

**Title: Bargaining, Gender and the Intra-household Allocation of Healthcare Resources:**

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\*\*\*\*Please note this paper has been shortened (from 50 pages) significantly. Please go to <http://www.uq.edu.au/economics/abstract/401.pdf> for the full working paper.

**Version: 3 December 2009**

We acknowledge the Asian Development Bank for providing funding to gather this data and for allowing us to use it for this work and also Prabha Prayaga for her excellent research assistance. In addition, we are grateful for comments received from Professor Denzil Fiebig, Professor Glenn Jones, Dr. Shiko Maruyama, Dr. Hong Son Nghiem, Professor Elizabeth Savage and Dr Stefanie Schurer. All mistakes and/or omissions are owned by the authors and all queries should be addressed to Grace Lordan at [g.lordan@uq.edu.au](mailto:g.lordan@uq.edu.au).

**Abstract:**

This paper focuses on how the distribution of household health resources can be influenced by bargaining within the household with a particular focus on gender biases across children for four countries; Armenia, Azerbaijan, Kyrgyzstan and Tajikistan. The framework utilised is owed to McElroy and Horney (1981). Following McElroy and Horney the value function for our bargainers is derived and it is on this that our empirical specification is based. Our measure of healthcare resources at an individual level is \$USD spent on preventative care and our analysis therefore has a multi-level structure with individuals clustered within households. The Hausman Taylor estimator is utilised to allow for certain explanatory variables to be endogenous with the household effects. The Asian Development Bank (ADB) through a household survey compiled the dataset used in this study in early 2007. The results reject the unitary model for all four countries, with the education gap between spouses being the most influential characteristic with respect to bargaining. The results also indicate a pro-boy bias with respect to resource allocation across children for all countries. In addition, a female offset of some of this pro-boy bias is found when a female is the household leader (excluding Kyrgyzstan). For these three countries pro-boy bias is worse in male lead households. Given that previous research suggests that a blanket increase in healthcare access may simply aid the advantaged group – in this case boys- it is our recommendation that schemes to offset this bias should provide free access to girls only, with particular attention being paid to the 4-16 female age group, where these biases are argued to be irrational and are certainly larger in magnitude as illustrated by our quantitative results.

**Keywords: Household Bargaining, Non-Unitary Model, Central Asia, Pro-Boy Bias, Gender Bias, Female Autonomy.**

## **Introduction:**

The received literature contains many examples of work that consider the factors that impact on household and individual level health expenditures (Matsaganis et al. (2009), Chaze (2005), Rous and Hotchkiss (2003)). The process in which households make these decisions is however ignored, with no example thus far that focuses on the distribution of intra-household healthcare resources and the effects of bargaining power. This is interesting given the amount of evidence that exists outside health economics that suggests that this decision process is not well represented by the traditional unitary modelling approach (see Thomas (1994), Browning et al. (1994) and Gray (1998)). In addition, assuming that we can indeed treat a husband and wife or household head and their spouse as a single decision maker, the potential for gender bias with respect to health resource allocation to children is also largely ignored. Therefore, this study relaxes the assumption of the unitary framework and investigates the factors that influence the decision of health resource allocation within a household. It is assumed that each household has limited monetary resources that they choose to devote to health consumption. In turn they must allocate these resources among the household members. Applications are considered that relate to four countries in Central Asia (Armenia, Azerbaijan, Kyrgyzstan and Tajikistan) and within these applications particular attention is given to resources allocated to children and whether there is pro-boy bias. In addition, attention is paid to whether the gender of the household leader determines the level of pro-boy bias.

Because a person falling ill and the subsequent severity of illness can greatly affect the quantity of resources allocated to that person with respect to health, focus on this work is on preventative expenditures. Clearly, expenditure on prevention benefits each individual in the household – albeit in varying degrees. Therefore, focusing on prevention allows us to retain all household individuals in our analyses.

When modelling the process of how resources are allocated within the household there are two approaches that a researcher can consider. These approaches centre on the assumption of whether the household is atomistic or conflictual. For the atomistic household, the traditional unitary model of intra-household resource allocation applies (Becker 1960). Specifically, this model treats the household as a single decision-making unit and households are a monolithic entity that maximizes the joint utility of its members. The assumption of a single household utility function masks any potential gender biases affecting decision-making and resource allocation, thereby assuming that male and female spouses have similar preferences. This also

assumes that variations in female autonomy are not important and thereby the distribution of ‘empowerment’ within the household does not affect the allocation of resources. There are many received papers in the development literature that suggest that this assumption may not be valid. (see for example Anderson and Eswaran (2009), Acharya and Bennett (1982), Ecevit (1991), Iyigun and Walsh (2007) and Sudhanshu (1996)). This coupled with evidence suggesting that females have different preferences to their male spouses (Schultz (2002)), and may in fact make decisions that benefit the health (Basu, 2006) of their children more, suggest that the unitary model is not appropriate when modeling the intra-household allocation of health resources. This heterogeneity of preferences has led to poverty alleviation programs, such as cash transfers, targeting female heads of households with the expectation that resources directed to women not only increase their autonomy and bargaining power, but also have a positive impact on children’s welfare<sup>1</sup>. Accordingly, it has been suggested (Folbre (1986) and Sen (1990)) that households in developing and least developing countries are better modeled as conflictual.

A conflictual approach to modelling household decision making arises by considering that an outcome –how resources are allocated within the household- which is derived through a bargaining process (McElroy and Horney, 1981) or which is a Pareto efficient outcome reached through a collective decision-making process (Chiappori, 1988). In this work, focus is on the bargaining approach and it is assumed that the head of household’s partner can be empowered by improving their threat options. In this case, threat options capture what their own position would be in the event bargaining breaks down with their spouse. The approach used in this work nests the unitary model within the non-unitary bargaining model allowing for a direct test of which model is the more appropriate. Usually the literature pertaining to developing countries models the household head and their spouse as the bargainers, for example Emerson and Souza, (2007) and Asfaw et al (2009). This approach is also taken here. In addition, a separate specification also considers the budget-holder and their partner.

Returning to the question of pro-boy bias, there is evidence in the literature that boys within the household do better than girls with respect to healthcare. None of these applications directly consider the bias with respect to the allocation of household health resources as we do in this work. There is one application that examines discrimination in healthcare financing strategies in

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<sup>1</sup> Empirical studies of cash transfer programs in Nicaragua and Mexico have confirmed this view (Gitter and Barham 2008; Attanasio and Lechene, 2002).

the case of severe illnesses of sons versus daughter (Asfaw et al, 2009). The logic behind the hypothesis is that parents may be more willing to finance the hospitalizations of their sons with their most valued assets. The findings suggest that boys are more likely to be hospitalized and that the gap in the probability of the usage of more onerous financing strategies is significant implying a pro-boy bias. A further study (Das Gupta 1987) presents simple ratios of the sex differences in medical expenditure for children living in 400 households in six villages in the Ludhiana District, Punjab. The ratios suggest that boys between 0 and 1 year do nearly twice as well with respect to these expenditures as girls in the same age, while all other age groups are treated more equally. It is worth noting that it will be subsequently argued that the former may be a rational response to boys being born more vulnerable. Although not directly linked to intra-household resource allocation, recent evidence also suggests that increases in public investment in healthcare leads to increasing access for boys first, generating inequality (Oster 2009) and that boys are more likely to have better access to healthcare (Borooah, 2004; Pande, 2003 and Gage et al.; and Sommerfelt and Piani, 1997).

Returning to the general literature on childhood gender bias, in the absence of observing individual spending on each child within the household much of this research has relied on the Engel Curve approach (see Deaton, 1989; 1997). This approach involves quantifying the differential between the reduction of the consumption of “adult goods” associated with the addition of a boy and a girl child to the household. If this differential is statistically significant, then the hypothesis of gender bias is supported. The validity of this procedure relies on the assumption of demographic separability between “adult goods” and other items underlying the restrictive Rothbarth model (see Myles, 1995). In addition, this approach is well known for its inability to detect gender-differentiated treatment even where gender bias is strongly expected. Because in this work actual spending on each individual child is observed, it is possible to develop a test for gender bias within the non-unitary household bargaining model. In addition, the model allows us to test whether having a female head of household/budget-holder affects the level of gender bias.

### **Theoretical Framework:**

In the non-unitary household model bargaining power is directly related to what the person’s fall back position would be should co-operation fail. The main ‘bargainers’ are taken to be the head of the household and their partner, with these individuals bargaining over how to divide household resources among their children. This however assumes that households are nuclear,

which is often not the case, particularly in developing countries. For example, in the data that is used in this work we observe as many as 13 different categories of household members within individual households. Clearly, it is still rational to assume that the household head and their partner are the main bargainers here with resources being divided among more individuals than just their children. This follows from the well-established rule that parents generally allocate resources among their children and that in developing/least developing countries relatives within the household typically have a lower ranking position (White, 2002). Following McElroy and Horney (1981) we derive the Nash household bargaining model by considering the household head and their partner's utility functions:

$$U^j = U^j(q, c_0, c_h, c_p, l_h, l_p) \quad (1)$$

where  $j = h, p$  indicates the household head and their partner respectively,  $c_0$  denotes household goods,  $c_j$  personal consumption and  $l_j$  personal leisure. Outside the marriage each spouse's utility is given by:

$$u_0^j = U_0^j(q_j, c_{0j}, c_j, l_j) \quad (2)$$

where  $q_j$  and  $c_{0j}$  is the amount of household goods  $j = h, p$  would have if their partnership dissolved. The individual budget constraint is:

$$I_j + w_j(T - l_j - t_j) = \frac{q_j}{q} \sum_{i=1}^k P_{ei} e_i + P_c(c_{0j} + c_j) \quad (3)$$

The main thrust of this model is that an individual's bargaining power is increasing with their opportunities external to the partnership. It is these opportunities that derive the threat point in Nash household bargaining. Even without the dissolution of the partnership, individuals with more external opportunities are afforded more bargaining power and therefore are more influential with respect to intra-household resource allocation (Park, 2007). While, the threat of divorce may never actually play out, it is the characteristics that remain with the bargainer, whether they stay or leave the marriage, that determine bargaining power.

In this work, the shift factor for a particular household spouse is assumed to be directly linked to the area in which they live. In addition, each spouse is afforded four 'bargaining chips' that can directly influence their bargaining power within the relationship. The bargaining chips

considered here relate to education, income, the gender of the household head and the age gap between the household head and their partner. Specifically, education is defined as the ratio of the household head's education relative to their partner's. Clearly the value of education is dependent on the market for education outside the household and in our specification this market is controlled for by the area effect. Therefore, for the case of the female spouse if the area has a favourable market for educated women then they are afforded more bargaining power. In addition, education can aid the partner in being more proficient with respect to the bargaining process itself.

Given that we do not observe each spouse's income an indicator as to whether or not the household head or their partner is in paid employment outside of the household is considered. Again, the market for such employment can be affected by the shift factor. Clearly, if an individual has their own income their ability to support themselves is more transparent should the marriage dissolve. Conversely, if they do not have their own income they may be more reluctant to see the marriage dissolve and hence relinquish some bargaining power. Ideally, actual income across spouses would be observed here but it has been shown that it is earned income outside the home that matters with respect to female autonomy (Anderson and Eswaran, 2009).

The gender of the head of the household can also affect their overall bargaining position. This effect arises because in some circumstances it may not be as straightforward for female heads to dissolve the marriage in comparison to male heads (and vice versa). These circumstances include the stigma of having a broken home, culture and even the gender ratio of the community, which determine the potential of future marriage prospects (Rubenstein and Wolinsky, 1994; 1995). In environments where these circumstances are unfavourable for females to dissolve a marriage, females may relinquish some bargaining power to their partner.

The final 'bargaining chip' considered relates to the age gap between the household head and their partner. The effects of this variable may be positive if when there is a large gap between the household head and their spouse's age (in our data this largely arises for men: women) the younger spouse has a weaker bargaining position. This may occur if older age is associated with more authority within the household. Given these the shift factors and four sets of 'bargaining chips' each spouse's threat point is given in the value function:

$$V_0^j = V_0^j(b_j, p', h', k | \tilde{\alpha}_c) \quad (4)$$

In equation 4  $\tilde{\alpha}_c$  is the vector of shift factors that represent the household's community and  $b_j$  is a vector of observable characteristics that may affect each spouse's bargaining power. Therefore:

$$\frac{\partial \mathcal{V}_0^f}{\partial b_f} > 0, \frac{\partial \mathcal{V}_0^m}{\partial b_m} > 0 \quad (5)$$

It is assumed that the household head and their partner allocate resources within the household so as to maximize the product of their utility gains. Therefore the demand for preventative health care for household member  $i$  in family  $k$  living in community  $c$  is given by:

$$h_{cki}^* = f(B_{ckj}, BF_{ckj}, H_{cki}, M_{cki}, MC_{cki}, MCF_{cki}, C_c, \alpha_c) \quad (6)$$

McElroy and Horney (1981) show that if the head of household's partner's preference for other household members is stronger than the head's preference, as the shift factors move in favor of the partner, the household will increase its demand for resources for those household members. For our work here this implies a movement of preventative health resources towards those in the household favored by the head of the household's partner.

As discussed, females do have different preferences towards resource allocation within the household. We therefore interact  $B_{ckj}$  (the bargaining chip vector), with gender to capture these effects. This new vector is denoted by  $BF_{ckj}$  in equation 6. In addition, given the literature suggests (Thomas 1994; 1995) that male heads may favor boys with respect to the allocation of intra-household resources the vector of children's characteristics  $MC_{cki}$  is also interacted with a female household head gender effect to give  $MCF_{cki}$ .

From equation 6 we now have several testable implications. Firstly, following Park (2007), if

$$\frac{\partial h_{ikc}^*}{\partial B_{ikh}} = \frac{\partial h_{ikc}^*}{\partial B_{iks}} \text{ the unitary household model is more appropriate. Secondly, if } \frac{\partial h_{ikc}^*}{\partial BF_{ikj}} = 0, \text{ this}$$

implies that there is no differentiating effect in the bargaining power whether the head is a male

or a female. Thirdly, if  $\frac{\partial h_{ikc}^*}{\partial MCF_{ikj}} = 0$  than there is no gender differences in the preferences

between male and female household heads with respect to household allocation of resources



between male and female children. Finally, the variables defined within  $MC_{cki}$ , which will be discussed subsequently, also allow a direct test of pro-boy bias with respect to the allocation of preventative resources across children.

So far, the methodology has considered a bargaining process whereby the two main ‘bargainers’ are the household head and their partner. It may however make more theoretical sense to consider the budget-holder and their partner as the main ‘bargainers’. While this has yet to be considered in the literature, it may arise that the budget-holder has more influence with respect to decisions concerning resources for preventative care for two reasons- first, it is they who hold the purse strings and second, expenditure on preventative care is not a significantly large decision (in comparison to buying a house, car etc.) to necessitate the household head being involved in the decision process. Therefore, this work also estimates equation 6 from the viewpoint of the household budget-holder and their partners being the main bargainers.

#### **Data Source:**

The Asian Development Bank (ADB) through a household survey compiled the dataset used in this study in early 2007 in four countries<sup>2</sup>: two Central Asian countries, Kyrgyz Republic and Tajikistan, and two countries from the South Caucasus, Armenia and Azerbaijan. The design of the questionnaire was based on the living standard surveys of the World Bank, consisted of 207 questions grouped into 19 sections, and included standard modules for household income and expenditure, asset ownership, socio-economic-demographic characteristics of households and each of their members, as well as some additional modules on various elements of well-being including health. The recall period for most questions was for the calendar year 2006. The survey also collected data on community level variables including geographic distance and travel time to key amenities and facilities, such as main roads, railway stations, community centers, shops and hospitals. Some information was also collected relevant to the year 2005, with respect to assets held and/or owned.

A stratified two-stage random sampling procedure was used, with households divided into the three strata: the capital city; other urban areas; and, rural areas. Survey interviews were conducted “face-to-face” between trained interviewers and the nominated household head in the residence of the respondent. The interviews were conducted in the principal language of the respective country. A hierarchical dataset at two levels was compiled and for each country this resulted in:

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<sup>2</sup> Please see working paper for some background information on these countries

1) 12,767 individuals clustered within 2988 households for Armenia 2) 16,701 individuals clustered within 3898 households for Azerbaijan 3) 17,334 individuals clustered within 2142 households for the Kyrgyz Republic 4) 20,346 individuals clustered within 3298 households for Tajikistan

### **Data:**

The variables described in Table 1 relate to the variables that are the main focus of this paper – these are the ‘bargaining chips’ and gender bias variables. The remaining variables are included in Appendix A (see working paper), although the rationale for their inclusion is still addressed in this section. For the descriptive statistics of all variables please see working paper.

The measure of prevention used here is preventative expenditure. This variable is defined in USD for all countries and relates to the amount spent on each individual in the household on prevention. In the analysis the natural log of this variable is utilised.

Returning to equation 6, vector  $B$  relates to variables that may influence the bargaining power of each spouse. In this study they are called ‘bargaining chips’ and for the household head (HH) specification these relate to four sets of variables. The first relates to whether the head of the household is a female. The second is a set of two indicators, which are equal to one if i) the household head works ii) the household head’s partner works in paid employment outside of the household. The third variable relates to the education gap between the household head and their spouse defined as the household head’s partner’s education in years divided by the household head’s own education in years. If the value of this variable equals one then both the partner and the head have equivalent years in education. The final variable relates to the age gap between the household head and their spouse. The education, age gap and work related  $B$  variables are interacted with a female household head indicator and these variables form vector  $BF$  in equation 6. For the budget-holder (BH) specification, an identical set of variables is created to those described for  $B$  and  $BF$ , the only difference being that they relate to the budget-holder and their partner.  $\alpha_c$  is the vector of shift factors and is defined as a vector of fixed effects pertaining to the area in which the household resides.

Vector  $Q$  in equation 6 relates to whether the individual within the household is deemed a ‘good’ investment. Of course, such perceptions cannot be directly observed and we rely on two proxies. The first of these relates to an ‘education gap’ defined as the normal number of

education years received by an individual of a particular age minus the number of years of education received by an individual. As this variable approaches zero the gap between education received and the level of education that should have been received gets smaller. The second proxy relates to whether the individual is in paid employment outside the home. This proxy is included in the absence of any information on how much income each individual member of the household contributes to the household monies. It is thought, that if the individual is an income earner, the household may view them as a better investment in terms of preventative care.

Individual characteristics (vector  $M$ ) included in this study relate to age and gender of the individual. In addition, indicators as to whether the individual is the household head or the household head's partner are included for the HH specification. For the BH specification these indicators relate to whether the individual is a budget-holder or the budget-holder's partner.

The specification in equation 6 also contains additional vectors  $MC$  and  $MCF$  which describe the individual characteristics of children. This vector is comprised of indicators denoting whether: i) the child is less than three years; ii) the child is a boy and less than three years; iii) the child is a boy less than three years and a member of a female-headed household (for the BH specification the interaction is with the female budget-holder indicator) iv) the child is less than sixteen years but greater than three years; v) the child is a boy and less than sixteen years but greater than three years; vi) the child is a boy less than sixteen years, older than three years and a member of a female-headed household (for the BH specification the interaction is with the female budget-holder indicator). This analysis separates infants (defined as three years or less) from other children (defined as between four and 16 years) because there is evidence in the literature to suggest that boys are born with less health stock in comparison to girls<sup>3</sup> it may be rational to have a pro-boy bias through the infant years. Often this is not considered in applications that investigate gender bias across children (for example Oster 2009; Gupta 1987).

The analysis also considers a number of household and community level variables that can potentially influence the level of preventative expenditure at a household level. The first relates to a measure of household wealth taken from the year prior to the survey. Although income has been the most commonly used measure of economic well-being to investigate the socioeconomic status-health expenditure relationship, wealth can be considered a superior measure as it can buffer the effects of income loss or short term income fluctuations (Pollack, *et*

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<sup>3</sup> There is evidence for newborn babies' relative differences in short-term morbidity and mortality persists between the genders (Stevenson 2000).

**Table 1: Description of Focus Variables**

Variable Name	Variable Type (Equation 8)	Variable Description
<b>Individual Level variables</b>		
Prevention \$	Dependant Variable	Individual level expenditure on prevention (USD)
Boy Child <=3	X1	Individual is <=3 years and male.
Child <=3	X1	Individual is <=3 years
FH Boy Child <=3	X1	Individual is <=3 years, male and in a female headed household
F Boy Child <=3	X1	Individual is <=3 years, male and in a female budget-holder household
Boy Child 4-16	X1	Individual is >3 & <=16 years and male.
Child 4-16	X1	Individual is >3 & <=16 years
FH Boy Child 4-16	X1	Individual is <=3 & <=16 years, male and in a female headed household
F Boy Child 4-16	X1	Individual is <=3 & <=16 years, male and in a female budget-holder household
<b>Household Level variables</b>		
BH Gender	X2	Household has a female budget-holder = 1
HH Gender	X2	Household has a female head = 1
HH Work	Z2	Head of household works = 1
HHP Work	Z2	Head of household's partner works = 1
BH Work	Z2	Budget-holder Works =1
BHP Work	Z2	Budget-holder's Partner Works =1
P/HH Education Gap	Z2	Education in years of household head's partner/ Education in years of the household head
F P/HH Education Gap	Z2	(Education in years of HH head's partner/ Education in years of the HH head) * HH gender
P/BH Education Gap	Z2	Education in years of budget-holders partner/ Education in years of the budget-holder
F P/BH Education Gap	Z2	(Education in years of budget-holders partner/ Education in years of budget-holder)*BH gender

*al.*, 2007). Unlike measures of annual income or consumption, household wealth is less volatile and might therefore be a better indicator of 'permanent income' and longer-term welfare (Sahn and Stifel, 2000). Wealth a year prior is chosen so as to best capture the effect of household planning with respect to expenditure on prevention.

In this work our measure of wealth is constructed using Principal Components Analysis (PCA) (see appendix B in working paper). Household size is also included as a household level variable. This inclusion is intuitive given that as size increases the resources allocated among household members are spread thinner. The level of remoteness of each household is also included given that access to care is a driver of preventative expenditure. This level of remoteness is based on a PCA (see working paper) that combines survey responses on questions regarding distances from the household residence to particular services. Based on the PCA, the first two components were added: the first component largely relates to distances from medical

care services (example, hospital and pharmacy) and the second largely relates to distances from transport (example bus) and infrastructure (example road). It was decided to use the survey responses that relate to distance time in minutes as it best represents the opportunity cost of pursuing preventative care<sup>4</sup>. A further household variable is included which denotes whether the household is in an urban area. The price of preventative care is an obvious factor that can influence the decision on how much preventative care to consume. Unfortunately, prices are not observed directly and we rely on an artificial measure of price which is defined as the average price paid for prevention by individuals within a primary sampling unit (PSU) that are outside a particular household. Therefore, this measure will be biased by the cultural tendency of the PSU to pursue such care.

### **Econometric Considerations:**

Assuming that the investment in preventative care for each household member is represented by the specification in equation 6,  $h^*_{cki}$ , defined as annual preventative health expenditure for person  $i$  within household  $k$  in community  $c$ , and is quantitatively determined by:

$$h^*_{ikc} = \alpha_0 + \beta' B_{jkc} + \chi' BF_{jkc} + \gamma' Q_{ijc} + \eta' M_{ijc} + \mathcal{G} MC_{ijc} + \psi' MCF_{ijc} + \phi H_{jc} + \varphi' C_c + \alpha_c + \nu_k + \varepsilon_{ikc} \quad (7)$$

where  $i, k, c$  index the individual, the household and the community respectively,  $j$  indexes the household head and their partner (budget-holder and their partner for the BH model),  $\alpha_c$  is a vector of community fixed effects,  $B$  is a vector of characteristics pertaining to the household's head and their partner's bargaining power,  $BF$  interacts vector  $B$  with a female head indicator,  $H$  is a vector of characteristics that indicate whether the individual member is a good investment,  $M$  is a vector of individual household member qualifications,  $MC$  is a vector of characteristics relating to children under the age of 16 years only,  $MCF$  interacts vector  $MC$  with a female head indicator,  $C$  is a vector of community characteristics,  $\nu_k$  is a family effect and  $\varepsilon_{ikc}$  is the usual random noise.

The use of lagged wealth avoids the possibility of the simultaneous determination of wealth and preventative expenditure. This does not however prevent endogeneity occurring through the unobserved household effects assuming the households use wealth to smooth their healthcare

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<sup>4</sup> Although a sensitivity analysis using distances in kilometres did not affect our results

expenditure. Clearly, similar effects may be expected for the variables relating to education, if the level of investment in education at an individual level is correlated with the expenditure on prevention. This can occur if certain individuals within the same household are consistently viewed as better investments than other members, and thereby consistently accrue more investment in both health and education. In addition, there is evidence to suggest that household size is endogenous to the family effects as households plan their fertility and even extend their family for increased labour (White2002), Cheater 1984)). Finally, the ability to hold employment outside the home may be an outcome of a spouse's existing bargaining power within the household (Anderson and Eswaren 2009) and therefore an indicator of a spouse's outside employment can subsequently be endogenous to the family effects.

The potential for explanatory variables to be endogenous to household random effects rules out using a GLS estimator for equation 7. It is possible to use a within transformation and estimate equation 7 with  $v_k$  specified as fixed effects. This is not ideal as many of the interesting variables in our analysis are latent to the household and using this estimator wipes these effects out. Instead, this analysis considers the Hausman and Taylor (HT) (1981) estimator. This is the first application of the HT approach to multi-level data, although it is relatively popular when considering panel data (for example Contoyannis and Rice 2001 and Egger et al. (2004)). Following, HT the explanatory variables detailed in Tables 1 and Appendix A(see working paper) are split into two sets of variables  $X=[X_1, X_2]$  and  $Z=[Z_1, Z_2]$  where  $X_1$  is  $n*k_1$ ,  $X_2$  is  $n*K_2$ ,  $Z_1$  is  $n*g_1$ ,  $Z_2$  is  $n*g_2$  and  $n=N*T$ :

$$y_{it} = x'_{1it}\beta_1 + x'_{2it}\beta_2 + z'_{1it}\alpha_1 + z'_{2it}\alpha_2 + \varepsilon_{it} + u_i \quad (8)$$

In this model  $X_1$  and  $Z_1$  are assumed to be exogenous and not correlated with the household effects and random noise components of equation 8. Conversely,  $X_2$  and  $Z_2$  are endogenous and allowed to be freely correlated with the individual household effects, but not the random noise component of equation 8 (See Table 1 and Appendix A in working paper where the division of variables is indicated into  $x_1, x_2, z_1, z_2$ ). In this work the endogenous variables relate to the wealth, household size, spouse employment and education variables. The intuition behind the model involves defining instruments from within the model by utilising the group mean deviations derived from the usual fixed effects estimator. For identification purposes it is necessary that  $X_1$  is at least as large as  $Z_2$  and the Hausman test can be used as a test for legitimate instruments (please see working paper for further details on this approach).

## Recall Bias and Sample Selection:

Up until this point the issue of sample selection has not been addressed. This is because what we are interested in is how the limited monetary resources within the household get divided up. That is, it is assumed that the household has a limited level of monies to spend on healthcare and individuals who receive more of these monies are better off-or even favoured-in comparison to those that receive less. In this respect, sample selection is not an issue. In addition, assuming there is no differences in the type of free schemes targeted at children who are threeyears of age or younger and aged between four and sixteenyears across genders than the comparison across groups with respect to gender bias is valid. To our knowledge this is the case here. Following this line of thought, it is not sensible to make inferences based on the differences between the coefficients of  $\leq 3$  and 4 to 16 year olds and this is avoided in this work.

A more pertinent issue surrounds the problem of recall bias. Given that the interviewee has been asked to recall expenditure on prevention for a 12-month period there is a risk of inaccurate reporting. In order to test the robustness of our conclusions we consider a second specification. Here  $h^*_{cki}$ , is re-defined as simply whether or not person i within household k in community c pursued healthcare in 2006. The logic here is that our interviewee is less likely to suffer recall bias with a simple yes/no question. Given this change equation 6 now becomes:

$$h^*_{ikc} = \alpha_0 + \beta B_{jkc} + \chi BF_{jkc} + \gamma Q_{ijc} + \eta M_{ijc} + \theta MC_{ijc} + \psi MCF_{ijc} + \phi C_c + \alpha_c + v_k + \varepsilon_{ikc} \quad (9)$$

The reader will notice that variables latent to the household have been dropped from equation 9. This is necessary to allow incorporation of fixed effects (that is,  $v_k$  is now a vector of household fixed effects), as the Hausman and Taylor approach is not applicable to the binary probit specification. This implies that all of our bargaining chips are now subsumed into the particular household's fixed effect. The point here is simply to examine whether the gender biases found in specification 7 still hold when sample selection is irrelevant and recall bias risk is assumed to be more minimal.

## Results:

All estimation was achieved using Limdep 9.0 and the details of the estimation approach for the Hausman Taylor estimator are detailed in the software's manuals (Greene, 2007). For all eight specifications the Hausman tests indicate that our instruments are legitimate. Focus in this

section is on results relating to the variables contained in vectors  $B, BF, MC$  and  $MCF$  (see equation 7) that relate to the bargaining chip and gender bias hypotheses. All other results are documented in Appendix D in the working paper.

The results pertaining to the bargaining chip variables are documented in Table 2. It is clear that these results support the rejection of the unitary model with the main significant effects emanating from the education variables. Recall that these variables are described as the ratio in years of education between the spouse and the head (budget-holder) and also include interaction effects with a female household head (budget-holder) indicator. A positive relationship between preventative expenditure and the education gap implies that as the partner gets more education there is more spending on prevention. Conversely a negative relationship implies that as the partner gets more education there is a negative relationship between expenditure on prevention. The coefficients illustrate the case where the ratio is 1:1. For Armenia, more money will get spent on prevention if the spouse has more education. This is illustrated by the positive coefficients on the P/HH (0.086) and P/BH (0.07) variables. In addition, the negative coefficients on the F P/HH (-0.059) and F P/BH (-0.089) imply that as female head education levels increase then more is spent on prevention. Interestingly, the negative coefficient also implies that when the female leader and her spouse have the same education, spending is less on prevention all else being equal. The same result is seen for the Kyrgyz Republic, where the coefficients on P/HH (0.128) and P/BH (0.07) are positive and the coefficients on F P/HH (-0.137) and F/P/BH (-0.087) are negative.

For Azerbaijan and Tajikistan, the results are the opposite with both P/HH and P/BH being negative. This suggests that when the education gap between a head/budget-holder and spouse is zero then there is less prevention purchased, with even less being purchased as the spouse gets more education. In addition, the coefficients on F P/HH and F P/BH are positive. Overall, this implies that the more educated the male is in the household the more prevention that is purchased. In addition, it also implies that when the ratio of education between the female lead and their spouse is 1:1, in Azerbaijan there will be 4% and 6% additional expenditure on prevention for the household and budget-holder specification respectively. The equivalent figures for Tajikistan are 4% and 9%.

Outside of the education variables, there are few other variables significant in Table 2. Exceptions to this pertain to the variables relating to the employment. Specifically, for Armenia, in the BH specification, if the spouse works then more prevention is purchased. This is



illustrated by the positive coefficient on the BHP work variable (0.026). In Azerbaijan, if the household head works then there is less spent on prevention. This is illustrated by the negative coefficient on the HH work variable (-0.070). In the Kyrgyz republic in the BH specification, if the household head works then more is spent on education (BH work, 0.023). Finally, while the age gap variables are insignificant for Armenia, Azerbaijan and the Kyrgyz republic, the P/HH age gap and P/BH age gap variables are significant and positive for Tajikistan. This suggests that as the age gap narrows between the household head and their partner more is spent on prevention.

### **Children and Gender Bias Results:**

The results for the gender bias variables pertaining to intra-household allocation across children are documented in Table 3. In Armenia, we see gender discrimination. In particular, both female heads and female budget-holders favour male children who are less than three years. This is illustrated by the coefficient on FH boy child  $\leq 3$ , which suggests that if the household head is a female baby boys receive almost 19% more prevention resources than others in the households. For the budget-holder specification, the coefficient implies an 8% increase for boys in this group. Of course, as previously explained, this may be rational given baby boys are more vulnerable. For children between the ages of four and 16 years there is a pro-boy bias, which implies that 4% and 7% more resources are allocated to this group from the household head and budget-holder specification respectively. Interestingly, if a female is in charge this effect is more than offset (we call this a 'female offset') with an 8% decrease in the resources allocated to these boys, regardless of whether the household head or budget-holder specification is considered.

In Azerbaijan, there is positive bias towards all children less than three years regardless of sex. Again, there is a pro boy bias for those children between four and 16 years that amounts to boys getting 11% more resources in comparison to girls. Interestingly, females who are between 4 and 16 years get 6% less resources<sup>5</sup>. In addition, there is a female offset for the 4 to 16 age group, implying that boys in this age group living in a female-headed (female budget-holder) household receive 4% (5%) less than other boys in terms of preventative resources allocation.

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<sup>5</sup> Although this effect is insignificant in the budget-holder specification, implying that boys between the ages of 4-16 get 6% and 11% more resources than all other household members for the household and budget-holder specification respectively

In the Kyrgyz Republic, we again see a pro-boy bias for children who are less than three years. Given the coefficients on the child  $\leq 3$  variables, this advantage is rather minimal in comparison to other household members, all else being equal. The child  $\leq 3$  variable does imply however that little girls do quite badly in comparison to other household members, receiving about 14% less preventative resources. There is a female offset for little boys living in a household that is female-led of about 5%. Again, given the coefficient on the child  $\leq 3$  variable, this female offset implies that little boys living in female-led households, while doing better than little girls of the same age, are worse off than other members all else equal.

Considering the older children, there is a pro-boy bias of 7% and 5% for the household and budget-holder specification respectively. This advantage is largely offset by the child 4-16 coefficients implying that all children in this group receive approximately 6% less resources than others regardless of gender. This negative is absorbed fully by females in this age group and there is no female offset.

In Tajikistan, we see pro-boy bias for children three years or less with the results implying that they receive between 12% and 16% more resources than others for the household head and budget-holder specification respectively. Little girls also do better than other family members- excluding little boys- given that the child  $\leq 3$  coefficient implies that they receive approximately 7% additional resources, all else being equal.

There is also a female offset of the pro-boy bias, with little boys living in female-headed (budget-holder) households receiving 5% (14%) less resources. Considering the older children, the results illustrate a pro-boy bias of 2% and 3% increases for the household head and budget-holder specification respectively. These gains are however more than offset by females if the boy lives in a female-led household, with the results implying a subsequent decrease of 4% for these boys.

**Table 2: Bargaining Chip Results:**

Variable Name	Armenia		Azerbaijan		Kyrgyz Republic		Tajikistan	
	HH	BH	HH	BH	HH	BH	HH	BH
HH (BH) Gender	-0.047 (0.090,0.599)	-0.055 (0.115,0.634)	-0.066 (0.134,0.622)	-0.165 (0.164,0.311)	0.142 (0.121,0.238)	0.036 (0.085,0.678)	-0.144 (0.107,0.180)	-0.012 (0.100,0.902)
HH (BH) Work	-0.002 (0.029,0.941)	0.012 (0.013,0.343)	<b>-0.070***</b> ( <b>0.005,0.000</b> )	-0.018 (0.020,0.379)	0.013 (0.025,0.622)	<b>0.021***</b> ( <b>0.013,0.009</b> )	0.007 (0.030,0.819)	0.008 (0.007,0.265)
HHP (BHP) Work	-0.010 (0.029, 0.740)	<b>0.026*</b> ( <b>0.015,0.086</b> )	0.052 (0.046,0.265)	-0.006 (0.023,0.784)	-0.024 (0.028,0.394)	-0.014 (0.016,0.374)	0.172 (0.030,0.561)	0.008 (0.006,0.260)
P/HH (P/BH) Age Gap	0.098 (0.125,0.438)	<b>0.006</b> ( <b>0.170,0.971</b> )	0.062 (0.109,0.568)	0.073 (0.112,0.519)	0.064 (0.091,0.483)	0.042 (0.039,0.283)	<b>0.023</b> ( <b>0.003,0.000</b> )	<b>0.017</b> ( <b>0.004,0.000</b> )
F P/HH (P/BH) Age Gap	-0.008 (0.037, 0.829)	<b>-0.007</b> ( <b>0.006,0.191</b> )	-0.062 (0.047,0.190)	-0.007 (0.013,0.568)	-0.051 (0.102,0.611)	-0.036 (0.051,0.487)	-0.007 (0.013,0.568)	-0.042 (0.097,0.666)
P/HH (P/BH) Education Gap	<b>0.086***</b> ( <b>0.017,0.000</b> )	0.077 (0.016,0.426)	-0.155 (0.110,0.158)	<b>-0.200***</b> ( <b>0.033,0.000</b> )	0.128 (0.108,0.232)	<b>0.031***</b> ( <b>0.002,0.000</b> )	<b>-0.114***</b> ( <b>0.041,0.000</b> )	<b>-0.011***</b> ( <b>0.003,0.000</b> )
F P/HH (F P/BH) Education Gap	<b>-0.059***</b> ( <b>0.005,0.000</b> )	<b>-0.089***</b> ( <b>0.027,0.000</b> )	<b>0.042***</b> ( <b>0.006,0.000</b> )	<b>0.062***</b> ( <b>0.015,0.000</b> )	<b>-0.037***</b> ( <b>0.013,0.000</b> )	<b>-0.087***</b> ( <b>0.015,0.000</b> )	<b>0.035***</b> ( <b>0.016,0.000</b> )	<b>0.097***</b> ( <b>0.005,0.000</b> )

**Table 3: Gender Bias and Children Results**

Variable Name	Armenia		Azerbaijan		Kyrgyz Republic		Tajikistan	
	HH	BH	HH	BH	HH	BH	HH	BH
Boy Child <=3	0.041 (0.062,0.509)	0.074 (0.065,0.259)	0.010 (0.095,0.917)	0.037 (0.097,0.704)	0.157*** (0.050,0.002)	0.139*** (0.053,0.009)	0.123*** (0.033,0.000)	0.158*** (0.034,0.000)
Child <=3	-0.008 (0.054,0.886)	-0.015 (0.054,0.280)	0.239*** (0.082,0.003)	0.238*** (0.081,0.003)	-0.143*** (0.044,0.001)	-0.145*** (0.043,0.001)	0.072*** (0.027,0.007)	0.072*** (0.026,0.006)
FH (F) Boy Child <=3	0.188* (0.106,0.076)	0.080*** (0.001,0.000)	0.141 (0.131,0.284)	-0.005 (0.120,0.966)	-0.082*** (0.017,0.000)	-0.049*** (0.014,0.000)	-0.051*** (0.010,0.000)	-0.136*** (0.045,0.002)
Boy Child 4-16***	0.043*** (0.001,0.000)	0.066** (0.032,0.042)	0.112*** (0.045,0.012)	0.110** (0.045,0.015)	0.067*** (0.025,0.007)	0.054*** (0.025,0.032)	0.015*** (0.002,0.000)	0.034*** (0.006,0.000)
Child 4-16	-0.015 (0.031,0.640)	-0.021 (0.031,0.497)	-0.065*** (0.014,0.000)	-0.062 (0.044,0.155)	-0.062*** (0.026,0.019)	-0.063*** (0.026,0.016)	0.009 (0.016,0.560)	0.008 (0.015,0.550)
FH (F) Boy Child 4-16	-0.081* (0.044,0.063)	-0.083** (0.037,0.026)	-0.042*** (0.005,0.000)	-0.051*** (0.016,0.000)	-0.035 (0.039,0.377)	-0.015 (0.030,0.319)	-0.047** (0.024,0.049)	-0.043** (0.195,0.050)

The results for the sensitivity analysis are documented in the working paper. As expected, these results change significantly with respect to the magnitude of the coefficients; however the overall conclusions are largely unaltered. That is, for all countries we still see pro-boy bias for children between the ages of four and 16 with this bias being offset by female leaders in both the household head and budget-holder specifications. The main difference is that the female offset coefficients are now significant for Tajikistan when they were previously not significant.

## **Discussion and Conclusions**

This paper focuses on how the distribution of household health resources can be influenced by bargaining within the household with a particular focus on gender biases across children for four countries; Armenia, Azerbaijan, Kyrgyzstan and Tajikistan. The framework utilised in this study is owed to McElroy and Horney (1981) and in our work there are two sets of bargainers: i) the household head and their partner: ii) the budget-holder and their partner. Following McElroy and Horney the value function for our bargainers was derived and it is on this that our empirical specification is based. Our measure of healthcare resources at an individual level is \$US spent on preventative care. It was decided to analyse preventative care rather than healthcare expenditure as it is something that can benefit all individuals in the household. The Hausman Taylor estimator is utilised to allow for explanatory variables to be correlated with the household effects.

The results from the analysis indicate that the non-unitary model is appropriate for all four countries. Specifically, the most important bargaining chip is the education gap – that is, the gap between a household leader's education and their spouses. For both Armenia and the Kyrgyz Republic more money will be spent on prevention if the female of the household is more educated regardless of position. Interestingly, the results also imply if the female is the head/budget-holder than there is 6% and 9% less spending on preventative resources if there is no gap between theirs and their spouse's education. While this may seem contrary to prediction, it is consistent with evidence that suggests that female-led households are relatively worse off than others (feminisation of poverty) (Huisman 2005 and Ruwanpura 2009) and can also be explained by female-led households having relatively less accrued education than others for these four countries. For Azerbaijan and Tajikistan, the results suggest that when there is a female budget-holder/head than 6% and 4% extra is spent on prevention respectively. Interestingly, the results also imply that more is spent on prevention, as the education gap gets bigger between male and females, with the males having more education. This result may be

somewhat attributed to households where males are highly educated being of higher socio-economic status in this dataset.

Considering gender bias, the results indicate that there is a pro-boy bias with respect to resource allocation across children for all countries. In addition, there is a female offset of some of this pro-boy effect when a female is either the household head or budget-holder (albeit this effect is not significant for the Kyrgyz Republic in the main specification). This indicates that pro-boy bias is worse in male lead households. The conclusions here are robust to a sensitivity analysis.

The differences between the budget-holder and household head specifications are evident in the magnitude of the coefficients and most often the magnitude of the coefficient in the budget-holder specification is higher, albeit not to a great extent. The overall conclusions from both of these specifications are the same. It is recommended however that future surveys such as this one consider a question for each component of expenditure that asks ‘who decides on expenditure here, the budget-holder or the household head’ in order that a trade-off of decision-making be established between these two roles.

As this is the first piece of work to consider the intra-household allocation of healthcare resources and gender biases across children, it is difficult to compare our results to others. It is sufficient to say that the findings of gender biases here are perhaps not surprising given that such biases have been found in the allocation of other resource types (Kurz and Johnson-Welch 1997; Hazarika, 2000; Mishra et al., 2004; and Chodhury et al., 2004). From a policy perspective, assuming that policymakers may wish to increase the consumption levels of preventative care, it is difficult to advise that education should be increased for either males or females, even with the quantitative results implying that it is the females that should be educated in Armenia and the Kyrgyz Republic and males in the other two countries. This is because these results are based on the gap between the education of the spouse and the household head/budget-holder rather than actual years in education as a proxy of bargaining power within the household. Hence, both highly educated households with no gap and those households with low education and no gap are pooled together. Rather, the main contribution of this research to policy is the highlighting of a clear gender bias. Given that previous research suggests that a blanket increase in access may simply aid the advantaged group – in this case the boys (Oster 2009 and Boorah 2004) it is our recommendation that schemes to offset this bias should provide free access to girls only, with particular attention being paid to the four to sixteen years female age group, where these biases are argued to be irrational and are certainly larger in magnitude as

illustrated by our quantitative results.

## References:

- ANDERSON, S. & ESWAREN, M. (2009) What determines female autonomy? Evidence from Bangladesh *Journal of Development Economics* 90, 179-191.
- ASFAW, A., LAMANNA, F. & KLASSEN, S. (2009) Gender gap in parents' financing strategy for hospitalization of their children: evidence from India. *Health Economics*.
- BASU (2006) Gender and Say: a Model of Household Behaviour with Endogenously Determined Balance of Power. *Economic Journal* 116, 558-580.
- BECKER (1960) An economic analysis of fertility. *Demographic and Economic Change in Developed Countries*. Princeton New Jersey Princeton University Press and NBER.
- BOROOAH, V. K. (2004) Gender bias among children in India in their diet and immunisation against disease. *Social Science and Medicine*, 58, 1719-31.
- BROWNING, M., BOURGUIGNON, F., CHIAPPORI, P. A. & LECHENE, V. (1994) Income and outcomes: a structural model of intrahousehold allocation. *Journal of the Political Economy* 102, 1067-1096.
- CHAZE, J. P. (2005) Assessing household health expenditure with Box-Cox censoring models. *Health Economics*, 14, 893-907.
- CHEATER, A. P. (1984) *Idioms of accumulation: Rural development and class formation among freeholders in Zimbabwe*, Gweru Mambo Press.
- CHIAPPORI, P. A. (1988) Rational Household Labor Supply. *Econometrica*, 56, 63-90.
- CONTOYANNIS, P., JONES, A. M. & RICE, N. (2004) The dynamics of health in the British household panel survey. *Journal of Applied Econometrics*, 19, 473-503.
- DEATON (1989) Looking for Boy-Girl Discrimination in Household Expenditure Data. *World Bank Economic Review* 3, 1-15.
- DEATON, A. (1997) *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy*. Washington D.C.
- DEVELOPMENT CENTRE (2009) *Gender, Institutions and Development Database*. OECD.
- EGGER, P. & PFAFFERMAYR, M. (2004) Distance, trade and FDI: A Hausman-Taylor SUR approach. *Journal of Applied Econometrics*, 19, 227-246.
- EMERSON, P. M. & SOUZA, A. P. (2007) Child labor, school attendance, and intrahousehold gender bias in Brazil. *World Bank Economic Review*, 21, 301-316.
- FILMER, D. & PRITCHETT, L. (1999) The effect of household wealth on educational attainment: Evidence from 35 countries. *Population and Development Review*, 25, 85
- FILMER, D. & PRITCHETT, L. H. (2001) Estimating wealth effects without expenditure data - Or tears: An application to educational enrolments in states of India. *Demography*, 38, 115-132.
- FOLBRE, N. (1986) Hearts and Spades - Paradigms of Household Economics. *World Development*, 14, 245-255.
- GAGE, A. J., SOMMERFELT, A. E. & PIANI, A. L. (1997) Household structure and childhood immunization in Niger and Nigeria. *Demography*, 34, 295-309.
- GRAY (1998) Divorce-law changes, household bargaining, and married women's labour supply. *American Economic Review*, 88, 628-642.
- GREENE, W. H. (2007) *Econometric Modelling Guide: Limdep Version 9.0* New York Econometric Software
- GREENE, W. H. (2008) *Econometric Analysis* New Jersey Pearson Prentice Hall
- GUPTA, M. D. (1987) Selective Discrimination against Female Children in Rural Punjab *Population and Development Review* 13, 77-100.

- HAUSMAN, J. A. & TAYLOR, W. E. (1981) Panel Data and Unobservable Individual Effects. *Econometrica*, 49, 1377-1398.
- HAZARIKA, G. (2000) Gender differences in children's nutrition and access to health care in Pakistan. *Journal of Development Studies*, 37, 73-92.
- IYIGUN, M. & WALSH, R. P. (2005) Building the family nest pre-marital investments, marriage markets and spousal allocations. *Discussion paper no. 1752*. Bonn, Germany, IZA.
- MANN, E. A., MCCARTNEY, K. & PARK, J. M. (2007) Preschool predictors of the need for early remedial and special education services. *Elementary School Journal*, 107, 273-285.
- MATSAGANIS, M., MITRAKOS, T. & TSAKLOGLOU, P. (2009) Modelling health expenditure at the household level in Greece. *European Journal of Health Economics*, 10, 329-36.
- MCELROY, M. B. & HORNEY, M. J. (1981) Nash-Bargained Household Decisions - toward a Generalization of the Theory of Demand. *International Economic Review*, 22, 333-349.
- MISHRA, V., ROY, T. K. & RETHERFORD, R. D. (2004) Sex differentials in childhood feeding, health care, and nutritional status in India. *Population and Development Review*, 30, 269.
- MYLES (1995) *Public Economics*, Cambridge, Cambridge University Press.
- OSTER, E. (2009) Does increased access increase equality? Gender and child health investments in India. *Journal of Development Economics*, 89, 62-76.
- PANDE, R. P. (2003) Selective gender differences in childhood nutrition and immunization in rural India: The role of siblings. *Demography*, 40, 395-418.
- PARK, C. (2007) Marriage market, parents' bargaining powers, and children's nutrition and education. *Oxford Bulletin of Economics and Statistics*, 69, 773-793.
- POLLACK, C. E., CHIDEYA, S., CUBBIN, C., WILLIAMS, B., DEKKER, M. & BRAVEMAN, P. (2007) Should health studies measure wealth? A systematic review. *American Journal of Preventative Medicine*, 33, 250-64.
- ROUS, J. J. & HOTCHKISS, D. R. (2003) Estimation of the determinants of household health care expenditures in Nepal with controls for endogenous illness and provider choice. *Health Economics*, 12, 431-51.
- RUBINSTEIN, A. & WOLINSKY, A. (1994) Rationalizable Conjectural Equilibrium - between Nash and Rationalizability. *Games and Economic Behavior*, 6, 299-311.
- RUWANPURA, K. N. (2009) Gender, Generation and Poverty: Exploring the 'Feminisation of Poverty' in Africa, Asia and Latin America. *Feminist Economics*, 15, 158-163.
- SAHN, D. E. & STIFEL, D. (2003) Exploring alternative measures of welfare in the absence of expenditure data. *Review of Income and Wealth*, 463-489.
- SAHN, D. E. & STIFEL, D. C. (2000) Poverty comparisons over time and across countries in Africa. *World Development*, 28, 2123-2155.
- SCHULTZ (2002) Why Governments Should Invest More to Educate Girls *World Development* 13, 827-846
- SEN, A. (1990) Economics and the Family. *Asian Development Reviews* 15-26.
- SUDHANSHU (1996) The Determinants of Female Headship in Jamaica: Results from a Structural Model. *Economic Development & Cultural Change*, 44, 793-815.
- THOMAS, D. (1994) Like father, like son; like mother, like daughter: parental resources and child height. *Journal of Human Resources* 29, 959-988.
- WHITE, H. (2002) Combining quantitative and qualitative approaches in poverty analysis. *World Development*, 30, 511-515