SEDP programs). The 1991/92 survey covered roughly 1,800 households from 87 villages in 29 thanas, collecting household and individual information on labor supply, income, employment, expenditure, borrowing and savings. In conjunction with this survey, a school-level survey was simultaneously administered covering the 687 primary, secondary and post-secondary schools attended by members of households surveyed.[14] The school-level survey collected information on student enrollment by gender and by class and other information such as the number of teachers and their gender and qualifications.

In 1998/99, a follow up survey of the same set of households and schools was conducted. As part of the 1998/99 survey, an additional 180 households were selected from 9 villages drawn randomly from three new thanas. These three thanas were drawn from the south-east part of Bangladesh, which was excluded in 1991/92 survey due to the damage caused by a devastating cyclone. The re-survey also added households from the original 87 villages, covering a total of 2,599 households and 889 schools.[15]

Girl's school enrollment and grade attainment well exceeded that of boys at the end of the 1991-98 period in the BIDS-WB dataset. As table 4 indicates, 52 percent of

[14] There were 301 primary schools and 384 secondary and other non-primary schools in the 1991/92 school survey.

[15] Among the 889 schools, there were 476 primary schools and 413 secondary and non-primary schools included in the follow-up survey.

school-aged (5-18 year old) boys were enrolled in school in 1991, compared to 62 percent in 1998, implying an annual increase of about 1 percent. In contrast, 46 percent of girls of the same age group attended schools in 1991/92 compared to 65 percent in 1998/99. If we focus on the target group of secondary school-aged children (aged 11-18), we see more dramatic changes. For boys of age 11-18 in our sample, the secondary school enrollment rate was 47 percent in 1991/92 and 58 percent in 1998/99. In contrast, the corresponding rate for girls of the same cohort was 44 percent in 1991/92 and 60 percent in 1998/99. The mean years of schooling completed by girls of age 11-18 increased from 3.0 years to 4.4, while the mean years of schooling completed by boys of the same age group increased from 3.2 to 4.1 over the same period. Among primary school graduates, the transition to secondary school was 45 percent in 1998/99 compared to 27 percent in 1991/92 for girls, while the corresponding rates for boys were 40 percent in 1998/99 and 27.5 percent in 1991/92. However, the secondary school completion rate has declined for females, while it has increased slightly for males over the same period.

FSSAP-MIS data contains school-level information on those schools that participated in the FSSAP program during the period 1994-1998. Since only female students are eligible for the program, the FSSAP-MIS data set includes information on participating coeducational or female-only schools. Exclusion of the male-only schools is the major source of discrepancy between our FSSAP-MIS data and the nationwide statistics on total and male enrollment. There are 4,770 schools included in the FSSAP-MIS data; among them, 3,391 joined the program in 1994, 352 in 1995, 467 in 1996, 303 in 1997 and 257 in 1998. Among the 4,770 schools, 4,046 (85%) are coeducational and 724(15%) are female only-schools. While all the participating schools presumably reported/maintained student-level information (on attendance and examination marks) for all female (but not male) students every year after joining the program —which is essential for administering the stipend program— not all schools reported school-level information (or school-level data entered in the MIS database) every year. For example, while 3,391 schools reportedly joined the program in 1994, 5 consecutive observations during 1994-1998 are found for 3,172 schools. In addition, there are cases where the school identification number appears in the data but all the enrollment variables have

missing values in some of the data years. As a result, only 2,764 (out of 3,391) schools report non-missing enrollment figures for 5 consecutive years.

4. Econometric issue in the household level analysis

The data available for the household-level analysis consists of two household surveys conducted in 1991/92 and 1998/99 that sample households from a common set of villages. These surveys are the source of our outcome measure, child-specific school enrollment, as well as parental characteristics. These data were merged with school-level data on the timing of the introduction of the FSSAP program. The crucial attributes of the data that affect estimation and interpretation are these:

I. program's were not in operation in any village during the first round;
II. program's operated in every village during the second round;
III. the only source of program variation is the date of its introduction between the two rounds.

Complicating estimation is the possible endogeneity of the date of program introduction across the villages of rural Bangladesh. Fixed effect conditional logit models are estimated to sweep out village-level heterogeneity that may both affect the determinants of the dependent variable, individual school enrollment, and the timing of the introduction of the FSSAP program into villages.

These data are sufficient to estimate the marginal effects of FSSAP program on the school enrollments of children, however, they are insufficient to identify the average effects of the program. To demonstrate the nature of our data and its limitations in the simplest manner, consider an illustrative model with first round outcome y_{i1}

$$y_{i1} = \alpha_1 + \varepsilon_{i1} \qquad (1)$$

where α_1 is an intercept and ε_{i1} is an error associated with outcomes in round 1, and a second round outcome y_{i2}

$$y_{i2} = \alpha_2 + \delta p_{i2} + \varepsilon_{i2} \qquad (2)$$

where p_{i2} is the intensity of an intervention in the second round. Observations are indexed by only i and time t=1, 2 as we abstract from "villages" or other clustering of the data, as well as issues of endogeneity and fixed effects. The intervention did not operate at the time of round 1, so that $p_{i1} = 0$ for all $i = 1, \ldots, N$, in the second round $p_{i2} > 0$ for all i. The difference $(\alpha_2 - \alpha_1)$ represents the change in outcome y due solely to the passage of time.[16] It is clear that if the program intensity were the same for all sample points in round 2 ($p_{i2} = 1$ for all $i = 1, \ldots, N$) then it would be impossible to identify α_2 from the program effect δ. Having p_{i2} vary is sufficient to identify δ. However, the time effect $(\alpha_2 - \alpha_1)$ is not separately identified from any scalar translation of the measure of program intensity p_{2i}, and consequently the average effect of the treatment is not identifiable unless such scalar translation is ruled out. In our case, p_{i2} is number of years of program operation. It could have alternatively been coded as the calendar year that the program began operation, which is a scalar translation of the form $\tilde{p}_{i2} = p_{i2} + \omega$. In this case, equation (2) becomes

$$y_{i2} = \alpha_2 + \delta \tilde{p}_{i2} + \varepsilon_{i2} = (\alpha_2 + \delta\omega) + \delta p_{i2} + \varepsilon_{i2} = \tilde{\alpha}_2 + \delta p_{i2} + \varepsilon_{i2} \qquad (3)$$

This scalar translation has no effect on α_1 because $p_{i1} = 0$. Consequently, the time effect $(\tilde{\alpha}_2 - \alpha_1)$ is not invariant to a scalar translation of how program intensity p is measured.

Figure 7 illustrates this issue graphically. At time t=τ, τ<0, prior to the introduction of the program, the (average) outcome is α_1. The program is introduced at time t=0 with instantaneous treatment effect δω, where ω can be positive or negative. For simplicity, assume that the effect of the treatment increases by δ for each year up to some maximum number of years T. The average outcome in year 0 without treatment is α_2 and with treatment is $\alpha_2 + \delta\omega$. When ω=1 we have a model in which the treatment is

[16] The tuition subsidy program for girls enrolled in grade 6-8 in operation during 1992-93 also effects secondary school enrollments during the 1994 to 1998 period. Its effect is not separately identified from the time effect $(\alpha_2 - \alpha_1)$.

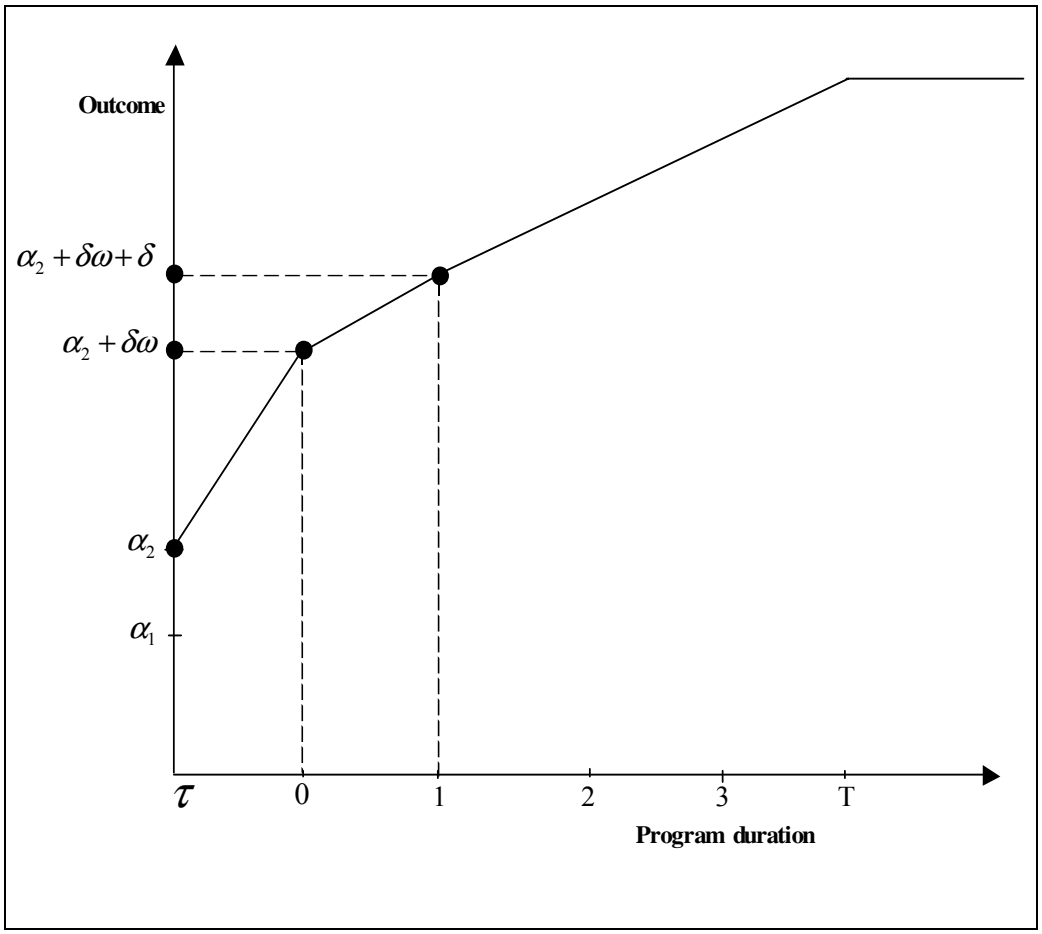

Figure 6. Identification of program effects

linear in treatment intensity (time) and the total (average) treatment effect is identifiable. Lacking data on treatment at time 0, it is not possible to separate out α_2 from $\delta\omega$ without knowing ω. However, one can identify δ, the effect of a marginal year (intensity) of treatment, from data on program durations (intensities) and outcomes in years 1,2,…T. This is the parameter that we estimate below.

Now consider a model having a single exogenous regressor x_{it}, and in which the program affects behavior through an interaction with a regressor x_{it}. In this, case equation (1) becomes

$$y_{i1} = \alpha_1 + \beta x_{i1} + \varepsilon_{i1} \qquad (4)$$

and equation (2) becomes

$$y_{i2} = \alpha_2 + \delta p_{i2} + \delta_x p_{i2} x_{i2} + \beta x_{i2} + \varepsilon_{i2} \qquad (5)$$

so that a scalar translation of the program measure to $\tilde{p}_{i2} = p_{i2} + \omega$ as before yields

$$y_{i2} = \alpha_2 + \delta\tilde{p}_{i2} + \delta_x \tilde{p}_{i2} x_{i2} + \beta x_{i2} + \varepsilon_{i2} = (\alpha_2 + \delta\omega) + \delta p_{i2} + \delta_x p_{i2} x_{i2} + (\beta + \delta_x \omega) x_{i2} + \varepsilon_{i2} \quad (6)$$

In the equation above, the parameter on x_{i2} in the second equation ($\beta + \delta_x\omega$) differs from the parameter on x_{i1} by the factor $\delta_x\omega$. In order to correctly estimate these equations jointly, or to estimate the time-differenced equation, requires that a variable interacting round (time) with x_{i2} be added as an independent variable; otherwise the estimates are not invariant to scalar translation. This variable will capture the effect of $\delta_x\omega$ arising from scale translation when β is truly time invariant.

The particular empirical model formulated is

$$s_{ijt} = \alpha_t + \delta(k_{ijt}, p_{jt}) + \gamma_1 k_{ijt} + \gamma_2 k_{ijt}^2 + X_{ijt}\beta + \mu_j + \varepsilon_{ijt}; \quad t = 1, 2 \qquad (7)$$

where s_{ijt} is the latent school enrollment of child i in village j in year t, k_{ijt} is the age of this child, α, γ_1, and γ_2 are parameters, δ is a function of child age and p_{jt}, the duration of the program in village j in year t, X_{ijt} is a vector of exogenous attributes affecting school-going behavior with associated parameter vector β, μ_j is a village-specific error, and ε_{ijt} is a nonsystematic error. The function $\delta(k_{ijt}, p_{jt})$ captures the possibly nonlinear effect of program duration and its interaction with child age. Unfortunately, p_{j2} takes only three values representing the three different starting dates of the FSSAP program. This provides us with very few degrees of freedom to work with when specifying $\delta(k_{ijt}, p_{jt})$ without destroying parameter identification. For this reason, we restrict ourselves to single parameter forms, in particular $\delta(k_{ijt}, p_{jt}) = \delta p_{jt}$ and $\delta(k_{ijt}, p_{jt}) = \delta p_{jt} k_{ijt}$. Note that age and its square are always separately included.

The interaction of age and program effects and more general forms of $\delta(k_{ijt}, p_{jt})$ allow the effect of program duration on school enrollment to depend on age or, equivalently, on the duration of exposure to the program and the age at which that exposure began. Age at first exposure to the program is simply $f_{ijt} = k_{ijt} - p_{jt}$. If first exposure occurs when the child is older, he or she may already have left school. The younger the child when first exposed, the greater the effect on subsequent school behavior as the subsidy should, in principle, reduce the probability of leaving school (or not entering) at every age above the minimal age of initial primary school entrance. On the other hand, the discounted value of the stipend to younger students who would at most be in primary school is smaller the further they are away from the entry into secondary school. If there is non-independence in household decision-making within the village, then observing one's neighbors start to send their daughters to attend secondary school in previous years may affect parent's decision on the schooling of their daughters in the current year. Consequently, the effect of the program can continue to grow well beyond its date of introduction.

5. Results of the household-level analysis

Summary statistics of the independent variables is shown in table 5 and the results of the household-level analysis are presented in table 6. The dependent variable in every case is current school enrollment. The sample is broken between boys and girls of ages 11 to 18 years and 13 to 18 years, the ages at which students are at risk for school leaving. The program duration variable reflects the date at which any school serving the children of a village became associated with FSSAP, and is coded as the years since introduction (1994=5, 1995=4, and 1996=3).

The first two columns of table 6 present standard logit estimates of the determinants of current school enrollment. The duration of the FSSAP stipend program in the village does not have a statistically significant effect on school enrollment for either gender when village-level heterogeneity is not controlled for. The columns marked "Model 1" present the same specification using village fixed effects logit. The estimated

coefficient on stipend duration for girls is positive (0.557) and statistically significant (t=2.36) using village fixed effects. This parameter corresponds to a derivative of the probability of school enrollment with respect to a year of stipend duration of approximately 0.12. The effects on boys schooling remain statistically zero.

As argued above, the effect of the secondary school stipends on school enrollment may depend on child age. One reason is that the value of the stipend to younger students who would still be in primary school is smaller the further they are away from the possible entry into secondary school. Moreover, school enrollment rates are quite high (about 80 percent for both girls and boys) at these ages. In model 2, where we drop children of 11 and 12 years of age from the sample, the estimated effect of stipend duration on girls rises appreciably (from 0.557 to 0.808) and the coefficient has a t-ratio of 2.77. With the limited variation on stipend duration available in these data, we allow for age-varying stipend effects through an age-stipend interaction term without a level stipend variable. The results of this specification are labeled Model 3 in Table 6. As suggested, the age-stipend interaction is positive and significant for girls.

6. Stipend program impact: analysis with FSSAP MIS data

Although the analysis of the household survey data demonstrates a positive effect of the female stipend program on girls' secondary enrollment, parameter identification rests on the limited variation in program duration across the villages in our sample. Our results would be strengthened if we could get confirmatory results from an analysis based on a very different data set. In particular, we make use of the aggregate school-level information obtained from the MIS information of the FSSAP project for this confirmation. The schools covered in the FSSAP MIS data provide information annually for the years 1994 to 1998, but not prior to 1994. The basic source of identification is the same — not all schools were enrolled in the FSSAP stipend program at the same time. However, the annual MIS data allow us to make use of another source of variation — not all grades were treated at the same year, even if the school was treated. We exploited both sources of variation observed at the school level to estimate the stipend program

effect. The student cohorts observed in FSSAP-MIS data are summarized in box 1. Each cohort in the box is represented by a unique shade or pattern.

Box 1. The student class cohorts* observed in the FSSAP-MIS data

Year	Class 6	Class 7	Class 8	Class 9	Class 10
1994	**1994 cohort**	**1993 cohort**	**1992 cohort**	**1991 cohort**	**1990 cohort**
1995	**1995 cohort**	**1994 cohort**	**1993 cohort**	**1992 cohort**	**1991 cohort**
1996	**1996 cohort**	**1995 cohort**	**1994 cohort**	**1993 cohort**	**1992 cohort**
1997	**1997 cohort**	**1996 cohort**	**1995 cohort**	**1994 cohort**	**1993 cohort**
1998	**1998 cohort**	**1997 cohort**	**1996 cohort**	**1995 cohort**	**1994 cohort**

*A 'class cohort' is defined as a group of students entering secondary school in a particular year, with each class cohort being identified by the year of entering class 6 (entering class cohort of 1991, 1992, etc.)
box is represented by a unique shade or pattern.

The FSSAP-MIS data contain enrollment data for each class for the year between 1994 (for schools that joined the program after 1994, the first year they joined the program) and 1998 so that MIS data constitute a school-level panel data set on enrollment immediately following the introduction of the stipend program. A major limitation of the FSSAP-MIS data, however, is that they contain no information on the period before the program was introduced. Nevertheless, there is one source of variation among class cohorts that helps us identify the program impact; ~~T~~that is, the stipend program restricted the entry points for the stipend recipients to only class 6 and class 9. This feature is applies to all three stipend programs. That is, when the nationwide stipend program started in 1994, stipend was awarded to the female students in classes 6 and 9 alone. In 1995, stipend was awarded to the female students in all the classes except class 8. Starting in 1996, all the female students meeting the eligibility criteria received stipend

Box 2. The student class cohorts* included in the FSSAP-MIS data and stipend recipients

Year	Class 6	Class 7	Class 8	Class 9	Class 10
1994	**1994 cohort**	**1993 cohort**	**1992 cohort**	**1991 cohort**	**1990 cohort**
1995	**1995 cohort**	**1994 cohort**	**1993 cohort**	**1992 cohort**	**1991 cohort**
1996	**1996 cohort**	**1995 cohort**	**1994 cohort**	**1993 cohort**	**1992 cohort**
1997	**1997 cohort**	**1996 cohort**	**1995 cohort**	**1994 cohort**	**1993 cohort**
1998	**1998 cohort**	**1997 cohort**	**1996 cohort**	**1995 cohort**	**1994 cohort**

*A 'class cohort' is defined as a group of students entering secondary school in a particular year, with each class cohort being identified by the year of entering class 6 (entering class cohort of 1990, 1991, 1992, etc.)
The shaded areas in the figure indicate the class cohort eligible for the stipend in a given year.

regardless of the class cohort (the class cohorts of female students receiving stipend in different years—indicated by the shaded area— are summarized in box 2).

Thus the coexistence of class cohorts receiving and not receiving the stipend in the same school in the same year provide intra-school variation in program exposure, a source of variation which is not available in the two cross-sections of household survey data analyzed above. Although all class cohorts become eligible for stipend during the time frame of these MIS data, relatively few cohorts did not receive stipends once the program was introduced into their school (unshaded in Box 2). We also calculate the future program duration, which is equal to the number of additional years that a girl in a particular class would get the stipend if she continues her education. To estimate the effect of the female stipend program on boy's enrollment in FSSAP schools, we calculate the mean of actual and future program durations across all classes.

We used the FSSAP-MIS school-level data to estimate the net impact of the stipend program on grade-specific enrollment. As we observed in section 2 above, national level data on enrollment indicate that there had been an upward trend in the enrollment before the stipend started. Thus it is likely that, even without the stipend program, the enrollment would have kept increasing after 1994. In order to estimate the net stipend impact controlling for the trend increase in demand for education as well as for other factors, we have fitted a semi-logarithmic grade-specific school enrollment equation for girls and boys separately at the school level:

$$\ln G_{ijt} = h_{ijt}\beta^{g} + s_{ijt}\delta^{g} + f_{ijt}\lambda^{g} + t\alpha_1^{g} + t^2\alpha_2^{g} + \mu_j^{g} + \varepsilon_{ijt}^{g} \qquad (8)$$

$$\ln B_{ijt} = h_{ijt}\beta^{b} + s_{ijt}\delta^{b} + t\alpha_1^{b} + t^2\alpha_2^{b} + \mu_j^{b} + \varepsilon_{ijt}^{b} \qquad (9)$$

where h_{ijt} is a set of class/school/village level variables, the s_{ijt} is the number of years of exposure to the stipend program for female students in class i, in school j, and year t, f_{ijt} is future duration of stipend for female students in class i, in school j, and year t conditional

on remaining in secondary school until completion. The schooling variables (G_{ijt} and B_{ijt}) are measures of log grade-specific enrollment levels of *i*-th class in the *j*-th school in period *t* so that the coefficient of stipend duration measures the percentage change in the level of grade-specific enrollment with respect to one year of program duration. The error is composed of a time-invariant school-specific component μ_j and a nonsystematic component. Unobserved attributes of a school, μ_j, may determine the timing of its program stipend treatment, and consequently bias least squares estimates of these equation. School-level fixed effects differences out the this error component, as well as any school and location observed and unobserved time-invariant variables that influence school enrollment behavior.[17]

Our empirical results using FSSAP-MIS school-level data are summarized in table 7. Our results show that the duration of stipend program has a significant positive impact on female class enrollment and a significant negative effect on male class enrollment in FSSAP schools. On average, one additional year of program exposure increases the female class enrollment rate by 8 percent, and reduces the male class enrollment rate by 29 percent. An additional year of future program exposure until graduation increases girls' secondary level class enrollment by 3.4 percent. Since almost all girl's schools became FSSAP schools between 1994 and 1996, and transportation costs are high, there is likely to have been relatively little transfer of girls from non-FSSAP schools to FSSAP schools. However, boys had many more schooling choice since they could readily enroll in male only schools, none of which are captured in these data. The results for boys simply suggest that the sex composition of coeducational schools was strongly effected by this sex-specific subsidy program.

The enrollment equations at the school level are re-run with quadratic program duration to see whether program impacts are non-linear (also shown in table 7). We find that the program effect is non-linear for both boys and girls. The positive effect for girls'

[17] Random effects models are also estimated. However, the Hausman tests strongly rejected the null hypothesis that the unobserved school-level effects are uncorrelated with the regressors. Thus, we only report the fixed-effects results here.

class enrollment increases with additional years, while the negative effect for boys' is reduced (or algebraically increases) with additional years.

These school-level estimates of girl's enrollment suffer from a number of drawbacks. First and foremost, the unit of analysis is the school rather than the true decision-making unit, the household. There are very few secondary schools in rural areas and the transport and other cost of moving schools in response to the FSSAP program are so large as to make it doubtful that secondary school transfers drive the results for girls in any appreciable way, as noted above. Nevertheless, schools may be expanding beyond the trend effect in response to the FSSAP program, and, to the extent that school enrollment decisions were constrained by school capacity, this is included as a program effect. Arguably, it should be included as a consequence of program introduction. Second, as new secondary schools are opening during this period, rather than closing, we may be underestimating program effects. Only schools in operation in 1994 are included in the panel. Third, we abstract from pretreatment "announcement" effects. Households may have known about the stipend program prior to its actual introduction and kept girls in primary school and secondary school as a consequence. This anticipatory behavior occurring prior to program introduction may not be very different from behavior subsequent to program introduction in which households are also likely to consider the secondary school stipend in deciding on the primary schooling of girls. Although both data sets used in the analysis of the FSSAP have their deficiencies, they both strongly suggest that this program has clearly benefited girls' school enrollment, perhaps at the cost of boys.

7. Targeting students with stipend: Who actually benefit the most among girls?

The female stipend program designed and implemented in Bangladesh is targeted to rural areas and only to girls who satisfy the stated criteria. The eligibility criteria of securing 45 percent of marks, attending 75 percent of school days, and staying unmarried, may not be strictly enforced. According to FSSAP-MIS data, only 6 percent of secondary students have failed to obtain a stipend because they did not satisfy the criteria (World Bank 1997). While the program has enhanced girls' secondary schooling, cost data shows unequivocally that the program is expensive to operate. In particular, the stipend

part is costlier than the tuition subsidy part of the program. Also the administrative costs of the female stipend program, as reported in the FSSAP annual reports, accounts for more than 18 percent of the total cost of the program. Schooling is subsidized in Bangladesh even without the stipend program. With the stipend program in place, the educational subsidy is more than doubled at the secondary education level. Sustaining such a program may not be feasible for the government, in which case targeting may be worth considering.[18]

In order to consider the distributional effects of the stipend program on children by land ownership status, the school enrollment equation is re-estimated adding as an independent variable our measure of landholding (the log of landholdings in hundredths of an acre plus one) interacted with the stipend program duration variable. The results presented in table 8 clearly suggest that the school enrollment benefits of the FSSAP program accrue disproportionately to girls from households with larger quantities of owned land. There is no effect on boy's school enrollment of stipend duration or its interaction with land. Land ownership has been used as an effective targeting mechanism for microfinance programs such as the Grameen Bank in Bangladesh, and its application in the FSSAP program may be an effective way of redirecting the subsidy to poorer households.

8. Summary and policy conclusions

An analysis using both household- and school-level data indicate that the nationwide rural stipend program for girls has had a significant positive impact on the secondary school enrollment of school age girls, and reduced boys' enrollment in coeducational secondary schools in rural Bangladesh. The school level data shows that, on average, an additional year of stipend program duration increased the female student secondary enrollment of an incoming cohort by as much as 8 percent. The household-level data analysis suggest that an additional year of program duration increases the school

[18] In fact, the mid-term review World Bank mission of the FSSAP project recommended such a targeting criteria. The mission recommended that the FSSAP project may have a pilot area where they introduce stipend and tuition subsidy targeting on the following: students would receive the stipend package if (i) parents do not own land; (ii) the girl has only one parent/guardian; (iii) mothers did not complete primary education; and (iv) none of the older siblings had ever attended a secondary school.

enrollment rate of girl's aged 11-18 years by 12 percentage points, and has no discernable effect on boy's enrollment.

As the program is costly and requires donor support to sustain this program, a natural question arises if the program can be targeted and if so how. One possibility is to target the program by landholding class. Our findings indicate that the currently untargeted stipend disproportionately effects the school enrollment of girls from households with larger land wealth. Targeting towards the land poor may reduce the overall enrollment gains of the program while equalizing enrollment effects across landholding classes.

Table 1. Stipend and tuition rates (amount in Taka)

Class	School type	First installment: Jan-Jun				Second installation: Jul-Dec				Annual total	Monthly stipend	Monthly tuition
		Stipend	Tuition	Books	Total	Stipend	Tuition	Books	Total			
6	Govt.	150	60		210	150	60		210	420	25	10
	Non-Govt.	150	90		240	150	90		240	480	25	15
7	Govt.	180	72		252	180	72		252	504	30	12
	Non-Govt.	180	90		270	180	90		270	540	30	15
8	Govt.	210	72		282	210	72		282	564	35	12
	Non-Govt.	210	90		300	210	90		300	600	35	15
9	Govt.	360	90	250	700	360	90		450	1150	60	15
	Non-Govt.	360	120	250	730	360	120		480	1210	60	20
10	Govt.	360	90		450	540	135	250	925	1375	60	15
	Non-Govt.	360	120		480	540	180	250	970	1450	60	20

Source: Government of Bangladesh, Ministry of Education (1996)

Table 2. Secondary school enrollment among FSSAP schools

	Class 6	Class 7	Class 8	Class 9	Class 10	Class 6	Class 7	Class 8	Class 9	Class 10
Year	**Male**					**Female**				
A. Actual enrollment										
1994	128,030	102,852	89,025	76,225	69,499	124,199	87,280	74,243	55,981	44,685
1995	136,171	114,466	97,846	84,045	64,353	119,925	116,318	82,842	61,770	50,419
1996	136,034	121,821	101,793	84,788	80,334	123,719	112,314	105,879	65,026	62,466
1997	139,265	115,514	104,550	90,386	73,700	132,247	115,690	104,062	101,865	60,341
1998	140,737	117,405	98,601	91,254	74,315	152,348	128,525	108,590	104,407	90,250
B. Indexed enrollment (class 6=100)										
1994	100	80	70	60	54	100	70	60	45	36
1995	100	84	72	62	47	100	97	69	52	42
1996	100	90	75	62	59	100	91	86	53	50
1997	100	83	75	65	53	100	87	79	77	46
1998	100	83	70	65	53	100	84	71	69	59

Note: Total number of schools=2,764
Source: FSSAP-MIS

Table 3. Nationwide secondary enrollment (thousands) and its growth rate (percentage)

Year	Boys		Girls		Total		Girls share	Rural enroll-ment	Urban enroll-ment
	Enroll-ment	Growth rate	Enroll-ment	Growth rate	Enroll-ment	Growth rate			
1961	367	--	166	--	533	--	31.14	n/a	n/a
1970	1205	14.12*	255	4.89*	1460	11.85*	17.47	n/a	n/a
1980	1778	3.97*	627	9.41*	2405	5.12*	26.07	n/a	n/a
1985	1866	0.97*	772	4.25*	2638	1.87*	29.26	n/a	n/a
1986	1941	4.02	804	4.15	2745	4.06	29.29	n/a	n/a
1987	2053	5.77	909	13.06	2962	7.91	30.69	n/a	n/a
1988	2130	3.75	1014	11.55	3144	6.14	32.25	2192	952
1989	2293	7.65	1124	10.85	3417	8.68	32.89	2426	991
1990	2345	2.27	1180	4.98	3525	3.16	33.48	2506	1021
1991	2297	-2.05	1365	15.68	3662	3.89	37.27	2586	1076
1992	2480	7.97	1529	12.01	4009	9.48	38.14	2772	1237
1993	3017	21.65	1656	8.31	4673	16.56	35.44	3381	1293
1994	3008	-0.30	1876	13.29	4884	4.52	38.41	3485	1399
1995	3204	6.52	2327	24.04	5531	13.25	42.07	3970	1561
1996	3277	2.28	2511	7.91	5788	4.65	43.38	4182	1606
1997	3239	-1.16	2718	8.24	5957	2.92	45.63	4325	1632

*: annual average
Source: Statistical Yearbook 1998

Table 4: Summary statistics of outcome variables from household survey data

Dependent variables	1991/92		1998/99	
	Mean	No. of obs.	Mean	No. of obs.
Boys' current enrollment (age 5-18)	0.516 (0.500)	1588	0.624 (0.485)	2039
Girls' current enrollment (age 5-18)	0.464 (0.499)	1378	0.652 (0.477)	1917
Boys' years of schooling (age 5-18)	1.911 (2.630)	1588	2.764 (2.947)	2039
Girls' years of schooling (age 5-18)	1.702 (2.602)	1378	2.816 (2.953)	1917
Boys' current enrollment (age 11-18)	0.471 (0.499)	765	0.579 (0.494)	1204
Girls' current enrollment (age 11-18)	0.441 (0.497)	636	0.599 (0.490)	1050
Boys' years of schooling (age 11-18)	3.184 (3.042)	765	4.127 (3.051)	1204
Girls' years of schooling (age 11-18)	3.010 (3.125)	636	4.411 (2.973)	1050
Boys' primary-to-secondary transition (age 11-18)	0.275 (0.447)	765	0.398 (0.490)	1204
Girls' primary-to-secondary transition (age 11-18)	0.271 (0.445)	636	0.446 (0.497)	1050
Boys' secondary level completion rate (age 11-18)	0.017 (0.131)	765	0.029 (0.167)	1204
Girls' secondary level completion rate (age 11-18)	0.029 (0.169)	636	0.023 (0.150)	1050

Note: Figures in parentheses are standard deviations.
Source: BIDS-World Bank household surveys, 1991/92 and 1998/99

Table 5: Summary statistics of independent variables from household survey data

Independent variables	Mean
Stipend duration (years)	2.658 (2.193)
Age (years)	14.174 (2.268)
Gender (boy=1, girl=0)	0.554 (0.497)
Education of household head (years)	3.514 (3.931)
Gender of household head (Male=1, Female=0)	0.930 (0.256)
Age of household head (years)	48.209 (11.317)
Household land assets (decimals)	174.061 (414.466)
If village has electricity	0.657 (0.475)
Percentage of village land that is irrigated	0.469 (0.353)
If village is accessed by road	0.788 (0.409)
Village daily adult male wage (taka)	38.807 (18.161)
Village daily adult female wage (taka)	21.748 (12.319)
Number of observations	2,446

Note: Figures in parentheses are standard deviations.
Source: BIDS-World Bank household surveys, 1991/92 and 1998/99

Table 6: Impacts of stipend program duration on current enrollment rate

	Logit		Village FE Logit: Model 1		Village FE Logit: Model 2		Village FE Logit: Model 3	
	Age 11-18		Age 11-18		Age 13-18		Age 11-18	
	Boys	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
Stipend duration (years)	-0.055 (-0.52)	0.056 (0.44)	0.139 (0.80)	0.557 (2.36)	0.152 (0.75)	0.808 (2.77)	-	-
Stipend duration*log of age (years)	-	-	-	-	-	-	0.057 (0.89)	0.209 (2.36)
Age (years)	-1.555 (-4.29)	0.097 (0.22)	-1.522 (-4.02)	-0.024 (-0.05)	-1.969 (-2.45)	-1.237 (-1.15)	-1.466 (-3.84)	-0.099 (-0.20)
Age squared	0.039 (3.16)	-0.02 (-1.36)	0.037 (2.88)	-0.019 (-1.14)	0.051 (1.98)	0.019 (0.55)	0.037 (2.84)	-0.018 (-1.07)
Education of household head (years)	0.137 (7.91)	0.165 (7.97)	0.124 (6.60)	0.172 (6.97)	0.134 (6.51)	0.183 (6.56)	0.124 (6.63)	0.172 (6.97)
Gender of household head (1=male, 0=female)	0.075 (0.38)	0.639 (2.47)	0.006 (0.03)	0.590 (2.01)	0.075 (0.30)	0.552 (1.57)	0.004 (0.02)	0.586 (2.00)
Age of household head (years)	-0.001 (-0.18)	0.004 (0.73)	-0.002 (-0.35)	0.002 (0.28)	0.004 (0.65)	0.002 (0.28)	-0.002 (-0.33)	0.002 (0.26)
Log of household land-holdings (decimals)	0.242 (6.58)	0.115 (2.67)	0.269 (6.54)	0.202 (3.98)	0.238 (4.99)	0.252 (4.22)	0.270 (6.55)	0.203 (3.99)
If village has electricity	-0.554 (-3.95)	-0.866 (-5.01)	-0.633 (-3.87)	-1.198 (-5.49)	-0.240 (-1.28)	-0.603 (-2.28)	-0.646 (-3.96)	-1.188 (-5.42)
If village is accessed by road whole year	0.487 (2.14)	1.002 (3.67)	0.735 (2.61)	1.216 (3.40)	0.804 (2.42)	0.892 (2.17)	0.718 (2.54)	1.199 (3.35)
Log of village male wage (taka)	0.062 (0.68)	0.231 (2.18)	-0.016 (-0.16)	0.183 (1.32)	-0.141 (-1.12)	0.189 (1.12)	-0.015 (-0.15)	0.193 (1.39)
Log of village female wage (taka)	0.270 (2.88)	0.109 (1.07)	0.293 (2.58)	0.164 (1.19)	0.359 (2.67)	0.273 (1.59)	0.292 (2.58)	0.165 (1.19)
Log likelihood	-1011.23	-732.99	-806.37	-497.77	-572.94	-330.10	-805.51	-497.32
Number of observations	1,967	1,682	1,967	1,677	1,386	1,180	1,967	1,677

Note: Figures in parentheses are t-statistics.

Source: BIDS-World Bank household surveys, 1991/92 and 1998/99

Table 7. School-level fixed-effects impacts of stipend duration on grade-specific enrollment (class six to ten)

Independent variables	Model 1		Model 2	
	Female	**Male**	**Female**	**Male**
Stipend duration (years)	0.083 (44.249)	-0.289 (-10.035)	0.029 (6.492)	-0.390 (-10.882)
Expected future stipend duration (years)	0.034 (4.278)		0.032 (2.554)	
Stipend duration squared			0.012 (13.420)	0.089 (4.722)
Expected future stipend duration squared			0.006 (5.371)	
Adjusted R-squared	0.084	0.067	0.084	0.096
Mean and std. deviation of enrollment	34.102 (34.621)	42.318 (30.124)		
Total number of observations	89,861	79,559	89,861	79,559

Note: In addition above variables, the regressions include these explanatory variables: year and its square, class and its square, whether the school has tube well, drinking water, and latrine.

Source: FSSAP-MIS data

Table 8: Impacts of stipend duration and its interactions with household landholding on current enrollment rate (Village FE Logit)

Independent variables	Boys	Girls
Stipend duration (years)	0.138 (0.73)	0.297 (1.17)
Stipend duration * log of household landholdings (decimal)	0.0003 (0.02)	0.055 (2.71)
Age	-1.522 (-4.01)	-0.096 (-0.20)
Age squared	0.037 (2.88)	-0.016 (-1.00)
Education of household head (years)	0.124 (6.60)	0.171 (6.90)
Gender of household head (1=male, 0=female)	0.006 (0.03)	0.590 (2.01)
Age of household head (years)	-0.002 (-0.35)	0.002 (0.26)
Log of household land-holdings (decimals)	0.268 (4.58)	0.066 (0.93)
If village has electricity	-0.633 (-3.87)	-1.210 (-5.52)
If village is accessed by road whole year	0.735 (2.61)	1.207 (3.36)
Log of village male wage (taka)	-0.016 (-0.16)	0.200 (1.44)
Log of village female wage (taka)	0.292 (2.52)	0.156 (1.13)
Log likelihood	-806.365	-494.08
Number of observations	1,967	1,677

Notes: 1. Figures in parentheses are t-statistics.
Source: BIDS-World Bank Household Survey data, 1991/92 and 1998/99.

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