RECOUP
RESEARCH CONSORTIUM ON
EDUCATIONAL OUTCOMES & POVERTY

RECOUP Working Paper 3

Female Autonomy and Gender Gaps in Education in Pakistan

Monazza Aslam
University of Oxford

June 2007

DFID Department for International Development

UNIVERSITY OF CAMBRIDGE

RECOUP Working Paper No. 3

Female Autonomy and Gender Gaps in Education in Pakistan

Monazza Aslam

University of Oxford

Abstract

In this study we examine whether gender bias in education depends on the extent of female decision-making power. Household headship is used as a measure of female autonomy, with different types of households theorized to reflect varying degrees of female autonomy. Most female-headed-households in Pakistan are formed either because women are widowed or because husbands migrate. Women in male-headed- households are hypothesized to have least autonomy followed by married women heads whose migrant husbands may retain some decision-making power. Widow heads are hypothesized to have the greatest degree of autonomy among women in different households. The econometric findings suggest that married women heads gender-discriminate as much as male heads but that widow-heads have significantly lower bias against girls in enrolment decisions than male heads. The results also suggest that educated female heads gender differentiate less than both uneducated female heads and than male heads. The evidence suggests that households having better educated women with more independent status discriminate against the education of their daughters less than other households.

Correspondence: Department of Economics, University of Oxford, Manor Road, Oxford, OX1 3UQ, United Kingdom, Telephone: +44-1865-271089.
Email: monazza.aslam@economics.ox.ac.uk

JEL Classification: I21, J12, J16.

Keywords: female headship, autonomy, child education, Pakistan.

Acknowledgements: I would like to thank Geeta Kingdon for the ideas, discussions, comments and suggestions that resulted in this paper. This paper has also substantially benefitted from comments by Harold Alderman, John Knight, Francis Teal, Steve Bond, Christopher Adam, Marcel Fafchamps, Mohammed Niaz Asadullah and Maria-Ana Lugo. I would also like to thank participants of the CSAE Lunchtime Seminar and Gorman Student Workshop, University of Oxford. My thanks also to participants at the IAFFE 2004 conference. Any errors are mine.

1. Introduction

Women are the main caretakers of children in South Asia yet, as is well known, their decision-making power and autonomy in the household is often lower than that of men. Past studies indicate that increasing women's status within households directs greater resources towards children and results in the latter's improved health and education outcomes (Haddad and Hoddinott, 1995; Haddad, Hoddinott and Alderman, 1997; Bruce and Lloyd, 1997; Durrant and Sathar, 2000; and Smith and Byron, 2005, among others). It is less clear whether improving women's status within households has a *differential* impact on boys and girls' education outcomes. Exploring this avenue is important since it could be that lower female autonomy is self-perpetuating because of poorer investments in girls' education than boys'. This issue is especially pressing in Pakistan which suffers from both very low levels of female autonomy and entrenched large gender gaps in education. This study investigates whether women in different types of households, where they are likely to have varying degrees of decision-making-power, have lower pro-male education biases than male headed households, where women are presumed to have the least degree of autonomy. In other words, the paper asks whether women are the 'fairer sex', i.e. less inclined towards differential treatment of sons and daughters compared to men.

The study uses 'self-reported' headship as a measure of women's status or autonomy in the household. Different types of households are hypothesised to reflect varying degrees of female autonomy. Female autonomy may differ depending on headship type because of the way in which headship forms. In the South Asian context, the main processes through which households become 'female-headed' are: divorce, desertion, widowhood, out-migration, disablement and (the very unlikely) choice of not marrying (Lewis, 1993, pp. 24). If male 'presence' reduces female autonomy, one can hypothesise that widowed women-heads may have greater autonomy in decision-making and implementing child-oriented expenditures as compared to wives of migrants whose migrant husbands may continue to be involved in long-term household decisions. Women heads in both types of female-headed households (FHH), however, may be more empowered as compared to those residing in male-headed households (MHH).

Clearly, like other measures of female empowerment (discussed in Section 1.2), self-reported headship is problematic. For example, a woman may be a 'token' head due to her age (for instance a household headed by a widow) but the decision-making power may rest with a male. However, it is difficult to disentangle pure autonomy and agency of a woman to implement her say in decision-making from confounding effects using *any* measure of

autonomy. Moreover, the empirical usability of different measures differs across country-settings and data availability. With these considerations and caveats, the self-reported headship measure is used because of ready availability and because it serves as a proxy, albeit imperfect, of female autonomy in Pakistan. However, we note that the effect of 'headship' (attempting to capture female autonomy), will be confounded by other factors such as income shocks and time allocation effects that are the consequence of the formation of FHHs (Chen, 2004) and one must be wary of interpreting the effects of female headship on child education as arising purely due to differences in female autonomy in different households.

Our research contributes to the sparse literature on female autonomy and education outcomes in various ways. Firstly, to our knowledge, there is no study in Pakistan analysing the effect of household type on child schooling. Household headship may have significant implications for educational outcomes and education expenditure allocations in general, and for gender gaps in these in particular. Secondly, we treat FHH as a heterogeneous group since varied domestic circumstances generate different types of FHHs. While a number of studies in Africa and Jamaica recognise the importance of heterogeneity in headship, we are aware of only two studies in Asia – Joshi (2004) in Bangladesh and Chen (2004) in Indonesia – that deal with this issue. As the resulting circumstances in which allocation decisions are made critically depend on how the FHH was formed, an informed analysis should ideally consider heterogeneity in headship. The resulting circumstances in which allocation decisions are made critically depend on how the FHH was formed. In our sample of women reporting headship in the Pakistan Integrated Household Survey (2002), widows and women whose husbands have migrated constitute the largest percentage – 59 per cent females heading households are currently married and 39 per cent are widows. Children belonging to these two different types of FHH are said to belong to Female Currently married Women Headed Households (FCHH) and Female Widow Headed Households (FWHH), respectively.

A third contribution of this study is that it overcomes a limitation of most previous analyses which treat female headship as exogenous. Unobserved factors determining household type may also be correlated with child education decisions, generating heterogeneity bias. A household fixed effects model helps control for family level unobservables and allows for *within* household analysis. Finally, while many previous analyses of household expenditure allocation between boys and girls have been constrained to use *total household* (rather than individual-level) education expenditure, Aslam and Kingdon (2007) note that aggregation of data at the household level mutes the true extent of gender bias within the household. The availability of unique, individual-level education expenditure data allows us to overcome this constraint.

Our findings suggest that married women heads gender-discriminate as much as male heads but that widow-heads have significantly lower bias against girls in enrolment decisions

than male heads. The results also suggest that educated female heads have a preference for lower gender discrimination than both uneducated female heads and than male heads. The point estimates are very indicative of lower gender bias in FWHH than in MHH. However, we are cautious in interpreting this as a causal 'autonomy' effect. Time allocation effects and income shocks may affect children in FWHH differently compared to FHH and MHH and these could be partially driving the results.

This study unfolds as follows. Section 2 provides a background of headship issues and child schooling decisions. Section 3 discusses empirical modelling and possible conceptual limitations while section 4 discusses the data and the descriptive statistics. The results are discussed in Section 5 and Section 6 summarises and concludes.

2. Female 'Empowerment' and Implications for Child Education

'Empowerment' is the ability to make and implement choices and is likely to be affected by increased control over material, social and human resources such as earnings, assets, education and social capital (Kabeer, 1999; Quisumbing and Maluccio, 2003; and Smith and Byron, 2005 among others). This happens through internal and external household dynamics, including customs and norms regarding marriage, kinship ties and factors such as the age and education difference between spouses (Smith and Byron, 2005; World Bank, 2005) and shocks such as migration, death, divorce or desertion (Handa, 1996a and 1996b; Joshi, 2004; and Chen 2004).

In past studies, women's autonomy or decision-making power has been variously measured as their education level; the difference in education between husband and wife (Hill and King, 1993; Strauss and Thomas, 1995; Haddad *et al.*, 1997; and Glewwe, 1999; Smith and Byron, 2005); their employment and earning shares in household income (Haddad and Hoddinott, 1995; Maitra and Ray, 2001; Lancaster, Maitra and Ray, 2003); and self-reported headship or classifying households as men-only/women-only households (Handa, 1996a; Appleton, Chessa and Hoddinott, 1999; Joshi, 2004; Edlund and Rahman, 2004 and Chen 2004). When available, direct measures of 'status' such as mobility, decision-making ability etc. have been used (Durrant and Sathar, 2000). The evidence from a majority of these studies suggests that improving female autonomy (howsoever defined) improves infant and child survival, increases child schooling and results in increased expenditure on child education and health. The evidence on whether increased female autonomy translates into less discrimination against girls (in terms of health and education outcomes) is mixed. Research in Cote d'Ivoire (Haddad and Hoddinott 1995), Uganda (Appleton *et al* 1999) and India (Lancaster *et al* 2003) suggests that women are not any less discriminatory towards girls than

boys. However, a study in Indonesia (Chen 2004) finds that the largest reductions in gender gaps in education occur through improving mother's bargaining power within households.

We are aware of two recent studies that explore whether increasing women's power would bring about a decrease in differential treatment against girls in Pakistani households. Durrant and Sathar (2000) use individual and community-level measures of female autonomy (individual-level measures include: *purdah,* measures of her mobility, fear of disagreeing with husband, domestic violence and access to financial resources; Community-level variables include community-mobility index, the percentage of women in the community working outside the home etc.) from the Pakistan Status of Women and Fertility Survey conducted in rural Punjab (1993-1994). The findings show that improving women's status at the individual level enhances child survival and boys' school attendance while community-level empowerment variables are more important for improving the schooling chances of girls in rural Punjab. It appears that social values and acceptance of women's status in a community are crucial determinants of gender gaps in schooling attendance in Pakistan. Another recent study by Smith and Bryon (2005) explores whether increasing women's power within households reduces discrimination in health outcomes (child's height-for-age Z score) against girls in Bangladesh, India, Nepal and Pakistan. The authors use comparable Demographic and Health Surveys (Pakistan data set from 1991). Women's decision making power is measured using four indicators: whether the woman works for cash income, her age at first marriage, the percent difference in the woman's and her husband's age and the difference in the woman's and her husband's years of education. The authors conclude that for South Asia as a whole, improving women's autonomy is effective in reducing gender discrimination against girls. Specifically, in Pakistan, there is convincing evidence that increasing women's power benefits girls more than boys.

As mentioned before, no study in Pakistan uses 'female headship' as a measure of female autonomy. One of the reasons is obviously the low incidence of female headship in Pakistan. However, there are reasons to believe that 'reported' headship, as opposed to any other measure of autonomy, may serve the purpose best in this study. Firstly, strong norms of patriarchy and *purdah* and one of the lowest female labour force participation rates among South Asian countries, severely limits women's income generation in Pakistan. For example, among all households in our sample, only about 1 per cent are 'female-headed' if defined using headship to mean the main economic earner of the family[1]. Secondly, even if a woman were the main economic earner in a MHH, a male (husband, father, son, brother etc.) may control her earnings. Thirdly, even among women who never married, are divorced, abandoned or widowed or whose husbands have migrated, a large proportion are absorbed

[1] As an experiment, we defined 'economic heads' as individuals generating maximum yearly cash earnings for the household. In 14878 MHH, only 188 households reveal female 'economic heads'.

into male-headed households since women living without the '*saya'* (shadow) of fathers, fathers-in-law, brothers etc. are ostracised in society. Consequently, women who *report* headship are clearly those not re-absorbed into male-headed households and presumably have some element of control, authority and decision-making power. Finally, no single measure of 'autonomy' is perfect and applicability differs across country settings and data-availability. For example, women's education may have a direct impact on child schooling through home-teaching, for example (see Behrman, Foster, Rosensweig and Vashishtha, 1999), and including it as a measure of status or autonomy may confound findings. Morover, measures such as 'difference in spousal age' or 'difference in spousal education' (as used in Smith and Bryon, 2005), if used in the PIHS (2002) would result in a loss of information about widows and migrant-wives as we do not have data on spouse's characteristics for these groups of women.

Headship is a powerful measure of female autonomy as the woman-head's control over resources, bargaining power, decision-making and authority may differ significantly depending on whether she is a *de jure* head (male is permanently absent) or a *de facto* head (male is temporarily absent) of the household[2]. In all cases, female headship may be synonymous with greater female autonomy for several reasons. It could be that women in female headed households are more economically active as compared to wives of male-heads in MHH[3], possibly yielding greater control over income. Women in FCHH and FWHH may have a relatively larger control of income from the total income pool (from earnings, remittances or other sources) as compared to women with male partners residing with them. Female-heads could be more able to implement their preferences (for greater child education for example) in the absence of a male. Along the spectrum of headship, we hypothesise that spouses of male heads will have the *least* bargaining power and control, followed by wives of migrants (whose husbands may exert some influence on how resources are spent) with maximum control and authority resting with female widowed-heads. Moreover, women heads

[2] Chant (1997, pp. 5) notes that a woman-headed household is "…a unit where an adult woman…resides without a male partner." while a male-headed household often represents a "…intact couple…" *De jure and de facto* heads are defined by Chant (1997, pp. 15) as: "... *de jure* female-headed unit…denote households where women live without a male partner on a more or less permanent basis and receive no economic support from one…This category would include single mothers, divorced and separated women and widows. *De Facto* female heads, on the other hand, …[are] women whose partners are absent due to labour migration, but who have ongoing contact, normally accompanied by the sending home of remittances. Women in this situation are thus heads of household on a temporary basis."

[3] This does not seem to be the case in Pakistan. In our sample, 24 per cent of female heads (widowed and married) work and the same fraction of wives of heads work in houses headed by males. A slightly larger proportion of widow heads report themselves to be working (28 per cent) as compared to female heads who are currently married (21 per cent).

may also target resources towards girls more than boys in a bid to equalise resource allocations.

3. Econometric Strategy

One factor explaining the lack of consensus on the consequences of headship on gender gaps in education is that female headship is potentially endogenous in child schooling and educational expenditure models. Since household type and child schooling may be jointly determined by unobserved factors, treating FHH as exogenous generates confusion whether the relationship between headship and schooling investment is causal or correlational. Furthermore, as female headship "…depends upon the characteristics of the marriage market, as well as the processes that lead to marital dissolution"[4], it should be treated as endogenously determined. Within a marriage framework, in cooperative bargaining models (McElroy, 1990 and McElroy and Horney, 1981), the individual's choice to remain married depends on the outside options available to them. "This…'threat point' is a function of individual characteristics, especially nonlabor income and education and social or institutional factors that affect the attractiveness of being married. It is possible that some of the female heads of households who are divorced or separated had better exit options because they had resources to live independently."[5]

The relevance of these ideas to Pakistan - and to the two types of female headship defined in our study - varies. Arguably, social norms prescribing the importance of male presence in a household and the rarity of divorce imply that female-headed households are formed mostly for exogenous reasons such as death of the husband. Female headship due to death of husband (widowhood) may be exogenous but female headship due to migration is clearly not. Also, current widowhood may not be entirely exogenous as a widowed woman may choose not to remarry because she prefers not to have a male intervene in her preferences. Male migration could also be jointly determined with child educational outcomes or expenditure allocations: fathers with greater preference for child education may migrate to ensure higher incomes for better child education. Therefore, FWHH (Female Widow Headed Households) and FCHH (Female Currently married woman Headed Households) may be endogenously chosen states.

In Section 5, we will estimate pooled models of current enrolment on the full sample of children in all household types and include FCHH and FWHH dummies as independent regressors. In another approach, we split the sample of children into those belonging to the different household types. Simple linear probability model and probit techniques are used to

[4] Quisumbing *et al.* (2001), pp. 261.
[5] Quisumbing *et al.* (2001), pp. 261.

model the current enrolment decision (CUR_ENROL), whether the household spends *anything* on a child's education (ANYEDEXP) and *how* much is spent conditional on spending a positive amount (LNTOTAL_EDU). In what follows, we discuss the anticipated problems and the solutions given possible endogeneity of FHH.

Suppose we wish to estimate the current enrolment decision on a pooled sample of children aged 5-14:

$$CUR\_ENROL_{ij} = \alpha_o + \alpha_1 \mathbf{X_j} + \beta_1 FCHH_j + \beta_2 FWHH_j + \mu \quad (1)$$

where CUR_ENROL is a binary variable equalling 1 if child is currently enrolled in school and 0 otherwise, **X** is a vector of independent variables believed to determine current enrolment and FCHH and FWHH are the household type dummies capturing the two types of FHH (with the base category being MHH – Male Headed Households). μ is composed of an unobserved household level error term (μ_j) and ε_{ij}, assumed to be an i.i.d error term. For simplicity, suppose we believe only FWHH to be endogenously determined. As stated above, a more independent-minded widow may chose not to re-marry because she prefers to implement her preferences without male interference. In this setting, the formation of a FWHH may occur as:

$$FWHH_j = \gamma_0 + \gamma_1 \mathbf{Z_j} + \eta_j \quad (2)$$

Where FWHH =1 if the household is widow-headed and 0 otherwise, **Z** captures all observed variables believed to directly affect the formation of a FWHH (such as age at marriage, age-gap between husband and wife, conditions in the marriage market at time of marriage etc.) and η captures all *unobservables* (such as attitudes and preferences). However, this unobservable is also captured in μ_j in the main equation of interest – a more motivated head is also more likely to educate her children. A more independent-minded head may also educate daughters equally to sons, which directly affects gender gaps in the household. In this instance, an unobservable determining female-headship is also likely to determine child schooling outcomes This generates a correlation: $corr(FWHH_j,\mu_j) \neq 0$ in (1) which engenders endogeneity in (1). This results in biased and inconsistent parameter estimates of all included regressors. Specifically, β_2 will be biased upwards as $corr(FWHH_j,\mu_j) > 0$ i.e. if more independent-minded women head FWHH and are also more likely to enrol children. Instrumental variables technique offers one solution to dealing with the endogeneity of household type. As always, with cross-sectional data it is difficult to find suitably valid

instruments- variables which determine household type but are not correlated with the error term in the schooling outcome and educational expenditure equations[6].

However, another constraint remains in estimating (1). By estimating models on all household types together, we impose the restriction that the vector of coefficients, except the intercept term, is identical across households. This constraint can be relaxed by analysing current enrolment decisions on sub-samples of children belonging to various household types – MHH, FCHH and FWHH. However, this introduces sample selectivity problems. For example, the subset of FWHH and FCHH may not be randomly drawn from the population and estimates, to be consistent, must account for this problem. This entails finding suitable 'exclusion restrictions' – variables directly affecting selection into one type of household while not affecting school enrolment and expenditure decisions. As in finding instruments for endogenous household types, this is the key econometric problem faced by researchers. Household fixed effects offer a solution to the problem of endogenous selection. The introduction of household fixed effects controls for all unobservable household characteristics which may be correlated with household type, i.e. with FCHH and FWHH. This also permits identification of the gender gap in schooling and expenditure allocation *within* the household. Chen (2004) utilises this approach in her decomposition of differential treatment between boys and girls *within* households in Indonesia. One drawback of this approach is the substantially reduced sample size which results from restricting the data to a subset of those households with at least one male and one female child of school-going age in a given age range. However, the advantage of the approach is that it permits identification of gender gaps in schooling and educational expenditure allocations *within* households.

4. Data, Samples and Descriptive Statistics

This study uses the Pakistan Integrated Household Survey (PIHS 2002), the latest nationally representative household dataset covering more than 16000 households from

[6] Handa (1996b) uses the following instruments for household headship: 1) level of remittances received by the household, 2) whether the oldest person in the household is male, 3) whether the person with the highest education in the household is male and 4) whether the household has no adult males. The plausibility of the instruments used can be questioned. For instance, arguing that the level of remittances does not affect household consumption (including education) other than through its effect on headship type seems implausible. Joshi (2004) also instruments for the two types of FHH (married women headed and widow-headed households) using four instruments: 1) A dummy variable measuring whether head's maternal grandfather was alive at the time of her marriage, 2) average level of rainfall when child's mother was aged between 11-15, 3) the fraction of the village with siblings resident outside the country or in the main city, Dhaka and 4) the fraction of the village with siblings resident in any other *thana* of Bangladesh other than Dhaka or abroad. Although her set of instruments is more plausible, such detailed data on pre-marriage circumstances of children's mothers is not available to us.

Pakistan. To analyse the issue at hand, we constructed various sub-samples, all with households having at least one child aged 5-24[7]. This yielded a total of 55669 children aged 5-24 in all (16,195) households headed by 16,195 household heads. There are 51, 637 children in MHH (14878 male heads) and 4032 children in FHH (1317 female heads). When the FHH group is broken up into its two sub-types (widow-headed and currently married women headed households), there are 2567 children in the FCHH sample (780 married women heads) and 1434 children in the FWHH (509 widowed heads) sample (See Table 1 for details). Depending on the analysis, these samples were further split by age-group (with children belonging to age-groups 5-14 and 15-24). The sample sizes are further reduced in fixed effects estimation.

Household Types: Incidence of Female Headship in Pakistan

The proportion of FHH in Pakistan is relatively low. According to the Pakistan Integrated Household Survey, roughly 7.5 per cent households were headed by women in 1998. This figure increased to 8.13 per cent according to PIHS (2002). Corresponding headship figures in Bangladesh in 1996 were 15.2 per cent.

Female headship in Pakistan typically pertains to 'male-absence' (either due to death, migration or debilitation due to illness) rather than assertion of female autonomy in establishing an independent household. Table 2 shows the *causes* of female headship in Pakistan. Clearly, female-headship is largely driven by marital status and the absence/presence of the male partner in the household. Among FHH, the largest proportion constitutes 'currently married' women (59 per cent of the sample) followed by widowed women heading households after their husband's death (39 per cent).

Given male-dominance in Pakistan, the category of 'currently married women' heading own households is puzzling. This sample of married-woman-headed households constitutes wives of migrant males. When building the household roster in the PIHS, the enumerators include members who 'usually live and eat here' in the household. 'Persons who are working in another city/town or village and are usually residing there, visiting their family occasionally' are to be excluded from the household roster[8]. In the roster, all members are provided a unique identification code, with the head of the household listed first and coded as 1. Observationally, there are households with the female denoted as 'currently married', coded 1 and with no observations recorded for the male partner of this female. The characteristics and activities of these male partners of 'female heads' are missing in the PIHS

[7] We excluded households without any children of school-going age so as to exclude the possibility that a household reports no educational expenditure because it doesn't have a child of school-going age.
[8] Pakistan Integrated Household Survey, Enumerator's Manual of Instructions, Round 4 (2001-2002), pp 3-4.

(2002) and there is no way of identifying these females as truly wives of migrants. However, we can turn to remittance information which is available (at the household-level) in the PIHS 2002, and make some informed decisions about the migration status of these households. Table 3 illustrates remittances information by headship and marital status. In Table 3 almost 18 per cent (2874/16195) of all households in the sample report receiving some remittance, either from within Pakistan (73 per cent) or from abroad (27 per cent). Of the 780 married women headed households, 735 (or 94 per cent) received remittances. Arguably, an overwhelming majority of married women reportedly heading households have a migrant husband supporting them financially. For MHH and FWHH remittances constitute relatively small proportions of total income (at 7 per cent and 32 per cent respectively) but for FCHH almost 87 per cent of total income takes the form of remittance receipts[9]. However, this is a rough approximation and it can only suggest that currently married females are *most likely* wives of migrants[10].

Migration, both within the country and abroad, is fairly common in Pakistan. According to the 1998 Census, 8 per cent of the population in the country (about 10 million individuals) constituted internal or international migrants. Migration abroad, especially to the Middle East, also boomed in the 1980s, constituting mostly uneducated individuals from rural areas whose remittances home apparently had a direct impact on rural poverty. However, migration within Pakistan is also a dominant feature and urban areas account for two-thirds of all in-migrants, according to the 1998 Census (Gazdar, 2003).

Tables 4a and 4b show the frequency of headship among widowed and currently married women in Pakistan. In a majority of the cases, upon death of the patriarch, adult sons tend to assume headship (65.7 per cent)[11] and in only 17.5 per cent of the cases do widowed women assume headship. A very small proportion of married women acquire headship status

[9] We generated a variable which determines what *proportion* of total income (which includes wage and salary earnings, inheritance, remittances etc.) is constituted of remittances.

[10] As another test, we matched female heads with spouses (780 households). We find that all currently married FHH receiving remittances (735/735) do not have a spouse residing in that abode suggesting that he is alive but has migrated (this is denoted by a missing value for 'spouse' but is coupled with 'currently married' in the marital status variable). This still leaves 45 households (about 6 per cent of the sample of currently married women) who do not report remittances, unaccounted for. Thirty seven such households do not report remittances and the spouse is not present (possibly abandoned women or whose husbands have migrated and are not regular remitters) and 8 of the households are ones where the male spouse is reported present but the declared head is the female. These 8 households are possibly ones where the male is debilitated due to illness. We group all 780 households into the FCHH category.

[11] Edlund and Rahman (2004) describe such households as 'middle-generation' households – where the headship status passes on to the adult male son (father of the child) rather than the grandmother of the child. This household type is compared to the 'two generation' household (nuclear families) housing just the parents of the child under consideration (with father as head) and 'three generation' families with the grandparent/s, father and children residing in a single abode and headship allocated to the grandfather.

(3.7 per cent according to Table 6.4) and, as expected, the largest proportion (68.4 per cent) of currently married women are the spouses of male heads.

Household Types: Circumstances and Profile

Table 5 describes all the variables used in the models while Table 6 shows the demographic and socio-economic differences between MHH, FCHH and FWHH in Pakistan. In Table 6, household heads in FCHH are the youngest (36.9 years on average) and those in FWHH the oldest (54.5 years old). AGE_OLDEST corresponds to HAGE in FWHH implying that age is a determinant of headship in the latter household-type. One expects the demographic profile of FHH to be reflective of the disruption (death/migration) which generated them in the first instance. FCHH are expected to be younger, having a larger proportion of children and a smaller proportion of adults as compared to MHH and FWHH respectively and this appears to be the case. The fact that FHH are substantially smaller than MHH is consistent with the findings of other studies (Kennedy and Peters, 1994; Kennedy and Haddad, 1994; Handa, 1994 and Lanjouw and Ravallion, 1995).

The demographic features of a household are indicative of differences in the potential to earn, face credit constraints or be more prone to poverty. *A priori*, one expects FHH of both types to be substantially worse off in terms of assets, income and expenditure as compared to MHH as women generally have lower human capital and earning capacities in Pakistan. The data show that MHH have highest yearly income and FHH of both types have almost similar, lower, yearly incomes from all sources[12].

[12] The maximum earnings (MAX_EARN), the yearly earnings of the highest earner in the household, are lowest in FCHH (Rs. 7617) followed by FWHH (Rs. 27027) as compared to Rs. 45855 in MHH and the differences between FCHH and MHH and FWHH and MHH are also statistically significant. However, this variable is not a good measure of the true economic circumstances of the households. In FHH in general and in FCHH in particular, a very large proportion of the households do not report *any* positive earnings. Presumably, these households have an earning member who is not considered part of the household roster (migrant wives, for instance) and their main source of income is remittances. A more useful measure, therefore, is total household income (head and non-head income including earnings, gifts in cash and kind, inheritances, remittances, *zakat* etc.).

FCHH also have the lowest proportion of income-earners as they have the highest dependency ratio and lowest proportion of earning adults. However, per capita expenditure (total and on food) is significantly greater in FHH as compared to that in MHH – i.e. at least in terms of per capita expenditure, FHH are not poorer as compared to MHH (this corroborates evidence from rural India in Drèze and Srinivasan, 1997). That FWHH are not the poorest households in Pakistan is confirmed when we turn to measures capturing asset holdings of the various households. These findings suggest that although FCHH and FWHH have significantly lower total household incomes than MHH, they have similar or better asset-holdings, are at least equal if not better-off in housing conditions, and are certainly not worse off in terms of per capita consumption expenditures.

A large literature documents the lower resource base of widows in South Asia (Kumari, 1989 on India; Joshi, 2004 on Bangladesh) while a number of studies find that married women heads (often migrants' wives) have a stronger asset base compared to other household types (Kennedy and Peters, 1992). If FHH (particularly FCHH) have a higher dependency ratio than MHH and a lower proportion of income earners, why then do we observe findings contrary to other studies in Asia?

There are several explanations for these findings. Firstly, household income is affected by factors other than household demographics. For FCHH, higher per-capita expenditure coupled with a high dependency ratio reflects remittance income. Secondly, that FWHH are not the poorest among all household types could be due to selectivity: better-off widows may choose to remain independent heads of their own households rather than be subsumed back into households headed by fathers/brothers. Finally, FWHH may acquire headship in a joint family. The proportion of adults in FWHH reflects this and suggests that these widow-heads possibly reside with male income-earners (possibly children of the widow-head). For the purposes of this study, the finding that FHH are not poorer than MHH is important because we want to highlight whether schooling investments in children are the consequence of female autonomy (among other potential dynamics resulting from household formation) and prevent economic status from confounding the findings as much as possible. This finding, as well as our ability to control for household socio-economic status and to compute household fixed effects, allows us to convincingly argue that it is something other than socio-economic status driving the results in Section 5.

Finally, we take a descriptive look at the allocation of education expenditures in the various household types in Table 6. We divide total educational expenditures into direct (sum of all expenditures directly paid to schools including admissions and exam fees for all school-going children in the household) and indirect expenditures (sum of expenses on books, uniform, transport etc). FCHH spend the largest total amount (direct plus indirect expenditure) on all children's education followed by FWHH. The least amount is spent in

MHH. The greater expenditure by FCHH is partly attributable to the higher proportion of school-age children in this type of household. However, these proportions are equally large in MHH and corresponding expenditures are significantly less than in FCHH.

Educational Outcomes and Educational Expenditure by Gender

Tables 7a, 7b and 7c show current enrolment rates by household type, age-group, gender and region. There are two main findings in the full sample (urban and rural). Firstly, current enrolment rates for *both* genders are higher in both types of FHH than in MHH. This is true for all age-groups. Secondly, gender gaps in current enrolment in FCHH are also larger and significant (5-9, 10-14 and 15-19 age groups) compared to those in MHH, while gender gaps are the smallest in FWHH (5-9, 10-14 and 15-19 age groups) and they are statistically significant only in the 15-19 age group. Thus, descriptive statistics suggest that while children in FHH are *more likely* to be enrolled in school than those in MHH, married women heading households enrol boys more often than girls. Thus, from the first glance at raw data, women do seem to have a greater preference for children's schooling than men but they are not consistently more equitable than men, in terms of their allocation to boys and girls.

Tables 7b and 7c split the samples by region (urban and rural). Table 7b reveals that as before, the enrolment rates (for both genders) are higher in FHH. Moreover, while significant gender gaps exist in MHH, there appear to be no pro-male gaps in FHH. In fact, FWHH have a significant pro-female bias in the 10-14 age-group. Table 1.7c reveals large pro-male gender gaps in rural areas – while the behaviour of FCHH is almost identical to MHH, FWHH either appear not to differentiate significantly by gender (5-9 age group) and have the lowest pro-male bias in the 10-14 age-group compared to MHH and FCHH. In summary, having a female head in urban areas works in favour of girls as urban female heads have a reduced tendency for pro-male bias (in 10-14 age group in fact have a pro-female bias). However, a woman heading her own household and residing in rural areas is more prone to a pro-male bias especially if she is married.

The descriptive statistics presented in this sub-section reveal that there is fairly strong evidence of differential schooling outcomes of males and females in all age groups and that this differs depending on household type. Although there are pro-male biases in current enrolment decisions in both rural and urban areas, these are generally statistically significant only for MHH in urban areas and for MHH and FCHH in rural areas. Pro-male biases prevail in unconditional expenditure allocation even in urban areas for MHH (Tables 8a, 8b and 8c). Finally, MHH seem to have strong pro-male biases in expenditure allocation conditional on enrolment even in urban areas whereas such biases decidedly disappear for FCHH and FWHH in urban regions and remain only for FWHH in rural areas (Tables 9a, 9b and 9c).

From the descriptive statistics we conclude that much of the bias in educational expenditures in FHH manifests itself via significantly lower probability of girls' enrolment (in rural areas) rather than lower expenditures conditional on enrolment, while for MHH the bias prevails in both decisions – enrolment *and* expenditure allocation conditional on enrolment. These findings provoke the question: *why* do these differences prevail by household type? This is an empirical question and we turn to an empirical analysis in Section 5 to examine whether belonging to a household headed by a female works in favour of a child's education and whether girls are less discriminated against in FCHH and FWHH as compared to MHH.

5. Econometric Results

Children of school-going age are split into two age-groups: 5-14 and 15-24. These broad age categories are necessitated by small sample sizes. Nevertheless, 5-14 still refers to the 'basic education' age group, which comprises elementary education in Pakistan. Late entry into school, especially girls', and repetition and drop-out from school means many 13 and 14 year-olds are likely to be in primary school at these ages. And, as the results later reveal it is the 5-14 year-olds age group where most of the interesting findings emerge. The results are divided into two sections. In the first section we ask: *does the extent of the gender gap in current enrolment differ depending on household type?* and in the second: *within households of different types, does the extent of gender gap differ depending on whether the head is young, educated or rich?*

Household Type and Current Enrolment

In the first instance, we model the parental current enrolment decision. Equations are estimated for children aged 5-14 and 15-24 in a pooled sample initially, ignoring endogeneity of FCHH and FWHH. The pooled models (using probit and Linear Probability Models, LPM) are estimated with and without headship-type dummies[13]. Equations of the following form are estimated:

$$CUR\_ENROL_{ij} = \alpha_o + \alpha_1 \mathbf{X_j} + \beta_1 FCHH_j + \beta_2 FWHH_j + \mu_j + \varepsilon_{ij} \qquad (1)$$

where CUR_ENROL_{ij} equals 1 if child is currently enrolled in school and 0 otherwise for child *i* in household *j* and **X** is a vector of all individual and household-level variables thought to influence current enrolment decisions. FCHH and FWHH are, respectively, dummies taking the value 1 if child *i* belongs to a Female Currently married woman Headed Household

[13] Due to space constraints, regressions without household dummies are not reported.

(and 0 otherwise) or a Female Widow Headed Household (and 0 otherwise) with the omitted category being MHH. The key parameters of interest are β_1 and β_2, with positive values suggesting children in FCHH and FWHH have better current enrolment outcomes compared to children in MHH and negative signs denoting the converse.

In the literature, kinship ties are often used to exclude children who are not the offspring of the head. As a parent is closest kin, he/she is most likely to invest in a child's education as compared to, say, a grandparent (see Edlund and Rahman, 2004 and Edlund and Lagerlöf, 2002). Inability to identify the length of time a child has been resident in the family is another reason to exclude non-head's children. These are valid arguments. However, this study aims to identify the effect of headship (regardless of whether the head is a parent, a grandparent or an uncle/aunt) on child educational decisions and *all* children (of head and non-head) are included in the samples. Small sample sizes, particularly in FHH and in FWHH, constrain us from excluding non-head's children especially in fixed-effects estimation[14].

The dependent variable is binary (CUR_ENROL) and could be modelled using probit/logit models. However, we estimate LPMs because the computed marginal effects from the two models (probit versus LPM) are similar[15] and because LPM allows easier fixed-effects estimation. The vector **X** includes *individual level variables* such as the child's age and its square (AGE and AGE2) and the gender dummy (MALE, equals 1 if child is male and 0 otherwise), *household level variables* such as log of per capita expenditure (LNPCE) and its square (LNPCE2), a household dependency ratio (DEPEND_RATIO) equalling the ratio of number of children aged between 0-15 years to the number of adults aged 16 and above, and household head's education and occupation[16]. Just as headship (and thus age of household head) is an endogenous variable, occupation is also a chosen state and thus endogenous, based on preferences that may be correlated with child education decisions. As this study later utilises household fixed effects, the above issues are resolved in this analysis. Dummy variables (URBAN and SINDH, BALOCHISTAN, NWFP, NORTH, AJK and FATA etc.) capture any regional and provincial differences in schooling decisions with rural areas and PUNJAB as omitted categories. Finally, μ_j in (1) is assumed to be a household level

[14] As a robustness check, OFFSPRING (equals 1 if child is offspring of head and 0 otherwise) was included in the current enrolment equations estimated in Section 3.6. The coefficient was small and insignificant in all equations (pooled with headship dummies and in the sub-sample analyses of MHH, FHH, FCHH and FWHH).

[15] Probit results not reported due to space constraints.

[16] Head's education is split into dummy variables capturing the various levels of education in Pakistan - less than primary (none or less than 5 years), primary (5 years), middle (6-8 years) and matric (at least 10 years). Head's with more than matric (i.e. those with FA/FSC, Bachelors, Masters or higher degrees, are the excluded category. Similarly, head's occupation is categorised by whether they work in white collar jobs or service and trade-related occupations. Household heads in agriculture and elementary occupations (such as domestic helpers) are the excluded category.

unobservable while ε_{ij} is assumed to be an independently and identically distributed error term. All estimates are corrected for clustering on Population Sample Units (PSUs).

Table 10a illustrates some of the estimated pooled and sub-sample regressions[17]. The regression results in column (a) confirm our hypothesis that children in FHH have better schooling outcomes than those in MHH – a child aged 5-14 (15-24) in a FCHH and a FWHH is almost 12 (9) percentage points and 9 (7) percentage points more likely to be currently enrolled in school than a child in a MHH. In both instances the marginal effects of the dummy variables are significantly positive at the 1 per cent level. These findings are consistent with the descriptive statistics and although not directly comparable, are also consistent with Aslam and Kingdon's (2007) findings of a positive coefficient on female headship in expenditure equations. Also note that a male child aged 5-14 is almost 20 percentage points more likely to be enrolled while this value drops to 12 percentage points in the 15-24 age group.

The above analysis suffers from a number of drawbacks. Firstly, it ignores unobserved heterogeneity caused by μ_j in (1) and that the formation of FCHH and FWHH may not be exogenous. Secondly, pooling across all household types imposes the constraint that, except for the intercept term, the vector of all other coefficients is identical across household types. Splitting children aged 5-14 and 15-24 into various sub-samples – MHH, FHH and further into FCHH and FWHH – resolves the latter concern. However, the endogeneity of household types now becomes an analogous problem of sample selectivity.

Columns (c) onwards in Table 1.10a report sub-sample results. As the MALE coefficient reveals, there is significant pro-male bias in current enrolment. The magnitude of this bias differs depending on household type. In a MHH a male child aged 5-14 is 16 percentage points more likely to be currently enrolled in school. In FCHH a male child in the younger age-group is 18 percentage points more likely to be enrolled in school as compared to girls and as compared to children in MHH. This pro-male bias is the smallest among children in FWHH where males are only 8 percentage points more likely to be enrolled in school than females.

School Availability

Measures of school availability and quality are noticeably absent from the enrolment regressions estimated above. However, a large literature documents the importance of school availability in schooling decisions especially in rural Pakistan (Sathar and Lloyd, 1994; Alderman *et al.*, 1995; Sawada and Lokshin, 2001 and Andrabi *et al.*, 2002). This continues to be an issue in rural Pakistan as 34 per cent of the rural communities in the PIHS (2002)

[17] Not all estimated regressions are reported.

report non-availability of a government girl's primary school compared to 15 per cent without a boy's primary school. The effect of school availability on enrolment may also depend on the type of household a child, especially female, resides in. Widows or married women without resident husbands may be more sensitive to school availability in general and to 'appropriate' schools in particular, especially for girls and this may be because of a desire to protect girls' reputations due to a lacking adult-male *'saya'* (literally 'shadow' but used to denote presence). Unfortunately, detailed school availability information (and limited information on school quality) has been collected in the PIHS (2002) using a community questionnaire only in rural areas. In this sub-section, we estimate LPM models (as above) on children aged 5-14, separately by gender, incorporating variables which measure whether government (single-sex or co-ed) or private primary schools are available in the rural community in which the child lives. Table 10b summarises the key findings.

Clearly, the availability of schools (especially government schools) matters for child enrolment. Although the effect is larger for girls than boys, this difference is statistically significant at the 10 per cent level only. Interestingly, there appears to be an externality on boys' schooling. Moreover, among different types of households, the availability of a single-sex government girl's school matters in MHH and FCHH. In MHH, girls' enrolment also increases with the availability of a co-ed government or a single-sex private school. Strikingly, FCHH appear very wary of sending girls to co-ed government schools. School availability (government or private) does not appear to matter for female children in FWHH though this could reflect the very small sample size we have.

Further Estimates

Estimates in Table 11 below correct for endogeneity by introducing household fixed effects. These estimates are limited to households with *at least one male and one female child* in the given age groups[18]. The final equation contains only AGE, AGE2 and the MALE dummy and we report the marginal effect on the MALE dummy variable in Table 11. The first two rows replicate the MALE results from Tables 10a (without fixed effects) and the final two rows report the marginal effect on MALE (with family fixed effects)[19].

Firstly, there is a pro-male bias in current enrolment among *all* household types in Pakistan. Secondly the coefficients on MALE in both fixed and non-fixed effects equations[20]

[18] On this sub-set of children, linear models of current enrolment outcomes are estimated. All household level variables (such as LNHHSIZE, DEPEND, HEAD_PRIMARY etc.) are automatically dropped as there is no variation *within* the household in any household level variables.

[19] The entire set of regressions with fixed effects is not reported in this paper although the results are available from the author on request.

[20] The coefficient estimates across fixed and non-fixed effects estimation are very similar, though not always statistically identical. For instance, in age group 5-14, in MHH, B1=0.16 with a standard error of 0.007 and in age group 5-24 in MHH with fixed effects the coefficient value is 0.18 with a

are largest in magnitude for MHH and FCHH and the smallest in FWHH in both age-groups[21]. In FWHH, according to the fixed effect results, a male child aged 5-14 (15-24) is 8 (10) percentage points more likely to be currently enrolled in school than a female child. Thirdly, in estimates with fixed effects the difference in FWHH and MHH coefficients is significant for the 5-14 and 15-24 year olds. Finally, pro-male bias in current enrolment decisions appears to be *decreasing* across children's age in MHH only. Coefficient sizes are significantly different only for MHH (the coefficient size is 0.18 for children aged 5-14 and 0.12 for children aged 15-24 in MHH).

How can we interpret the finding that gender bias is lowest in widow-headed households? On the one hand, for widows the investment motive may prevail – male children are future earners while girls are burdens to be sent to their husband's home. On the other hand, having suffered widowhood, they may believe in educating girls to equip them to deal with life as an independent person. As suggested in Section 3.2, women's autonomy has implications for child education decisions and gender gaps within households in Pakistan. We hypothesised widowed women as having the greatest autonomy in decision-making among women in different types of households and this appears to manifest itself in reduced gender gaps in enrolment decisions. Married women heading households behave similarly to MHH – the coefficient estimates are almost identical across the two household types suggesting that male migrants may continue to exert control over decision-making pertaining to child education and they seem to be driven by the investment-nature of education, with long-tern consequences for both parents involved, in terms of old-age support from sons.

Household Type and Expenditure Allocation

In this sub-section household fixed effects are used to investigate expenditure allocation decisions by household type and gender in Pakistan. Two equations, using individual-level data, are estimated: 1) a linear equation of ANYEDEXP (whether any positive expenditure was incurred on the child's education) and 2) an OLS equation of the log of educational expenditure (LNTOTAL_EDU) conditional on positive educational expenditure[22]. Note that the CUR_ENROL results in previous tables and the ANYEDEXP coefficient estimates in Table 12 are almost identical. Our data show that parents incur

---

corresponding standard error of 0.005. The Wald test = $(B1 - B2)^2/\{Var(B1) + Var(B2)\}$ which is highly statistically significant suggesting we can reject the null hypothesis that the coefficients are equal.

[21] For non-fixed estimation, the difference in the FWHH coefficient (0.08) and MHH coefficient (0.16) for age 5-14 is statistically significant at the 5 per cent level.

[22] We also estimated OLS equations of unconditional educational expenditure (TOTAL_EDU) but as the findings were not different by sub-sample and often not significant, we suppress the results.

positive education expenditure for currently enrolled children more than 98 per cent of the times, suggesting that positive education expenditure and enrolment are virtually synonymous.

Table 12 reports the findings. ANYEDEXP findings are identical to CUR_ENROL results reported above. The main conclusion was that among the different household types, widow heads discriminate the *least* against girls in the enrolment decision. In education expenditure conditional on enrolment (LN_TOTALEDU), however, all household types discriminate against girls *equally* (the coefficients in MHH, FCHH and FWHH are not significantly different in the 5-14 age group and not significant for FCHH and FWHH in the 15-24 age range)[23].

Does Extent of Gender Bias Differ Depending on Head's Characteristics?

In this sub-section we consider whether the extent of gender bias in education varies with the head's characteristics within a household type. Three characteristics are considered: head's education, head's age and household per capita expenditure. We interact the MALE dummy with three dummy variables:

1. HEAD_EDUCATED - a variable capturing whether head has *any* education or not (equals 1 if head has 1 or more years of education, and 0 otherwise);
2. HIGH_LNPCE - a variable capturing whether the household is rich or poor (equals 1 if LNPCE is greater than or equal to 9 and 0 otherwise) and
3. HEAD_YOUNG - capturing whether the head of household is young or old (equals 1 if head is aged 45 or less and 0 otherwise)[24].

The two expenditure regressions estimated with household fixed effects in the previous section (ANYEDEXP and LNTOTAL_EDU) are re-estimated incorporating the interaction

[23] The computed chi-2 value from the Wald test of equality of coefficients yields 0.94 for MHH versus FCHH and 0.20 for MHH versus FWHH suggesting we cannot reject the null hypothesis that the coefficients are equal.

[24] We experimented with the data to decide what thresholds to create cut-off points for the three dummy variables. HEAD_EDUCATED equals 1 for a head with at least 1 year of education because in the data set it was found that 48% of MHH had 0 years of education, with figures corresponding to almost 78% and 75% for FWHH and FCHH. Among MHH, FCHH and FWHH with any education, the average years of education were as follows: 8.5, 6.1 and 5.4 years respectively. The threshold for LNPCE >=9 was set because among MHH the proportion with a relatively 'high' LNPCE were 39% and the corresponding figures for FWHH and FCHH were 52% and 56% respectively. Finally, HEAD_YOUNG was set at less than or equal to 45 years because about 35% of FWHH have heads aged less than equal to 45, and 85% and 48% of FCHH and MHH have heads less than equal to this age, respectively.

terms one at a time to analyse whether the head's being young, rich or educated affects expenditure allocations by household type. The results are reported in Tables 13a and 13b[25].

Table 13a reports some striking differences in child educational expenditures by education of household head. For the younger age group (5-14), head's education emerges as a significant determinant of expenditure allocation for MHH and FCHH. To interpret the results, consider the following example. In MHH, the coefficient on ANYEDEXP (or CUR_ENROL) on MALE in the 5-14 age group is 0.217 (denoting a pro-male bias) while that on the interaction term is -0.068. The overall effect of being a male child in an educated head's household is 0.149 (0.217 minus 0.068), i.e. a boy in a MHH is almost 15 percentage points more likely to have positive educational expenditure than a girl. The equivalent bias is 0.033 in FCHH, suggesting smaller gender biases in the binary (ANYEDEXP) decision among educated FCHH. The small *pro-female* bias among educated FWHH is statistically insignificant. The FCHH and MHH coefficients on the interaction term are -0.176 and -0.068 respectively and are statistically significantly different from each other at the 10 per cent level[26]. These results suggest that there is significantly less gender bias in FCHH than in MHH when the head is educated. If education confers greater autonomy which makes it possible to implement one's preferences, then educated women (albeit currently married) have a greater preference than educated men for girls' education.

Among older children, the magnitude of pro-male biases is smaller, and the interaction terms are largely insignificant. The overall effect of being a boy aged 15-24 in a household headed by an educated head is 0.119 in a MHH, 0.033 in FCHH and 0.055 in FWHH, indicating largest biases in households headed by males, though as stated before the interaction terms are insignificant. Conditional on enrolment, the coefficient on MALE in the LN_TOTALEDU equation is similar across the 4 household types, the coefficients being 0.17 in MHH, 0.20 in FHH, 0.15 in FCHH and 0.17 in FWHH. These are not significantly different from each other.

In summary, the findings so far suggest that in conditional education expenditure, all types of households bias equally against girls but that in the ANYEDEXP decision, FWHH bias significantly less than MHHs (Table 1.11 and 1.12) and that among the sub-sample of educated heads, women heads bias less (both FCHH and FWHH) than MHH although the results are significant only for FCHH. It is perhaps arguable whether this is because female heads have equalising preferences and the ability to implement them freely, since the

[25] Results for HEAD_YOUNG suppressed as interaction terms are mostly insignificant and there are no significant findings suggesting that head's age does not affect gender bias differentially across the different household types.

[26] Chi-2 value in a Wald test is 3.56 which suggests that we can reject the null hypothesis that they are equal at the 10% level.

coefficients in FWHH are not statistically significant. Had they been significant, we could have argued that widows, arguably with the most free will to implement preferences, are less prone to practice gender biases in expenditure allocation (in fact, if anything are likely to be female-biased) as compared to male heads. However, the lack of statistical significance of the MALE*HEAD_EDUCATED variable in the FWHH could be due to the small sample size in this group. The point estimate of the coefficient of this interaction variable (-0.143) is large, large enough to make educated FWHH completely free of gender bias (total effect of MALE in these households being 0.130-0.143 = -0.013).

Table 13b highlights the implications for gender biases of belonging to rich households headed by males or females. Clearly, *all* households have a distinct pro-male bias in expenditure allocations. The striking result from this table is that well-off households of all types discriminate equally against girls. Although the coefficient on the interaction term in FWHH (-0.194) is a bigger negative than that in MHH and FCHH, it is not statistically significantly different from either[27]. However, the point estimates suggest that equally well-off widows have much smaller gender biases as compared to MHH and FCHH.

6. Summary and Conclusion

This study examined whether improving female autonomy (proxied by headship) has consequences for child education and whether female-heads are also more *equalising* in their educational expenditure allocations than male heads. All households were divided into two types: male-headed-households and female-headed-households. All female-headed-households were further divided into those where the head was currently married, mostly the wives of an out-migrant male and women whose husbands have died leaving them widowed. We investigated gender bias in the current enrolment and educational expenditure allocation decisions by household type. We utilised a household fixed effects model to circumvent the problem that family's unobserved characteristics may be correlated with household type. The Pakistan Integrated Household Survey, PIHS (2002) was used for the analysis.

The descriptive statistics point to invariably larger pro-male biases in education in male-headed-households than in both types of female-headed-households. A first glance at the raw data is indicative of higher enrolment rates for both boys and girls in female-headed-households than in male-headed-households, but female heads do not appear to be consistently more equitable than male heads in terms of their allocation to boys and girls. Moreover, much of the bias in educational expenditures in FHH manifests itself via significantly lower probability of girls' enrolment rather than lower expenditures conditional

[27] The computed value from the Wald test of equality of coefficients (MHH and FWHH) is 1.33.

on enrolment, while for male heads the bias prevails in both decisions – enrolment *and* expenditure allocation conditional on enrolment.

However, our econometric results using household fixed effects estimation are of most interest. As mentioned in the introduction, these findings are subject to a caveat. The effect of 'headship' will be confounded by other factors such as income shocks and time allocation effects that are the consequence of the formation of FHHs. Consequently, one must be cautious in interpreting the effects of female headship on child education as arising purely due to differences in female autonomy in different types of households.

The econometric findings suggest that married women heads gender-discriminate as much as male heads but that widow-heads have significantly lower bias against girls in enrolment decisions than male heads. The results also suggest that educated female heads gender-discriminate less than both uneducated female heads and than male heads. The point estimates are very suggestive of lower gender bias in households headed by widowed females than by males even though a Wald test shows that the difference is not statistically significant.

How do our findings compare with previous evidence from Pakistan? Durrant and Sathar (2000) found that improving female autonomy (at the community level) increases the likelihood of girls' enrolment. Our findings are not so clear-cut. While other explanations are possible, it seems most likely that the difference between Durrant and Sathar's findings and our own is that ours uses a more stringent test, based on household fixed effects analysis which controls for at least some of the unobservables generating biases in other studies.

References

Alderman, H., Behrman, J.R., Khan, S.R., Ross, D.R. and Sabot, R. (1995), 'Public Schooling Expenditures in Rural Pakistan: Efficiently Targeting Girls and a Lagging Region', in D. Van de Walle and K. Nead (eds.), *Public Spending and the Poor, Theory and Evidence*, Baltimore : The Johns Hopkins University Press, pp. 187-218.

Andrabi, T.,Das, J. and Khwaja, A. (2002), 'The Rise of Private Schooling in Pakistan: Catering to the Urban Elite or Educating the Rural Poor?' World Bank and Harvard University.

Appleton, S. (1996), 'Women-headed Households and Household Welfare: An Empirical Deconstruction of Uganda', *World Development*, 24 (12), pp. 1811-1827.

Appleton, S., Chessa, I. and Hoddinott, J. (1999), 'Are Women the Fairer Sex? Looking for Gender Differences in Gender Bias in Uganda', Centre for the Study of African Economies (Mimeo).

Aslam, M. and Kingdon, G.G. (2007), 'Gender and Household Education Expenditure in Pakistan', Forthcoming in *Applied Economics* and as GPRG-WPS-025 (2006).

Barros, R., Fox, L. and Mendonca, R. (1997), 'Female-Headed Households, Poverty and Welfare of Children in Urban Brazil', *Economic Development and Cultural Change*, 45 (2), pp. 231-257.

Behrman, J., Foster, A. D., Rosenzweig, M.R. and Vashishtha, P. (1999), 'Women's Schooling, Home Teaching, and Economic Growth', *Journal of Political Economy*, 107 (4), pp. 682-714.

Bruce, J. and Lloyd, C. (1997), 'Finding the Ties that Bind: Beyond Headship and Household', in L. Haddad, J. Hoddinott, and H. Alderman (eds.) *Intrahousehold Resource Allocation in Developing Countries: Models, Methods and Policy*. Baltimore, MD: The Johns Hopkins University Press, pp. 213-228.

Buvinic, M. and Gupta, G.R. (1997) 'Female-Headed Households and Female-Maintained Families: Are They Worth Targeting to Reduce Poverty in Developing Countries?' *Economic Development and Cultural Change*, 45 (2), pp. 405-438.

Chant, S. (1997), *Women-Headed Households, Diversity and Dynamics in the Developing World*, Macmillan Press Ltd., UK.

Chant, S. (2003), 'Female Household Headship and the Feminisation of Poverty: Facts, Fictions and Forward Strategies', New Working Paper Series, Issue 9, Gender Institute, London School of Economics.

Chen, J. (2004), 'Dads, Disease and Death: Decomposing Daughter Discrimination.' Harvard University (Mimeo).

Dréze, J. and P.V. Srinivasan (1997), 'Widowhood and Poverty in Rural India: Some Inferences from Household Survey Data', *Journal of Development Economics*, 54, pp. 217-234.

Durrant, V.L. and Zeba. A. Sathar (2000), 'Greater Investments in Children through Women's Empowerment: A Key to Demographic Change in Pakistan?' Population Council, Working Paper (137).

Dwyer, D. and Bruce, J. (eds.) (1988), A Home Divided, Women and Income in the Third World, Stanford University Press. Stanford, CA.

Edlund, L. and Lagerlöf, N. (2002), 'Implications of Marriage Institutions for Redistribution and Growth', Columbia University (Mimeo).

Edlund, L. and Rahman, A. (2004), 'Household Structure and Child Outcomes: Nuclear vs. Extended Families – Evidence from Bangladesh', Columbia University (Mimeo).

Gazdar, H. (2003), 'A Review of Migration Issues in Pakistan', paper prepared for the 'Regional Conference on Migration, Development and Pro-poor Policy Choices in Asia' (2003).

Glewwe, P. (1999), 'Why Does Mother's Schooling Raise Child Health in Developing Countries? Evidence from Morocco', *Journal of Human Resources*, 34, pp. 124-159.

Haddad, L. and Hoddinott, J. (1995), 'Does Female Income Share Influence Household Expenditures? Evidence from Côte D'Ivoire', *Oxford Bulletin of Economics and Statistics*, 57 (1), pp. 77-95.

Haddad, L., Hoddinott, J. and Alderman, H. (eds.) (1997), *Intrahousehold Resource Allocation in Developing Countries: Methods, Models and Policy*, Baltimore MD: Johns Hopkins University Press for the International Food Policy Research Institute.

Hallman, K.K. (2000), 'Mother-father Food Control, Marriage Payments, and Girl-boy Health in Rural Bangladesh', Food Consumption and Nutrition Division (IFPRI), Discussion Paper No. 93.

Handa, S. (1994), 'Gender, Headship and Intrahousehold Resource Allocation.' *World Development*, 22 (10), pp. 1535-1547.

Handa, S. (1996a), 'Maternal Education and Child Attainment in Jamaica: Testing the Bargaining Power Hypothesis.' *Oxford Bulletin of Economics and Statistics*, 58 (1), pp. 119-137.

Handa, S. (1996b), 'Expenditure Behaviour and Children's Welfare: An Analysis of Female Headed Households in Jamaica.' *Journal of Development Economics*, 50, pp. 165-187.

Hill, M.A. and King, E.M. (1993), 'Women's Education in Developing Countries: An Overview', in Elizabeth M. King and M. Anne Hill (eds.), *Women's Education in Developing*

Countries: Barriers, Benefits, and Policies. Baltimore, MD: Johns Hopkins University Press, pp. 1-50.

Joshi, S. (2004), 'Female Household-Headship in Rural Bangladesh: Incidence, Determinants and Impact on Children's Schooling', *Yale University Economic Growth Center Discussion Paper No. 894*

Kabeer, N. (1999), 'Resources, Agency and Achievements: Reflections on the Measurement of Women's Empowerment', *Development and Change*, 30 (3), pp. 434-464.

Kennedy, E. and Lawrence Haddad (1994), 'Are Pre-Schoolers from Female-Headed Households Less Malnourished? A Comparative Analysis of Results from Ghana and Kenya.' *Journal of Development Studies*, 30 (3), pp. 680-695.

Kennedy, E. and P. Peters (1992), 'Household Food Security and Child Nutrition: the Interaction of Income and Gender of the Household Head.' *World Development*, 20 (8), pp. 1077-1085.

Kumari, R. (1989), *Women-Headed Households in Rural India*, Sangam Books Limited, UK.

Lancaster, G., Maitra, P. & Ray, R. (2003), 'Endogenous Power, Household Expenditure Patterns and New Tests of Gender Bias: Evidence from India', *Preliminary Version of paper presented at the NEUDC conference*, Yale, 2003.

Lanjouw, P. and Ravallion, M. (1995), 'Poverty and Household Size', *Economic Journal*, 105 (433), pp. 1415-1434.

Lampietti, J.A. and Stalker, L. (2000), 'Consumption Expenditure and Female Poverty', Policy Research Report on Gender and Development, Working Paper Series No. 11, The World Bank.

Lewis, D.J. (1993), 'Going It Alone: Female-Headed Households, Rights and Resources in Rural Bangladesh', Centre for Development Studies, Occasional Paper 01/93.

Lloyd, C. and Brandon, A. (1993), 'Women's Role in Maintaining Households: Family Welfare and Sexual Inequality in Ghana', *Population Studies*, 47 (1), pp. 115-131.

Maitra, P. and Ray, R. (2001), 'Intrahousehold Resource Allocation and Their Impact on Expenditure Patterns: Comparative Evidence from South Africa and Pakistan.' Australasian Econometric Society Meeting, Conference Proceedings (2001), edited by Peter C. B. Phillips and Bryce Hool, University of Auckland.

McElroy, M. (1990), 'The Empirical Content of Nash-bargained Household Behaviour', *Journal of Human Resources*, 25, pp. 559-583.

McElory, M. and Horney, M.J. (1981), 'Nash-bargained Household Decisions: Towards a Generalization of the Theory of Demand', *International Economic Review* 22, pp. 333-349.

Pakistan Integrated Household Survey, Enumerator's Manual of Instructions, Round 4 (2001-2002).

Quisumbing, A.R., Haddad, L. and C. Pena (2001), 'Are Women Overrepresented Among the Poor? An Analysis of Poverty in Ten Developing Countries', *Journal of Development Economics*, 61 (1), pp. 225-269.

Quisumbing, A.R. and Maluccio, J.A. (2003), 'Resources at Marriage and Intrahousehold Allocation: Evidence from Bangladesh, Ethiopia, Indonesia and South Africa', *Oxford Bulletin of Economics and Statistics*, 65 (3), pp. 283-328.

Sathar, Z. and Lloyd, C.B. (1994), 'Who Gets Primary Schooling in Pakistan: Inequalities Among and Within Families', *Pakistan Development Review*, 33 (2), pp. 103-134.

Sawada, Y. and Lokshin, M. (2001), 'Household Schooling Decisions in Rural Pakistan', World Bank Policy Research Paper No. 2541.

Smith, L.C. and Bryon, E.M. (2005), 'Is Greater Decisionmaking Power of Women Associated with Reduced Gender Discrimination in South Asia?', Food Consumption and Nutrition Division (IFPRI), Working Paper No. 200.

Strauss, J. and Thomas, D. (1995), 'Human Resources: Empirical Modelling of Household and Family Decisions', in J. Behrman and T.N. Srinivasan (eds.), *Handbook of Development Economics*, Vol. IIIA, Amsterdam, The Netherlands: Elsevier, pp. 1920-1948.

Thomas, D. (1994), 'Like Father, Like Son; Like Mother, Like Daughter: Parental Resources and Child Height', *Journal of Human Resources*, 29 (4), pp. 950-988.

Valery, A. (1996), 'Women-Headed Households: Some More Equal than Others?' *World Development*, 24.

World Bank (2005), 'Pakistan Country Gender Assessment: Bridging the Gender Gap, Opportunities and Challenges', Report No. 32244-PAK.

Tables

Table 1: Relation to Head by Household Type, Children aged 5-24[28]

	ALL HH	MHH	FHH		
			Currently Married	Widowed	Other[29]
Relation to Head	%	%	%	%	%
Son/daughter	77.3	76.8	92.1	71.0	61.3
Grandchild	8.2	8.2	1.1	21.6	-
Brother/sister	5.5	5.9	0.43	0.1	3.2
Nephew/niece	3.2	3.4	1.1	0.3	29.0
Other[30]	5.8	5.7	5.3	7.1	6.5
Observations	55669	51637	2567	1434	31
Own children of head (n)	43049	39647	2365	1018	19

Table 2: Causes of Headship in Pakistan

Head and:	TOTAL (MHH+FHH)		FHH	
	Number of Households	%	Number of Households	%
Never Married	548	3.4	14	1.1
Currently Married	14485	89.4	780	59.2
Widowed	1101	6.8	509	38.7
Divorced	54	0.3	14	1.1
Other	7	0.04	0	0
TOTAL	16195	100	1317	100

[28] In this sample of 5-24 year olds, we excluded individuals aged 5-24 who were: heads, spouses of heads, mother/father-in-law or mother/father. Our objective in analysing this sample is to understand enrolment and schooling decisions of children aged 5-24 i.e. of school-going age and these excluded individuals are not considered representative of the analysis on which samples are based. Observations deleted are less than 2 % of total sample.

[29] 'Other' includes heads who are: Never Married, Divorced or whose Nikkah has taken place but rukhsati is yet to occur. 28 such heads heading households were excluded from the analysis.

[30] 'Other' includes son/daughter-in-law, brother/sister-in-law, servants and others.

Table 3: Household Type and Remittance Receipts by Marital Status

	Total Observations	Marital Status of Head	Number Receiving Remittance (Within or Abroad)	% Receiving Remittance
	(a)	(b)	(c)	(d) = (c)/(a)
All Heads	16195		2874	18
FHH	780	**Married**	735	94
	509	**Widowed**	221	43
	28	**Other**	14	50
Total FHH	1317		970	74
MHH	13705	**Married**	1680	12
	592	**Widowed**	98	17
	581	**Other**	126	22
Total MHH	14878		1904	13

Table 4a: Widowed Women

Widow's Relation to Head	No. of Widows	% of Widows
Head	509	17.5
Daughter of head	48	1.7
Grandchild of head	1	0.03
Mother of head	1912	65.7
Sister of head	78	2.7
Niece of head	4	0.1
Daughter-in-law of head	39	1.3
Sister-in-law of head	47	1.6
Mother-in-law of head	136	4.7
Other	137	3
Total no. of widowed women	*2,911*	*100*

Table 4b: Married Women

Woman's Relation to Head	No. of Married Women	% of Married Women
Head	780	3.7
Spouse of head	13,824	68.4
Daughter of Head	176	0.8
Grandchild of head	23	0.1
Mother of head	930	4.4
Sister of head	69	0.3
Niece of head	24	0.1
Daughter-in-law of head	4280	20.0
Sister-in-law of head	943	4.4
Mother-in-law of head	35	0.2
Other	268	1.3
Total no. of married women	*21,352*	*100*

Table 5: Definitions of Variables Used in Schooling Decisions and Expenditure Functions

Variable	Definition	Description
CUR_ENROL	Current Enrolment status	Dummy variable equalling 1 if individual is currently enrolled in school, 0 otherwise
ANYEDEXP	Any Educational Expenditure	Dummy variable equalling 1 if any positive educational expenditure is incurred for the individual, 0 otherwise
LNTOTAL_EDU	Ln of Conditional Educational Expenditure	Natural log of educational expenditure conditional on ANYEDEXP being 1
TOTAL_EDU	Total Educational Expenditure	Total household educational expenditure
ADULT16_MORE	Adult aged 16 or more	Number of individuals aged 16 or more in the household
AGE	Age of individual (yrs)	
AGE2	Age squared	Square of Age
AGE_OLDEST	Age of the oldest member (yrs)	Age of the oldest member in the household roster.
AGE_MAX_EARN	Age of maximum earner (yrs)	Calculates the age of the individual in the household who brings maximum yearly earnings (in Rupees) for the household.
AJK	Azad Jammu and Kashmir	Equals 1 if in AJK and 0 otherwise.
BALOCHISTAN	Balochistan	Equals 1 if in Balochistan and 0 otherwise
BIKE	Household has bicycle	Dummy variable, BIKE=1 if household owns at least one bicycle and -0 otherwise
CHILD0_15	Children aged 0-15	Number of individuals aged between 0 and 15 in the household
DEPEND_RATIO	Dependency Ratio	Calculated as: Number of children aged 0-15/Number of adults aged 16 or more
DIRECT_EDU_YR_PCE	direct educational expenditure in household (Per capita, yearly)	Sum of admissions and exam fees for all school-going children in household- the expenditure directly given to schools, divided by HHSIZE.
EDU_HH_YR_PCE	Per capita household educational expenditure (year)	Sum of: admission fees, uniform, books, exams, tuition, transport and miscellaneous expenditures for all enrolled children in household. Includes a total figure for those households unable to break down the various direct and indirect educational expenses. Divided by HHSIZE.
ELECTRIC	Household has electricity connection	Equals 1 if yes and 0 otherwise
FAN	Household has fan	Dummy variable, FAN=1 if household owns at least one fan and -0 otherwise
FATA	Federally Administered Tribal Areas	Equals 1 if in FATA and 0 otherwise.
FCHH	Female Currently married woman	Equals 1 if in FCHH, 0 otherwise.

	Headed Household	
FWHH	Female Widow Headed Household	Equals 1 if in FWHH, 0 otherwise.
FOOD_PCE_YR	Per Capita Food Expenditure	FOOD_EXP/HHSIZE
FRIDGE	Household has fridge	Dummy variable, FRIDGE=1 if household owns at least one fridge and -0 otherwise.
GAS	Household has gas connection	Equals 1 if yes and 0 otherwise
HAGE	Head's age (yrs)	Age of the household head.
HEAD_EDU_MISS	Head Education Missing	Equals 1 if no observations on Head's education, 0 otherwise.
HEAD_PRIMARY	Head has primary education or less	Equals 1 if head has primary education or less, 0 otherwise.
HEAD_MIDDLE	Head has Middle education	Equals 1 if head has at least 8 years education (middle), 0 otherwise.
HEAD_MATRIC	Head has matric education	Equals 1 if head has at least 10 years education (matric), 0 otherwise.
HEAD_OCCUP_MISS	Head occupation missing	Equals 1 if no observation on Head's occupation.
HEAD_WHITE_COLLAR	Head White collar	Equals 1 if head in white collar occupation, 0 otherwise/.
HEAD_SERVICE	Head Service occupation	Equals 1 if head in service or trade occupation, 0 otherwise.
HHSIZE	Household Size	Total number of members in household
INDIRECT_EDU_YR_PCE	Indirect educational expenditure in household (Per capita, yearly)	Sum of uniform, books, tuition, transport and miscellaneous for all school-going children in household., divided by HHSIZE.
LNHHSIZE	Ln. HHSIZE	
LNPCE	Ln. of Per Capita Expenditure	
LNPCE2	Ln. of Per Capita Expenditure, squared	
MALE	Gender Dummy	Equals 1 if child is male and 0 otherwise (female).
MAX_EARN	Earnings of the maximum earner in the family (Rupees)	This includes earnings from working in the labour market. It does not include cash pensions, benefits or value of benefits in-kind.
NORTH	Northern territories	Equals 1 if in North and 0 otherwise
NWFP	North West Frontier Province	Equals 1 if in NWFP and 0 otherwise.

PCE_YR	Per Capita Expenditure (Rupees)	TOTAL_EXP/HHSIZE
PHONE	Household has phone connection	Equals 1 if yes and 0 otherwise
PIPED_WATER	Household has piped drinking water	Equals 1 if yes and 0 if water is available from a hand pump, tube/open/closed well, from a pond/river/stream/canal/spring or otherwise
RADIO	Household has radio	Dummy variable, RADIO=1 if household owns at least one radio and -0 otherwise
ROOMS	Number of rooms in household	
SEWING	Household has sewing machine	Dummy variable, SEWING=1 if household owns at least one sewing machine and -0 otherwise
SINDH	Sindh	Equals 1 if in Sindh and 0 otherwise.
STOVE	Household has cooking stove	Dummy variable, STOVE=1 if household owns at least one cooking stove and -0 otherwise
TOTAL_INCOME_YR	Total household income (yr)	Total household income from all sources (zakat, remittances, earnings, gifts, inheritance etc.)
TOTAL_EXP_YR	Total household expenditure (Rupees)	Sum of yearly food, non-food and all expenditures.
TV	Household has television	Dummy variable, TV=1 if household owns at least 1 TV and -0 otherwise
URBAN	Regional Dummy	Equals 1 if in urban and 0 otherwise (rural).
WASH_M	Household has washing machine	Dummy variable, WASH_M=1 if household owns at least one washing machine and -0 otherwise
School Availability Variables		
GGOVTPRIM	Girl's government primary school	Dummy equals 1 if there is a government girl's primary school in community (PSU), 0 otherwise
GPVTPRIM	Girl's private primary school	Dummy equals 1 if there is a private girl's primary school in community (PSU), 0 otherwise
BGOVTPRIM	Boy's government primary school	Dummy equals 1 if there is a government boy's primary school in community (PSU), 0 otherwise
BPVTPRIM	Boy's private primary school	Dummy equals 1 if there is a private boy's primary school in community (PSU), 0 otherwise
BGGOVTPRIM	Boy's/Girl's (co-ed) primary school	Dummy equals 1 if there is a government co-ed primary school in community (PSU), 0 otherwise

Table 6: Demographic and Socio-economic Circumstances by Household Type

VARIABLE (MEAN)	MHH	FHH		FCHH – MHH		FWHH - MHH	
		FCHH	FWHH				
Demographic							
HAGE	45.8	36.9	54.5	-8.90	**	8.70	***
HHSIZE	7.4	5.5	5.1	-1.85	***	-2.40	***
AGE_OLDEST	52.7	43.5	55.4	-9.17	***	2.71	***
AGE_MAX_EARN	41.1	37.9	39.4	-3.21	***	-1.67	***
DEPEND_RATIO	1.0	2.2	0.7	1.20	***	-0.33	***
CHILD0_15	3.4	3.3	1.8	-0.1		-1.53	***
ADULT16_MORE	4.0	2.2	3.3	-1.83	***	-0.71	***
Earnings/Expenditure							
MAX_EARN	45855	7617	27027	-38238	***	-18828	***
TOTAL_INCOME_YR	66983	60548	60983	-6435	***	-6000	**
TOTAL_EXP_YR	66483	60093	61001	-6390	**	-5483	*
PCE_YR	10257	12470	12457	2213	***	2200	***
FOOD_PCE_YR	5993	7549	8250	1556	***	2256	***
Educational Expenditure							
EDUHH_YR_PCE	500	922	772	423	***	273	***
DIRECTEDU_YR_PCE	178	320	286	141	***	108	***
INDIRECTEDU_YR_PCE	264	537	439	273	***	175	***
Assets (percentage)							
FRIDGE	22.5	26.5	30.9	4.0	*	8.4	***
FAN	83.8	84.3	92.4	0.5		8.6	***
WASH_M	33.1	31.6	42.1	-1.4		8.9	***
STOVE	28.2	29.7	42.3	1.5		14.1	***
BIKE	33.2	17.3	25.5	-15.8	***	7.7	***
TV	38.1	40.0	50.7	2.0		12.7	***
RADIO	34.2	43.9	33.9	9.7	***	-0.3	
SEWING	53.1	55.4	59.2	2.3		6.1	***
Housing							
ROOMS	2.4	2.4	2.5	0		0.1	*
ELECTRIC	69.2	76.6	86.1	7.5	***	0.7	***
GAS	21.4	13.5	33.1	-7.9	***	0.1	***
PHONE	11.8	16.6	18.9	4.8	***	0.1	***
PIPED_WATER	31.5	28.9	45.5	-2.7		14.0	***

Note: *, **, and *** signify that the difference is statistically significant at the 10%, 5% and 1% levels respectively.

Table 7a: Current Enrolment Rates[31] by individual, age-group, gender and headship status: URBAN and RURAL

Households		Age 5-9				Age 10-14				Age 15-19			
		B	G	Gap		B	G	Gap		B	G	Gap	
All HH		59	47	12	***	69	49	20	***	39	23	16	***
MHH		58	46	12	***	67	48	19	***	38	22	16	***
FHH	Married	75	59	16	**	84	63	21	***	54	35	19	**
	Widowed	74	67	7		67	64	3		45	34	11	*

Table 7b: Current Enrolment Rates by individual, age-group, gender and headship status: URBAN only

Households		Age 5-9				Age 10-14				Age 15-19			
		B	G	Gap		B	G	Gap		B	G	Gap	
All HH		71	66	5	***	75	70	5	***	45	38	7	***
MHH		71	65	6	***	75	69	6	***	44	37	7	***
FHH	Married	83	77	6		79	85	-6		56	56	0	
	Widowed	83	77	6		69	80	-11	*	48	47	1	

Table 7c: Current Enrolment Rates by individual, age-group, gender and headship status: RURAL only

Households		Age 5-9				Age 10-14				Age 15-19			
		B	G	Gap		B	G	Gap		B	G	Gap	
All HH		53	38	15	***	66	36	30	***	35	13	22	**
MHH		52	37	15	***	65	35	30	***	34	12	22	***
FHH	Married	72	55	17	***	86	55	31	***	53	27	26	***
	Widowed	67	58	9		65	44	21	*	40	18	22	**

[31] 'Other' category in FHH (including Never married and Divorced) contains too few observations-5, 7, 13 and 5 (total 30) respectively in the age groupings from 5-24.

Table 8a: Annual Educational Expenditure (Rs./yr) on ALL children (Unconditional): Urban + Rural

		Age 5-9				Age 10-14				Age 15-19				Age 20-24			
		Boy	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**	
All Households		874	709	165	***	1338	997	341	***	1389	820	569	***	618	284	334	***
MHH		884	697	187	***	1391	1012	379	***	1576	852	724	***	987	439	548	***
FHH	FCHH	1224	873	351	**	1799	1373	426	**	2723	1729	994	*	3199	770	2429	*
	FWHH	1939	1449	490		2227	1696	531		2057	1424	633	*	1695	414	1281	**
	FHH	1387	1023	364	**	1946	1462	484	**	2434	1599	835	*	2186	554	1632	**

Table 8b: Annual Educational Expenditure (Rs./yr) on ALL children (Unconditional): Urban Only

		Age 5-9				Age 10-14				Age 15-19				Age 20-24			
		Boy	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**	
All Households		1839	1548	291	**	2279	1986	293	**	2402	1708	694	***	1643	730	913	***
MHH		1795	1506	289	**	2230	1934	296	*	2336	1609	727	***	1602	719	883	***
FHH	FCHH	2281	2049	232		3090	2715	375		4460	3402	1058		5123	1715	3408	
	FWHH	3054	2505	549		2670	2490	180		2453	2322	131		1391	480	911	*

Table 8c: Annual Educational Expenditure (Rs./yr) on ALL children (Unconditional): Rural Only

		Age 5-9				Age 10-14				Age 15-19				Age 20-24			
		Boy	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**	
All Households		496	335	161	***	977	502	475	***	1125	383	742	***	610	230	380	***
MHH		460	316	144	***	933	474	459	***	1077	345	732	***	524	227	297	**
FHH	FCHH	928	568	368	***	1409	847	562	***	1935	1000	935	**	2250	212	2038	**
	FWHH	1110	621	489	*	1812	744	1068	*	1425	361	1064	**	2282	327	1955	*

Table 9a: Annual Educational Expenditure (Rs./yr) on ENROLLED children (Conditional): Urban + Rural

		Age 5-9				Age 10-14				Age 15-19				Age 20-24			
		Boy	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**	
All Households		1495	1513	-18		1941	2063	-122	**	3629	3695	-66		6260	5646	614	
MHH		1542	1519	23		2040	2147	-107		4143	3848	295		8916	6952	1964	*
FHH	FCHH	1642	1473	169		2137	2163	-26		5080	4875	207		13280	5301	7979	*
	FWHH	2637	2197	440		3313	2720	593		4634	4273	361		11423	5158	6265	*
	FHH	1865	1673	192		2459	2325	134		4910	4626	284		10750	5237	5513	

Table 9b: Annual Educational Expenditure (Rs./yr) on ENROLLED children (Conditional): Urban Only

		Age 5-9				Age 10-14				Age 15-19				Age 20-24			
		Boy	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**	
All Households		2355	2589	-234	*	2868	3043	-175		5377	4491	886	**	8715	6556	2159	***
MHH		2314	2519	-205	*	2835	2997	-162		5291	4360	931	*	8995	6678	2317	**
FHH	FCHH	2769	2672	97		3900	3177	723		7906	6098	1808		8350	5635	2715	**
	FWHH	3690	3304	386		3872	3221	651		5152	5059	93		7950	5658	2292	

Table 9c: Annual Educational Expenditure (Rs./yr) on ENROLLED children (Conditional): Rural

		Age 5-9				Age 10-14				Age 15-19				Age 20-24			
		Boy	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**		**Boy**	**Girl**	**Gap**	
All Households		941	876	65	*	1484	1384	100		3218	2896	322		7193	5237	1956	
MHH		897	858	39		1444	1360	84		3166	2814	352		7716	6463	1253	
FHH	FCHH	1283	1038	245	*	1645	1545	100		3698	3758	-60		6555	4136	2419	
	FWHH	1665	1067	598	*	1876	1675	201		3632	1955	1677	*	5438	4410	1028	*

Table 10a: Linear Probability Model of Current Enrolment, Children Aged 5-14 and 15-24

	Pooled		MHH		FCHH		FWHH	
	Age 5-14 (a)	Age15-24 (b)	Age 5-14 (c)	Age 15-24 (d)	Age 5-14 (e)	Age 15-24 (f)	Age 5-14 (g)	Age 15-24 (h)
MALE	0.20 ***	0.12 ***	0.16 ***	0.12 ***	0.18 ***	0.15 ***	0.08 **	0.07 **
AGE	0.30 ***	-0.23 ***	0.26 ***	-0.23 ***	0.23 ***	-0.25 ***	0.10 **	-0.23 ***
AGE2/10	-0.13 ***	0.05 ***	-0.13 ***	0.05 ***	-0.11 ***	0.05 **	-0.06 **	0.04 **
LNHHSIZE	0.07 ***	0.04 ***	0.07 ***	-0.04 ***	0.11 ***	0.12 ***	0.07	0.08 *
DEPEND_RATIO/100	-0.49	-0.10	-0.63	-0.68	0.18	-0.02	-0.19	-5.22
LNPCE	1.11 ***	-0.26 **	1.05 ***	-0.29 **	1.84 ***	1.19 **	1.30 ***	0.63
LNPCE2	-0.05 ***	0.02 ***	-0.05 ***	0.02 ***	-0.09 **	-0.05 *	-0.10 **	-0.02
HEAD_EDU_MISS	-0.20 ***	0.03	-0.20 ***	0.04	0.07	-0.20	-0.33 **	-- --
HEAD_PRIMARY	-0.20 ***	-0.18 ***	-0.20 ***	-0.18 ***	-0.10	-0.16	-0.16 *	-0.25 **
HEAD_MIDDLE	-0.04 ***	-0.10 ***	-0.04 ***	-0.11 ***	0.02	0.10	0.10	0.09
HEAD_MATRIC	-0.02	-0.08 ***	-0.02	-0.08 ***	-0.05	0.05	0.12	0.02
HEAD_OCCU_MISS	0.05 ***	0.01 *	0.06 ***	0.01	-0.04	-0.00	-0.01	0.07
HEAD_WHITE_COLLAR	0.07 ***	0.05 ***	0.07 ***	0.05 ***	0.00	-0.03	-0.10	0.12
HEAD_SERVICE	0.06 ***	0.02 **	0.07 ***	0.02 **	-0.14 *	-0.10	-0.04	0.09
SINDH	-0.20 ***	-0.04 ***	-0.15 ***	-0.04 ***	-0.21 *	-0.17 **	-0.02	-0.06
NWFP	-0.08 ***	0.01	-0.08 ***	0.01	-0.12 ***	-0.00	-0.03	0.02
BALOCHISTAN	-0.21 ***	-0.03 ***	-0.21 ***	-0.03 ***	-0.48 ***	-0.19 *	-0.20 *	-0.07
AJK	0.10 ***	0.08 ***	0.13 ***	0.09 ***	0.02	0.05	0.26 ***	0.08
NORTH	0.03	0.21 ***	0.03	0.21 ***	0.07	-0.01	0.18 *	0.16
FATA	-0.30 ***	-0.08 ***	-0.30 ***	-0.08 ***	-0.43 ***	-0.16	-0.11	-0.22
URBAN	0.07 ***	0.03 ***	0.07 ***	0.03 ***	0.04	0.02	0.13 **	-0.00
FCHH	0.12 ***	0.09 ***	-	-	-		-	-
FWHH	0.09 ***	0.07 ***	-	-	-		-	-
CONSTANT	-6.51 ***	3.45 ***	-6.21 ***	3.47 ***	-9.87 ***	-3.74	-6.28 ***	-0.59
Pseudo_R2	0.24	0.26	0.24	0.26	0.22	0.28	0.21	0.30
N	33429	23346	31048	21765	1745	806	625	756
Dependent Variable Mean	0.561	0.210	0.550	0.201	0.706	0.340	0.676	0.263

Note: Coefficients are presented for LPM models. (*) denotes significance at 10 %, (**) at 5 and (***) at 1 per cent. The dependent variable is CUR_ENROL (=1 if child is currently enrolled in school and 0 otherwise). Base dummy for Head's education is HEAD_MATRICMORE =1 if head has more than 10 years of education 0 otherwise. Base dummy for Head's Occupation is HEAD_AGRI =1 if the head is involved in agricultural or elementary occupations (such as domestic helpers etc), Punjab and rural areas are the omitted categories in provincial and region dummies. (-) denotes not included and (--) denotes where a variable predicts success perfectly.

Table 10b: Linear Probability Models of Current Enrolment (School Availability) in Rural Communities, Children Aged 5-14

Variable	Pooled				Sub-sample					
	W/o dummy		With dummy		MHH		FCHH		FWHH	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
GOVTPRIM	0.156 ***	0.108 ***	0.155 ***	0.108 ***	0.154 ***	0.108 ***	0.147 **	0.125 *	0.057	-0.118
(Single-sex)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.06)	(0.07)	(0.12)	(0.11)
GOVTPRIM	0.071 **	0.112 ***	0.065 **	0.107 ***	0.085 ***	0.104 ***	-0.143 **	0.081	0.178	0.260 **
(Co-ed)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.06)	(0.05)	(0.15)	(0.11)
PVTPRIM[32]	0.084 **	0.044	0.086 **	0.042	0.087 **	0.040	0.156	0.070 **	0.155	-0.09
(single-sex)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.11)	(0.04)	(0.32)	(0.12)
FCHH	-	-	0.142 ***	0.129 ***	-	-	-	-	-	-
			(0.03)	(0.02)						
FWHH	-	-	0.102 **	0.055	-	-	-	-	-	-
			(0.05)	(0.04)						
All controls (as in 3.10a)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	10570	11641	10570	11641	9777	10761	631	710	159	169
R^2	0.25	0.20	0.25	0.21	0.24	0.20	0.30	0.20	0.36	0.33

Note: Standard errors are in parentheses. (*) denotes significance at 10 %, (**) at 5 and (***) at 1 per cent. The dependent variable is CUR_ENROL (=1 if child is currently enrolled in school and 0 otherwise). GOVTPRIM =1 for girls if government girls primary school is available in rural community, 0 otherwise. GOVTPRIM =1 for boys if government boy's primary school is available in rural community, 0 otherwise etc.

[32] Note that we do not include private co-ed primary schools. The proportion of villages reporting these schools was very small.

Table 11: Marginal Effect on MALE dummy in Current enrolment equations (Without and with household fixed effects)

	MHH		FHH		FCHH		FWHH	
No Fixed Effects								
Ages 5-14	0.16	***	0.15	***	0.18	***	0.08	**
	(0.007)		(0.021)		(0.023)		(0.037)	
Ages 15-24	0.12	***	0.11	***	0.15	***	0.07	**
	(0.006)		(0.023)		(0.033)		(0.030)	
N	52813		3956		2546		1371	
With Fixed Effects								
Ages 5-14	0.18	***	0.16	***	0.17	***	0.10	**
	(0.005)		(0.019)		(0.022)		(0.041)	
Ages 15-24	0.12	***	0.11	***	0.14	***	0.08	***
	(0.005)		(0.025)		(0.039)		(0.032)	
N	38083		2553		1643		901	

Note: Coefficient values reported with standard errors in brackets. (*) denotes significance at 10%, (**) at 5% and (***) at 1%. Shaded cell's coefficients are statistically different at the 5% level in a chi-2 distribution (FWHH versus MHH across columns and MHH of both age-groups across rows).

Table 12: Coefficient on MALE dummy and t value (brackets), (with household fixed effects): All age groups.

	MHH	FHH	FCHH	FWHH
ANYEDEXP				
Age 5-14	0.18	0.16	0.17	0.10
	(35.31)	(8.28)	(7.99)	(2.67)
Age 15-24	0.12	0.11	0.14	0.08
	(23.20)	(4.45)	(3.53)	(2.79)
LN_TOTALEDU				
Age 5-14	0.16	0.20	0.20	0.18
	(15.55)	(5.90)	(4.97)	(3.40)
Age 15-24	0.27	0.21	0.27	0.20
	(7.35)	(1.65)	(1.53)	(1.09)

Note: t-values are in parentheses and those significant at the 5% level are shaded.

Table 13a: Coefficient on MALE dummy and MALE*HEAD_EDUCATED interaction term and t values (brackets), (with household fixed effects), All age groups.

		MHH	FHH	FCHH	FWHH
Age 5-14: MALE					
CUR_ENROL	MALE	0.217	0.189	0.209	0.127
		(30.13)	(8.86)	(8.62)	(2.82)
	MALE*HEAD_EDUCATED	-0.068	-0.164	-0.176	-0.140
		(-6.71)	(-3.44)	(-3.26)	(-1.36)
ANYEDEXP	MALE	0.214	0.190	0.209	0.131
		(29.70)	(8.88)	(8.61)	(2.88)
	MALE*HEAD_EDUCATED	-0.068	-0.164	-0.171	-0.143
		(-6.67)	(-3.23)	(-3.18)	(-1.09)
LN_TOTALEDU	MALE	0.174	0.204	0.150	0.171
		(10.92)	(2.73)	(3.13)	(2.70)
	MALE*HEAD_EDUCATED	-0.026	-0.012	0.157	0.043
		(-1.23)	(-0.14)	(1.81)	(0.36)
Age 15-24: MALE					
CUR_ENROL	MALE	0.123	0.136	0.181	0.100
		(15.65)	(4.66)	(3.98)	(2.60)
	MALE*HEAD_EDUCATED	0.002	-0.093	-0.152	-0.041
		(0.20)	(-1.67)	(-1.69)	(-0.58)
ANYEDEXP	MALE	0.123	0.135	0.175	0.100
		(15.70)	(4.68)	(3.89)	(2.71)
	MALE*HEAD_EDUCATED	0.001	-0.093	-0.147	-0.045
		(0.08)	(-1.69)	(-1.64)	(-0.64)
LN_TOTALEDU	MALE	0.271	-0.055	0.099	0.266
		(6.09)	(-0.30)	(0.35)	(1.01)
	MALE*HEAD_EDUCATED	-0.006	0.479	0.264	-0.125
		(-0.08)	(1.93)	(0.23)	(-0.34)

Note: t-values significant at 5% are shaded.

Table 13b: Coefficient on MALE dummy and MALE*HIGH_LNPCE interaction term and t values (brackets), (with household fixed effects), All age groups.

		MHH	FHH	FCHH	FWHH
Age 5-14: MALE					
CUR_ENROL	MALE	0.215	0.222	0.224	0.209
		(34.99)	(8.52)	(7.70)	(3.62)
	MALE*HIGH_LNPCE	-0.102	-0.141	-0.114	-0.211
		(-9.35)	(-3.70)	(-2.63)	(-2.63)
ANYEDEXP	MALE	0.212	0.222	0.224	0.209
		(34.33)	(8.49)	(7.69)	(3.59)
	MALE*HIGH_LNPCE	-0.100	-0.140	-0.112	-0.194
		(-9.04)	(-3.53)	(-2.58)	(-2.40)
LN_TOTALEDU	MALE	0.137	0.137	0.152	0.072
		(9.67)	(2.58)	(2.46)	(0.70)
	MALE*HIGH_LNPCE	0.046	0.093	0.081	0.156
		(2.24)	(1.37)	(1.00)	(1.29)
Age 15-24: MALE					
CUR_ENROL	MALE	0.118	0.158	0.187	0.150
		(16.38)	(3.96)	(2.89)	(2.98)
	MALE*HIGH_LNPCE	0.013	-0.078	-0.071	-0.106
		(1.24)	(-1.53)	(-0.87)	(-1.63)
ANYEDEXP	MALE	0.117	0.161	0.186	0.145
		(16.25)	(3.81)	(2.75)	(2.90)
	MALE*HIGH_LNPCE	0.016	-0.067	-0.061	-0.094
		(1.46)	(-1.32)	(-0.76)	(-1.46)
LN_TOTALEDU	MALE	0.132	-0.259	0.193	-0.473
		(1.66)	(-0.81)	(0.40)	(-0.97)
	MALE*HIGH_LNPCE	0.167	0.549	0.084	0.779
		(1.84)	(1.59)	(0.14)	(1.50)

Note: t-values significant at 5% are shaded.

For publication enquiries, please contact:

Communication Officer
RECOUP
Faculty of Education
184 Hills Road
Cambridge CB2 8PQ
United Kingdom

tel: (01223) 507231 e-mail: recoup@hermes.cam.ac.uk

www.educ.cam.ac.uk/RECOUP/index.html

ISSN 1754–2464