I Intrahousehold Resource Allocation

I.1 Why intrahousehold resource allocation issues?: An introduction

Many important decisions that affect economic development outcomes take place at the household level, including fertility decisions, education of children, labor force participation, and production activities at various agricultural and nonagricultural household enterprises. Naturally, many empirical studies in development economics use the household as the unit of analysis. Most of those studies, albeit with a growing number of exceptions, treat the internal decision making processes within the household as a ‘black box’; that is, relatively little attention has traditionally been paid to what happens within the household, such as how the decisions are made and how resources are allocated among household members.

There has been an increasing recognition, however, that some aspects of intrahousehold resource allocation issues are of potential importance for policymakers for at least two reasons. First, paying attention to the individual-level welfare, rather than the household-level welfare, may affect the policymakers’ views about who and where the poor are. There is a possibility, for example, that some households whose average per capita incomes/expenditures are above the poverty line may still contain household members whose standard of surviving actually falls below the poverty line due to intrahousehold inequality in resource allocation (e.g., Haddad and Kanbur (1990)). Secondly, the way household members allocate resources among themselves could potentially affect the effectiveness of policy interventions and may even lead to unintended consequences for policymakers. One classic example is the possible household responses to school feeding programs; there has been reported incidence that when children receive meals at school their food allocation at home are reduced in response in order to feed other household members in the household who do not receive meals at school (e.g., Beaton and Ghassemi (1982)). There are other instances where policy interventions

---

2Corresponding author. Development Studies Center, Institute of Developing Economies. E-mail to: itohse@ide.go.jp
1This section draws on Fuwa et al. (2000).
 Yet, whether such unintended effects exist is an important empirical question. For example, Jacoby (2002) found that
are nullified by the ‘unanticipated’ responses by the household, including some instances of the introduction of new agricultural technologies and microcredit programs.\[^{33}\] Those examples reveal that understanding how resources are allocated within the households and how policy interventions could potentially affect such allocation behavior is of great importance for policymakers.

### 1.2 Modeling intrahousehold resource allocation behavior

Modeling household behavior has been among the core of microeconomics, and, traditionally in the majority of studies (exclusively until the 1980s and many of them still today), household behavior is analyzed under the assumption that household members are in complete agreement as to how best to combine their time and other resources to attain maximum possible welfare among the members (e.g., Becker, 1991; \[\text{Rosenzweig and Evensson, 1977}\]; Singh, Squire and Strauss, 1986). The models based on such a view have been named the ‘unitary’ household models (Alderman, et al., 1995). Certain types of intrahousehold resource allocation phenomena, including some aspects of gender disparity, have been analyzed under such theoretical/conceptual frameworks in the literature (Behrman, 1988a; 1988b; Rosenzweig and Schultz, 1982; Pitt, Rosenzweig and Hassan, 1990).

However, there has been an increasing recognition that the unitary models of household behavior may not be adequate for analyzing intrahousehold resource allocation behavior. In addition to the fact that unitary model assumption (i.e., household members are always in agreement in priority and preferences) is perhaps not a good description of the reality, certain phenomena such as the incidence of domestic violence, for example, apparently contradict the unitary view of household behavior. In addition, there has been accumulating empirical evidence that contradicts key underlying assumptions of the unitary models, especially the income pooling approach (e.g., Bourgignon et al. 1994; \[\text{Haddad and Hoddinott, 1994}\]; Thomas, 1990; 1993; 1997; Thomas and Chen, 1994; Schultz, 1990).

As a consequence, various alternative theoretical models have been developed that relaxes the key assumptions of the unitary model. Those more general models have been loosely called ‘collective’ models of household behavior, where the unitary models are special cases (Alderman, et al (1995)). Those models typically assume that different household members have different preferences and/or different ‘bargaining powers,’ and intrahousehold resource allocation outcomes emerge as a result of interactions among those elements (e.g., McElroy and Horney, 1981; Manser and Brown, 1980; Chiappori, 1988; Lundberg and Pollak, 1993; \[\text{Carter and Katz, 1997}\]).

It is important to recognize that, as noted above, some of the intrahousehold resource allocation phenomena can be and have been explained by the unitary models as well as by collective models.

---

\[^{33}\]See Alderman et al. 1995; Fuwa, et al., 2000, for other such examples.
For a policymaker’s point of view, as far as different theoretical models produce the same predictions about the relationships between policy instruments and intrahousehold outcomes, which model to base her/his analysis on is not of much significance in terms of how she/he may design policy interventions (Hoddinott (1992)). For example, Rosenzweig and Schultz [(1990)] is a classic study explaining the differential survival probabilities by gender in rural India by differential employment opportunities for women based on the unitary model framework. The same reduced form relationship can also be interpreted as the outcome of bargaining processes between the husband and the wife within the household based on a collective model approach (Folbre 1984). Whatever theoretical models one uses, however, the policy implication is essentially the same: enhancing employment opportunities for women could reduce the gender gap in survival probabilities between boys and girls.

1.3 When and why theoretical models make significant differences for policy makers

Nevertheless, there are ample examples where what theoretical framework to use for policy analysis makes a significant difference in terms of policy implications. And some of those issues will be explored in detail in the specific papers collected in this volume. One such example has to do with the validity of the so called the ‘income pooling’ assumption underlying the unitary models. This assumption posits that incomes brought into the household by different household members are ‘pooled’ and the question of ‘who’ brings ‘how much’ incomes into the household has no bearing on how such pooled incomes are subsequently allocated/spent on various goods and services within the household. In contrast, however, if the identity of income earners within the household affects the patterns of household consumption expenditures, then policy makers, in implementing welfare payment programs, for example, would need to carefully design who (among the household members, such as the wife or the husband) should be the designated recipient of such transfer payments from the government (Lundberg, Pollak and Wales (1997)).

Secondly, while all the unitary models and a subset of the collective models assume that intrahousehold resource allocation processes result in Pareto efficient outcomes, such outcomes may not always result in reality. If resource allocation outcomes are not efficient, there may be additional rooms for policy intervention. Most notably, such examples of inefficient resource allocation outcomes within the household have been documented in the context of agricultural production in some African countries (Jones, 1986; Udry, 1996). Udry (1996) demonstrated that marginal productivity of land is not equalized between wife-managed plots and husband-managed plots for the case of Burkina Faso, even after controlling for land quality, which is in clear violation of the Pareto efficiency in intrahousehold resource allocation. More recently, stochastic extension of the Pareto
efficiency test has been attempted by Dercon and Krishnan (2000) and Duflo and Udry (2002), who found that income shock is not fully pooled within a household, another violation of the Pareto efficiency.

Finally, collective models often point to the possibilities where institutions and social norms that differentially affect the access of different household members to various economic resources can have significant implications for intrahousehold resource allocation outcomes. Such institutions include: laws and other social norms governing marriage, inheritance and access to common property resources (Haddad and Kanbur, 1992; Chiappori, Fortin and Lacroix, 2002; etc.). Under such circumstances, Pareto optimal resource allocation is not necessarily guaranteed. Moreover, specific rules and norms governing household members are not sufficient to mitigate enforcement problems and often fail to overcome issues of commitment failure under serious imperfect information within a family. Using experiments with microfinance participants in the Philippines, Ashraf (2005) found that intrahousehold information sharing and communication is important in order to enhance efficiency of resource allocation. While growing numbers of programs provide transfer income solely to women and exclude men, such programs may induce intrahousehold conflict such as domestic violence. Alternatively, transfers can be provided to husband and wife together under full information sharing.

In sum, under certain circumstances, distinguishing alternative models of household behavior is not only of academic interest but is also likely to have important implications designing policies.

1.4 Some common limitations in the empirical literature and the main contributions of the present study

As recognized in all papers included in this special issue, there appear to be two notable data limitations that are common across many studies in the existing literature. The dataset used for the papers in this volume attempts to rectify (at least partially) those issues. Demonstrating the utility of such innovation in data collection is among the major contributions of the papers collected in this volume.

- Lack of time use data: Intrahousehold allocation of time among its members is among the most important outcomes of intrahousehold cross-persons effects; In typical large scale household survey data (such as most of LSMSs), consumption of leisure is not documented (mainly due to the lack of information on household chores);
- Potential endogeneity of ‘bargaining power’ proxy variables (see Quisumbing and Maluccio, 2000, for a short review of the measurement issues of bargaining power): Early studies of testing (and rejecting the unitary models) tested the ‘income pooling’ assumption of the unitary
model by utilizing information on non labor incomes, but as often pointed out, such incomes cannot be regarded as exogenous. Some developed country studies used samples limited to ‘couples of full-time employed workers,’ with the assumption that labor supply decisions are largely fixed for such population. Given the relatively small population in developing countries of such couples (many jobs are not stable and self-employment is more important in developing countries), applying the same approach does not seem feasible. While some studies (in developed countries) utilized spatial (or temporal) variations in laws governing gender relationships (marriage laws), in developing country contexts, instances of such clear variations in legal statute are perhaps not readily available nor is it clear if such statutes are enforced as rigorously as in developed country contexts.

The papers in this volume are based on the dataset collected with those limitations of the existing studies in mind. In the survey, we collected detailed time use data (remedy to the first problem), and we went back in time (pre-marital; parental generation) and collected information on extra-household linkages (such as existence or absence of parents of the couple), remedy to the second problem.

II Women’s Work and Intrahousehold Resource Allocation

In examining intrahousehold resource allocation, the allocation of time is an important aspect since the way a household allocates its member’s time among various economic activities is a crucial determinant of its income level and human capital investments (Harvey and Taylor, 2000). In this section, we review selectively the existing studies on female labor participation as an important dimension of intrahousehold time allocation and as a key determinant of household income.

In general, it is known that the female labor force participation rate tends to decline in the early stages of economic development and then increases. This is the U hypothesis of female labor market participation in the process of economic development (Durand, 1975; Goldin, 1995). The association between the two variables can be seen in Figure 1, which used a data set for 144 countries to plot the labor market participation rate of women against logarithm of per capita GDP in 1985 US dollar price. In Figure 1, the horizontal axis is log GDP per capita based on purchasing power parity (PPP), i.e., gross domestic product converted to international dollars using purchasing power parity foreign exchange rates. The vertical axis represents the female labor force as a percentage of the total which shows the extent to which women are active in the labor force. The quadratic fitted line does indicate the U-shape relationship, especially if we omit the ‘outlier’ Persian gulf countries.

Along the latter part of the U curve, an increase in female labor market participation is regarded as a sign of better achievements in developed countries. While women’s low labor participation
rate often be regarded as an outcome of quantity and wage discriminations against female labor, in general more women decide to work outside as a result of better labor market condition due to a country’s improving economic condition (Mammen and Paxson, 2000). Even in the context of middle-income countries, there is an emerging literature on the positive impact of child care services on maternal employment (Hallman et al., 2005; Connelly et al., 1996; Lokshin et al., 2000).

While in developed countries, women’s labor force status is regarded as an important progress indicator of a society, in developing countries, maternal labor participation often occurs as a consequence of poverty, involving undesirable outcomes such as withdrawals of children from schools and children’s engagements in domestic and outside labor. In the earlier stages of economic development when agriculture is the dominant mode of production, female labor participation in family farms, household businesses, and domestic workshop should be very high. In these stages, however, women’s education level is low and thus their only wage labor opportunity outside the home is paid manual work. By using Indian household data, Mammen and Paxson (2000) found that more than 60 percent of both rural and urban working women at the lowest levels of per capita expenditure work for wages. Accordingly, unlike in developed countries, women’s high labor participation rate in developing countries should be understood as a response against poverty and resource constraints.
under limited market accessibility. Often, researchers identify the low level of female labor market participation and exclusion from formal sector as a source of lower levels of well-being of women, i.e., “female marginalization.” However, such an interpretation is misleading unless we carefully consider the constraints households face and the consequences of maternal labor participation on intrahousehold labor allocation. Assessing the effects of women’s labor participation requires attention to how resources are allocated within families (Mammen and Paxson, 2000).

Poor households without assets for collateral are likely to face the lack of credit accessibility. For example, Pender (1996) found seriousness of credit constraints among poor households in rural India. In theory, these constrained households are likely to have a relatively high marginal utility of current consumption. Under this situation, labor income becomes an important source of extending household resources. For example, studies on Indian villages found that labor market participation acts as an informal but strong insurance device against crop income fluctuations (Walker and Ryan, 1990, pp. 87-88; Kochar, 1999). Yet, credit market imperfections can impose considerable barriers in the intertemporal smoothing of labor supply, leading to ‘excessive’ labor participation. More importantly, it has been supported empirically that such effect may be significant especially for adult women’s labor market participation. For example, by using panel data from India, Skoufias (1996) found labor inducement effects on women appear to be more serious for landless and small-farm households than large-farm households. In Rose (2000), the responses of households are divided into \textit{ex ante} and \textit{ex post} of shocks. She finds that, \textit{ex ante}, households facing greater risks are more likely to participate in the labor market, while \textit{ex post}, unexpected shocks increase labor force participation. It is shown that reducing the variability of agricultural income streams through labor market participation comes at a cost: Risk averse households accept a risk penalty in terms of lower expected income in order to maintain more certain income streams.

Moreover, under binding credit constraints, induced maternal labor participation further generates serious consequences on intrahousehold time allocation and human capital investments. By using data from Bolivia, Columbia, Cote d’Ivoire, and the Philippines, Grootaert and Patrinos eds. (1999) found that the mother’s employment usually leads to an increase in child labor, usually domestic labor of daughters. In spite of different social and cultural characteristics of these four countries, the consistency of the result is remarkable. One reason why girls might fare badly within households is that in poor credit-constrained families, siblings must compete for resources (Mammen and Paxson, 2000). When net returns to education to a daughter’s education seems to be consistently lower than that for a son’s education, girls may be treated badly within households. There are ample empirical evidence finding that elder daughters may bear a good part of the burden of limited household resources by providing domestic labor (Strauss and Thomas, 1995, p.1990). For example, Parish and Willis (1993) found that having many elder sisters increase school entry probability for both younger
brothers and sisters, suggesting that older sisters receive fewer resources than other siblings.

III Child Labor

Among intrahousehold resource allocation issues, a phenomenon that attracts a far greater public attention is child labor and schooling. Although it is widely acknowledged as a key to rapid economic development both in policy arena and in academia, the record shows there is a substantial variation in primary and secondary net enrolment rates among the low income countries (see Ito paper of this volume). Moreover, the recent survey conducted in India shows a significant portion of school going children are underachievers (The Hindu, Feb 16, 2006).

India is a country with a dismal enrolment record, but with rapid improvements in the recent times. It is thus important to learn from the field the effectiveness of policies, and obtain structural interpretation of underlying economic forces. The joint IDE-MVF study, on which the data used in this volume rely, can reveal some insights through its data collection and rigorous measurement of MVF interventions.

A great mass of earlier literature on child labor often takes the form of analysis of household labor supply, with a special emphasis on child labor. Leading examples include Jacoby and Skoufias (1997) who used ICRISAT Village Level Survey data collected from villages including Andhra Pradesh. These studies share an econometric feature in that they deal with endogeneity/omitted variables/measurement error problems with a choice of instrumental variables.

In the recent studies, a more emphasis is being placed on explicit randomization of particular education interventions (Duflo (2004b) (2005), Glewwe (2002), Glewwe and Kremer (2005)). Unlike studies that use observational data and instruments, this approach has an advantage of guaranteed consistency of parameter estimates of policy impacts, which allows us to have a causal interpretation. This research effort is in sync with actual policy implementation: increasingly, economists work with policy implementors to ensure random assignments of programs.

This stand of research found that, among others, directed monetary transfers to mothers conditional on child school attendance increases school attendance (Schultz, 2004; Skoufias, 2005). In the food-for-education programs and school lunch programs, it is also found that attendance is responsive to such incentives (Ravallion and Wodon, 2000; Vermeersch, 2003). In other incentive schemes, school vouchers are found to enhance secondary enrolment in the private schools in a middle income country (Angrist et al., 2002) where a private school system is well established and most children are enrolled in schools. As these incentive schemes transfer resources conditional on school attendance, it is appropriately called ‘conditional transfer programs.’

Another strand of research that carefully looks for randomization is the studies on supply-side interventions. While conditional transfer programs can be referred to as the demand-side policies,
as it supports household decisions to be pro-school, the supply-side polices aim at reducing the access costs of schooling born by the household, and at increasing the returns to education. A typical example is school expansion in backward area that Duflo (2001) examined. Using Indonesian census data and the school construction rules of government, school expansion significantly increased the enrolment, and subsequent labor participation rates and wages. In a similar identification strategy, Chinn (2005) found that an Indian program that allocates teachers from large schools to small schools significantly increases girls’ primary completion rates. While these two studies utilize the government intervention rules, Spohr (2003) relies on uniformity of intervention in compulsory education law of Taiwan, and found a significant increase in enrolment. Remedial schooling in northern India studied by Banerjee et al. (2003) is an example of supply-side intervention that aims at increasing returns to education through school quality improvement. Their empirical strategy is placement randomization.

Except for quality improvement studies, the two approaches, conditional transfers and large scale supply-side interventions, share the view that the opportunity costs of schooling is too high for the poor households. CT programs address it by handing out resources, while supply-side policies address it by reducing access costs. While reduction of opportunity costs plays a central role in achieving universal education, in India, there is an increasingly visible argument that money (or wealth) is not a sufficient condition of schooling. MVF explicitly commits to such an argument that they promise not to hand out any cash or in-kind resources, or even the credit accesses. And MVF records show that they are not failing: they have sent more than 250 thousand children from work to school in the last 15 years. Given its magnitude of operation and its distinct methodology, it is both interesting and important to know the effectiveness of their approach, and the adjustment mechanism of the households. The primary purpose of joint IDE-MVF survey is to conduct a randomized trial of MVF interventions in the remote area of Andhra Pradesh, India. This volume is intended to pave the way for studying the mechanism underlying child labor, by documenting the incidence of child labor, substitutability of child time use and mother time use, and intrahousehold resource allocation rules.

IV Overview of Joint IDE-MVF Survey

IV.1 Sampling strategy

With a limited amount of monetary and human resources, we used a variable probability sampling (VPS, Wooldridge, 2002: 590-596) scheme. This is a version of choice-based (CB) sampling, and, as does the CB sampling, has a cost advantage over random and exogenous sampling if there is only a limited number of people (households) choosing the strata of interest. One example, taken from
ILO (1985, p.321), is sampling at the train/bus stations when one wants to survey train and bus commuters, which will be cheaper than conducting a large scale household survey asking each individuals about the most favored mode of transportation.

The essential estimation problem entailed in CB sampling is that, by definition, there is a systematic selection on who appears in data. This is corrected by dividing the likelihood by sampling weights, or probabilities of each strata being sampled. For example, if one stratum is sampled twice as much as other strata, then one has to divide the likelihood for the stratum by 2 to adjust for its overinfluence on estimation. This also indicates the strata in CB sampling must be exhaustive: to infer the characteristics of population, so no single stratum must be left unsampled. This can be considered as a pitfall in, or a cost of, CB sampling.

The strata we used are households with and without child labor. We have chosen VPS to ensure the sufficient number of households with child labor to be included in the sample. This is partly done for the purpose of measuring the impacts of MVF’s intervention on child labor eradication. Naturally, one needs to have a sufficient number of households with child labor if one wants to measure the impacts of a child labor eradication program. The definition of child is ages between 5 and 14, following the widely used definition of ILO’s convention on child labor ban (ILO Convention No. 138).[24]

Elementary and secondary school going children in India are ages between 5 and 16. Our age definition treats 15 and 16 year olds as adults and does not fully conforms with the Indian school system. This is not problematic for two reasons. First, the legal upperbound for compulsory education set in Article 45 of the Indian Constitution is 14.[25] The Child Labor Act (Prohibition and Regulation Act) of 1986 also sets the upperbound of age at 14. Of course, it is highly unlikely, and the casual observation supports this skepticism, that such a legal basis against child labor constrains parents and employers in any way in the surveyed region. But our age definition is consistent with the legal basis of rights to education which will form any enforcement of child labor ban, if it exists. Second, when facing two different upperbounds, parents are more likely to choose the smaller upperbound in an area where child labor is prevalent. The surveyed regions is particularly backward in the southern state of Andhra Pradesh, which is known (inter-?)nationally for the state with greater rates of child labor incidence (Kurosaki et al in this volume). In addition to these two reasoning, we adopted 5-14 definition to make international comparison easier.

VPS uses the following procedure:

---

[24] ILO (1996) lets the definitional ages of being a child depend on work contents: a person is a child if he or she works for ‘light’ works and is under 13, or if works for ‘hazardous’ works and is under 18. The former restricts the definition of child labor, and the latter broadens it by setting the upperbound to be higher.

[25] “The State would endeavor to provide within 10 years of Independence, for free and compulsory education for all children until they complete the age of 14 years.”
1. For each village $v = 1, \cdots, 32$, randomly sample a household.
2. If the household is in the stratum $j = 1, 2$, sample the household with probability $p_j$, reject the household with probability $1 - p_j$.
3. Go to 1 and repeat for $M_j$ times.

$j = 1$ denotes a stratum $\delta_1$ of households with child labor, $j = 2$ is a stratum $\delta_2$ without child labor. We set $p_1 = 1 - p_2 = \frac{2}{3}$ to oversample the households with child labor.

One complication arose because the national census data we used in selecting households misclassified the strata. Some $\delta_1$ households did not have child labor, while some $\delta_2$ households had child labor. These error probabilities are $r_1$, $r_2$, respectively, which we assume to be common among villages. Then, the actual sampling probability for correctly stratified $\delta_j$ households is:

$$\pi_j = \frac{M_j p_j (1-r_j) + M_j p v r_j}{N_j + N_j'}, \quad \text{for } j \neq j'.$$

Given that we take the each village belongs to a different set of population of village-level parameters, the denominator is total number of households with children in each villages $N_v = N_{v,1} + N_{v,2}$. Having set $M_1 = M_2 = M = 30$, we have:

$$\pi_{v,j} = \frac{M}{N_v} [p(1-r_j) + (1-p)r_j].$$

In estimation, the common multiplicative term can be dropped off, so for all villages $v = 1, \cdots, 32$:

$$\pi_{v,j} = \frac{p(1-r_j) + (1-p)r_j}{N_v}, \quad \text{for } j = 1, 2, j' \neq j.'$$

Probabilities in the numerator are $\pi_1 = .4388$, $\pi_2 = .5488$. For better or for worse, due to errors in stratum classification, our intention to oversample child labor households was nullified and resulted more closely to random sampling.

### IV.2 Logistics

A team of 15, English speaking enumerators formed 5 to 7 groups, and each group visited the household selected by VPS. A questionnaire written in English on roster, time use, expenditure, land use, health status, credits, and risks are used. The enumerators were trained in the several rounds of pilot survey conducted prior to the main survey, and asked questions in Telugu (official language of AP state) but write in English. The enumerators are all employees of MVF, and they are accustomed to surveys because MVF carries out a village census jointly with local collaborators before they expand their programs to a new village (see MVF 2004, p.263).
For each of roughly 15 households in a village, the team visited more than twice, early in the morning before farmers go to the field, and late in the afternoon after they come back from the field. In addition, the team sometimes followed the farmers in the field at lunch break to ensure respondents to answer. As they stayed in the region for an extended period, the team were able to avoid surveying during the frequent local festivities. The resultant data are inputted electronically in Hyderabad and cleansed in Japan. The total of 400 households were surveyed from 32 agricultural villages in two mandals during February and March in 2005 for the first round. The second round of survey was conducted in October 2005. In this volume, we use information from the first round of the survey which is available for statistical analysis.

V Contributions of Papers

Ito’s paper overviews the current condition of schooling across countries. It notes that net enrolments have substantial variability among low income countries, and net enrolment rates is positively correlated with per student government spending, which in turn positively correlated with national dependency rates.

A model is presented to classify the interventions into demand-side and supply-side: the former varies at household-level while the latter varies at the community-level. The literature review shows demand-side policies, conditional transfer programs, are successful in raising enrolments. The supply-side policies, which reduces access costs and increases returns to education, also have been successful in the past. However, author points that little is known the reasons behind the successes (and failures). This is partly due to recent emphasis on randomized trials that ensures consistent estimates of program impacts. It is argued that, while it is a scientifically correct way to conduct research, one needs to weigh trade-offs between randomized trials and observational studies.

As part of supply-side oriented interventions, MVF program has been explained. It is shown that its emphasis clearly departs from previous insights that one needs to reduce the opportunity costs of schooling, which was addressed in conditional transfer program in resource transfers, and in supply-side polices in reducing access costs. It is argued that a rigorous study on MVF program impacts and household adaptation mechanism give a new insight into the child labor.

Kurosaki et al. paper empirically analyzes the determinants of child labor and school enrollment in rural Andhra Pradesh, India. A village fixed-effect logit model for each child is estimated with the incidence of child labor or school enrollment as the dependent variable, in order to investigate individual and household characteristics associated with the incidence. Among the determinants, this paper focuses on whose education matters most in deciding the status of each child, an issue rarely investigated in the context of extended family system. The regression results show that the education of the child’s mother is more important in reducing child labor and in increasing school
enrollment than that of the child’s father, the household head, or the spouse of the head. The effect of the child’s mother is similar on boys and girls while that of the child’s father is more favorable on boys.

Sawada et al. recognizes that, in developed countries, women’s labor force status is regarded as an important progress indicator of a society. In developing countries, however, maternal labor participation often occurs as a consequence of poverty, involving undesirable outcomes such as withdrawals of children from schools and children’s engagements in domestic and outside labor. One the other hand, there is an emerging consensus in the literature that the lack of credit is a major source of child labor and intrahousehold resource inequality. Yet, the existing studies do not necessarily explore the intervening structure of the credit constraints and child labor nexus. In this paper, we consider the effects of credit constraints on maternal labor and those of maternal labor on intrahousehold inequality of labor allocation within a unified framework. By doing so, we believe we fill the gap in the literature by uncovering the structure between the credit constraints, maternal labor, and child labor relation. There are three findings emerged in our analysis. First, mothers’ labor participation generate undesirable negative impact on intrahousehold labor resource allocation. Elder daughters may bear a major part of the burden of maternal labor participation by quitting education and providing domestic labor. Second, a mother is more likely to work outside when a household lacks sufficient resources and her domestic labor can be easily replaced by other members: A lack of educated adult male members, availability of daughters and sons who can supply labor for domestic chores, and absence of infants in the family all increase a probability of a mother’s labor participation. Finally, credit market accessibility is identified as a major factor inducing maternal labor by constraining the household’s resource availability.

Fuwa et al. investigates the characteristics of intrahousehold resource allocation of the poor households. First, it gives a unified framework for testing unitary and collective models of households using expenditure data. With a rich set of grandparental variables collected in the survey, we use them as what are called ‘extra-household environmental parameters’ or EEPs, that are predicted by theory to influence bargaining powers, hence expenditure decisions, within a household.

Using Chiappori (1992)’s result, a set of testable restrictions of collective models are tested. An analogous argument is employed to derive a set of testable restrictions for the unitary model without requiring information on individual income. This distincts from the commonly used test of income pooling. The results does not reject the unitary nor collective models, while give some supportive evidence for the collective model.

The coefficient on surviving spouse’s father’s rainfed land holding shows a positive impact on both mother and father goods, implying a wealth effect. But the size of wealth effect is much larger for mother goods, further lending support to collective models. Literacy of surviving spouse’s father
also reduces father good consumption. These last pieces of evidence are stronger than the mere significant estimates of EEPs: significant estimates of EEPs cannot tell if it is capturing preference heterogeneity or the parameters of sharing rule function. On the other hand, it is not plausible that differences in surviving/death condition of grandparents to affect preference of a unitary household. A collective model has a natural interpretation of change in bargaining powers.

Given the support for collective model, we examine if the household exhibits gender discrimination against girls in its expenditure patterns. Gender discrimination is a well-talked problem in India and other developing countries, but its argument has concentrated on enrolment or morbidity of females, and was rarely examined by expenditure data. This is due to relative ease in observing enrolment and morbidity, and the difficulty in acquiring detailed information of assignable goods, a group of goods that can determine the end user such as men’s clothing. As the welfare of individuals primarily derives from consumption, it is important to formally test the existence of gender discrimination using expenditure data. The detailed expenditure information compiled in the survey gives us a unique opportunity to study discrimination in everyday consumption.

We follow Deaton (1989) that allows data to classify by itself the assignment of goods, or the ‘adult goods approach.’ Estimated point estimates suggest a general pattern of discrimination against daughters in consumption, although they are mostly insignificant. This is roughly in line with existing literature that uses Indian National Sample Survey, suggesting the power of ‘adult goods approach’ may be weak in detecting statistically significant evidence of gender discrimination.

To sum up the volume, our research focuses in particular on three important topics: child labor, gender discrimination, and intrahousehold resource allocation. While a wide range of finding is presented, some of them are shared between the papers. Child labor is predominant in the surveyed region, with some usual finding: less educated parents and poorer parents are more likely to send their children to work. Examining child status reveals girls are less favored than boys, which is also vindicated by the spending patterns including school related goods. Gender discrimination against girls is clear and strong in our sample. It takes the form of lower enrolment rates, longer work hours, shorter leisure and schooling hours, and fewer spending. They are set to work from younger ages with fewer investments on them. Partly in response to ameliorate the inequality, mothers cut their own consumption for their daughters. Thus recovering intrahousehold resource allocation rule turns out to be crucial to the understanding and reduction of poverty. Whether the household follows the norm of unitary or collective models fundamentally affects the policy design. For example, recipient of transfer increase his/her bargaining position in the household, and the transfer should be directed to those who cares about the weak and vulnerable members. All of the evidence are suggestive of supporting the collective models, although the identification may suffer from usual omitted variable biases. One exception is found in estimation of expenditure patterns where certain characteristics
Table 1: Summary of Common Finding on Child Labor, Gender Discrimination, Intrahousehold Allocation

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Child Labor</th>
<th>Gender Discrimination</th>
<th>Unitary vs. Collective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurosaki</td>
<td>Birth parents’ education matters, not household head’s or spouse’s.</td>
<td>Significant estimates on sex dummies. Fathers favor sons, while mothers treat both sons and daughters equally.</td>
<td>Supportive of collective models.</td>
</tr>
<tr>
<td>Fuwa</td>
<td>School-related expenditure on senior girls decreases.</td>
<td>A bias against infant girls in consumption allocation is weakly detected. Boys’ school-related expenditure remain constant with age. Mothers cut own spending for daughters.</td>
<td>Formal tests reject both models. A less formal test using interaction terms supports collective models.</td>
</tr>
<tr>
<td>Sawada</td>
<td>Given sex, a positive correlation with maternal labor supply and child labor. * In credit constrained households, mothers of work more outside of households, daughters work more domestically and go less frequently to schools. Maternal employment increases girls’ time spent on household chores relative to boys. Maternal employment reduces girls’ time spent on schooling, and leisure.</td>
<td>Maternal employment increases girls’ time spent on household chores relative to boys. Maternal employment reduces girls’ time spent on schooling, and leisure.</td>
<td>Supportive of collective models.</td>
</tr>
</tbody>
</table>

Note: * indicates control for household fixed effects. All regressions control village and caste fixed effects.

of surviving spouse’s father increase female and child consumption, but not of deceased spouse’s fathers. With an additional assumption of fixed preference, this lends a stronger support to the collective model.
REFERENCES


____ and Michael Kremer (2005), “Schools, Teachers, and Education Outcomes in Developing Countries”, second draft for Handbook of Economics of Education.


