

Intrahousehold Access to Land and Sources of Inefficiency:

Theory and Concepts

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Abstract¹

This chapter examines the allocation of land and other productive resources within rural households of poor countries. Building upon the existing literature, it provides a consistent framework from which to study productive efficiency and intrahousehold equity. The topics discussed include: returns to scale and household centralization; specialization and gender casting; separate spheres and commitment failure; and labor market cartelization and discrimination. Implications for intrahousehold access to land are discussed in detail. We show that intrahousehold productive inefficiency should not arise unless household members are prevented from entering into enforceable contracts with each other. Our analysis predicts that intrahousehold inefficiency increases with factors that exacerbate commitment failure such as short time horizon, low assets, unequal stakes in the household, and poor external enforcement. Granting plots of land to dependents appears to be a response to commitment problems. Patrimonial laws and customs regarding inheritance and divorce can similarly be understood as efforts to mitigate commitment failure within the household although, possibly, at the expense of women and young adults.

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The literature on women and development has documented women's lack of access to land, credit, and farm inputs in many developing countries (e.g., Boserup (1970), Gladwin and McMillan (1989), von Braun and Webb (1989)). It also have provided evidence of gender casting and other restrictions on female labor (e.g., Brown and Haddad (1995), Fafchamps and Quisumbing (1998)). This situation has been identified as a source of inequality between men and women, and as encouraging abuse (e.g., Jones (1983, 1986)). In addition, it has been claimed to be inefficient (e.g., Jiggins (1989), Udry (1996b)). In response to these claims, aid agencies have set up targeted programs to deliver credit and inputs to women and, to a lesser extent, to open their access to land. The purpose of this paper is to propose a framework that integrates efficiency and equity issues and to identify conditions under which intrahousehold allocation of resources can be inefficient.

Implicit in much of the lay literature is the assumption that women's unequal access to land is a source not only of inequality but also of inefficiency. For instance, it is often claimed that poor countries cannot develop unless women are granted equal access to productive resources (e.g., Boserup (1970)).² The rationale behind these claims is not entirely clear, however.³ The main objective of this paper is to clarify the debate by identifying conditions under which inequality is indeed a source of inefficiency. To do so, we must distinguish between access to land within households and across households. Although the two are often discussed interchangeably,

² Calls for better female access to land have been strongest in Sub-Saharan Africa (Gladwin and McMillan (1989)). This is somewhat surprising because, relative to other regions of the world such as South Asia or Latin America, women in Sub-Saharan Africa have a comparatively easier -- though by no means equal -- access to land.

³ Some claim that women produce 'all the food' and thus should be given more land (e.g., Gladwin and McMillan (1989), Jiggins (1989)). Jiggins (1989), for instance, claims that in Sub-Saharan Africa '[women] produce approximately 60% of the food that is consumed by rural households'. It is unclear how women could produce this much food if they do not have access to land. Others argue that women should be given better access to credit so that they can hire enough manpower to cultivate their fields. Egyir (1998), for instance, points out that Ghanaian women who farm independently '[hire] male labor to take on strenuous activities'. But the fact that these women must hire outsiders to farm suggests that they have more land than they can cultivate -- i.e., that they were given too much land for an efficient allocation of factors of production, not too little.

conceptually they are quite separate. Access to land for male and female dependents is determined within the household; access to land for female headed and female operated households is determined outside the household.⁴ The processes for allocating resources vary between the two.

Allocation within the household resembles what takes place within a firm. Most households have a hierarchical structure, with much of the control over household resources such as land and capital concentrated into the hands of the head (e.g., Haddad, Hoddinott and Alderman (1997), Egyir (1998)). Conflicts over the division of welfare between dependents and the head are somewhat reminiscent of labor disputes between workers and employers -- and potentially as bitter and unpredictable. In addition to a hierarchical structure, households often institute an explicit division of labor together with systems of delegation of authority (e.g., Cleave (1974), Egyir (1998), Shapiro (1990), Fafchamps and Quisumbing (1998)). This is particularly true of rural households in poor economies where self-provision of food, shelter, water, fuel, child and elderly care, and most services is the rule -- and thus where the tasks undertaken by households are both numerous and complex.

In contrast, the allocation of land across households typically takes either the form of gift or of market transaction, with occasional hybrid combinations of the two (e.g., Egyir (1998), Table 2).⁵ Land sales, rentals, and sharecropping are market transactions: they involve two-way contractual obligations that are mutually balancing. Inheritance, transfer at marriage, and other transfers *inter vivos* are example of allocation mechanisms based on the gift principle. In this chapter we focus exclusively on intrahousehold allocation; interhousehold allocation is discussed in other chapters of this volume. As we shall argue in the conclusion, access to land by female headed and operated households can be fully understood only after making sense of intrahousehold allocation issues. This is important because, the proportion of such households appears to be

⁴ For the purpose of this chapter, female headed households are defined as households headed by widows, divorced, and single women; female operated households are those where the male head is absent and participates little or not at all to household production activities.

⁵ E.g., rental to a friend at below market price.

on the rise in certain African countries (for Ghana, see Egyir (1998)).

This chapter is organized as follows. After a brief review of the literature, we construct a model of intrahousehold allocation of labor and land and we derive conditions for allocative efficiency. We show that, depending on returns to scale, specialization and experience, efficiency in production may require land and other productive inputs to be centrally managed and individuals to specialize in certain tasks or activities. Intrahousehold equity in welfare, however, need not be achieved. We also propose an explanation for the observed heterogeneity in the allocation of tasks by age and gender across regions. We then explore conditions under which commitment failure arise, that is, when household members are unable to pre-commit their future actions and hence find it difficult to enforce intrahousehold agreements regarding land and labor. In this case, we show that imperfect factor markets prevent households from achieving allocative efficiency and that access to land and other productive resources is likely to be conflictual. We argue that the West African practice of letting female and male dependents cultivate their own plots of land can be understood as a way of motivating dependents to work harder and of resolving commitment failure between head and dependents. Implications for empirical research are summarized at the end.

Section 1. A Brief Survey of the Intrahousehold Literature in Economics

Much of the economic literature on intrahousehold issues has focused on the distribution of consumption among household members (e.g, McElroy and Horney (1981), Manser and Brown (1980), Haddad and Kanbur (1990), Haddad, Hoddinott and Alderman (1997), Browning et al. (1994)). Production decisions are often ignored and, with the exception of Becker (1981), the emphasis is exclusively put on gender issues, with little consideration for intergenerational issues. Such treatment may suffice for developed countries where small nuclear households dominate, most people work for a wage, and children go to school and leave their parents afterwards. Indeed, thanks to household equipment and public utilities, the time devoted to household chores

has drastically been reduced. Meal preparation and child care services are increasingly purchased on the market instead of being self-provided.

This fundamental transformation of family life has yet failed to reach much of the Third World, especially rural areas. There, households are large, occasionally encompassing several couples with their children. Household members are engaged in a multiplicity of income generating activities, both on their own account and in collaboration with others. Self-employment is the rule -- in farming, livestock raising, crafts, trade, and services. Household chores are many and time-consuming; they fall overwhelmingly on the shoulders of women. Children, whom there are plenty, spend less time in school and more time helping around the house or the farm. It is customary for young adult males to remain on their father's farm until they are allowed to marry -- and often to stay after marriage in the case of vertically integrated households (e.g., Binswanger and McIntire (1987), Rosenzweig and Wolpin (1985)). Third World households are thus more complex than present day households in developed economies. A proper understanding of their functioning requires a conceptual framework tailored to their characteristics.

Much of the descriptive literature on intrahousehold issues in developing countries -- and much of social tension and political activism -- focuses on access to productive resources such as land, capital, and farm inputs (e.g., Kumar (1994), Groote and Kebe (1995), Goetz and Gupta (1996), Smith (1994)). This is hardly surprising given that the predominant avenue to financial independence -- and thus to the freedom to choose one's consumption and privately enjoy it -- is by engaging in an individually managed income-earning activity such as a farm or business (e.g., Egyir (1998)). Third World societies have evolved detailed laws and customs governing the transfer and use of productive resources such as land and capital, and assign specific tasks and roles to household members according to their status (e.g., Fafchamps and Quisumbing (1998)). These rules restrict individual choice and impose financial and work obligations to contribute to the joint welfare of the household as a group.

Financial independence is usually granted in exchange for assuming specific responsibilities. In many Sahelian villages, for instance, the head of the household manages the main cereal fields and disposes of the output, but is responsible for feeding the family. Married wives often are granted small plots that they cultivate on their own, but they must provide the 'sauce', that is, the vegetables and condiments that spice up family meals. Unmarried sons may earn pocket money by cultivating their own field, but they must first work on the household's main fields. Tension between household members therefore results regarding the allocation of labor among competing income-generating activities with distinct residual claimants (e.g., Jones (1983, 1986), Boe (1996)). Some suspect that tension over labor allocation may even be the source of economic inefficiency (e.g., Udry (1996a), Balsvik (1995)). Gender inequality in the acquisition of schooling, experience and skills opening the door to wage employment is also widespread (e.g., Rosenzweig and Evenson (1977), Adams and He (1995), Alderman and Christi (1990), Khandker (1988), Jacoby (1992), Filmer (1996)), together with occasional accusations that male heads of household collude to exclude women or young adults from remunerative activities (see Kevane (1996), Anderson and Francois (1996)). Domestic violence and social stigma are cited as additional pressure certain heads of household bring to bear on recalcitrant members. Jones (1986), for instance, reports that if a wife refuses to work on her husband's farm, the husband is allowed by custom to beat her (see also Lilja (1996), Lilja et al. (1996), Kevane (1996)).

While some of the themes that run through the intrahousehold literature in developing countries are similar to those that animate the feminist discourse in developed economies, the emphasis on access to productive resources and on the allocation of household labor to individual income earning activities is original (e.g., Haddad, Hoddinott and Alderman (1997)). Issues of welfare equity within Third World household are also not limited to gender distinctions (e.g., Haddad and Kanbur (1990, 1993), Kanbur and Haddad (1994), Quisumbing, Haddad and Peña (1995), Dercon and Krishnan (1997)). They encompass adult dependents, mostly young males.

Early formalization of intrahousehold allocation is couched in terms of a unitary model of the household (e.g., Becker (1965)). Labor supply response and nutrition outcomes are interpreted as results of the maximization of a single utility function. The works of Rosenzweig (1986), Rosenzweig and Evenson (1977), Pollack and Wachter (1975), Jacoby (1992), and Skoufias (1993) fall within this category. If applied wisely, this approach can yield interesting results, even if the underlying assumptions can be criticised as unrealistic. For instance, it can explain why parents prefer to send boys to school because returns to education is higher than for girls (e.g. Rosenzweig and Schultz (1987)); why food, when it is scarce, goes to adult males because they are the prime income earners of the household (e.g., Pitt, Rosenzweig and Hassan (1990)); or why women concentrate on house chores because their wage outside the household is lower than that of men (e.g., Evenson (1978), Becker (1965), Low (1994)).

Seminal contributions by Manser and Brown (1980) and McElroy and Horney (1981) challenged the unitary model of the household and proposed its replacement with a collective model in which household members bargain over the distribution of consumption among themselves. They show that the bargaining power of individuals depends on the resources they command, and thus on their individual incomes. Consumption thus depends not only on the household's total income but also on which member earns it. Individual payoffs in case of breakdown of cooperation serve as threat points in the negotiation over household expenditures, thereby helping to shape the allocation of leisure and consumption among household members. Several possible determinants of these threat points have been suggested in the literature, such as land ownership, education, entitlement programs, laws and customs about the sharing of household assets in case of divorce, and social norms regarding gender-specific tasks and parenting responsibilities (e.g., McElroy (1990), Lundberg and Pollack (1993)). Tests of income pooling have usually rejected the unitary model (e.g., Manser (1993), Thomas (1993)).

Intrahousehold modeling has recently been rejuvenated by the work of Chiappori (1988,

1992, 1993) and coauthors (e.g., Browning et al. (1994), Bourguignon et al. (1993), Bourguignon, Browning and Chiappori (1995)). Chiappori's idea is a simple but powerful one. Even though there is no commonly accepted model of bargaining, most such models discussed in the economic literature -- whether cooperative or not -- generate Pareto efficient outcomes (as do unitary models which are a special case of collective models; see Haddad, Hoddinott and Alderman (1997)). Efficient allocations within the household exhibit certain characteristics which can serve as a basis for a test of allocative efficiency without assuming any particular form of bargaining. The application of these ideas to household consumption data from developed countries has failed to reject allocative efficiency while rejecting income pooling (e.g., Browning et al. (1994), Bourguignon et al. (1993), Thomas (1993), Manser (1993), Fortin and Lacroix (1993)). Using data from Taiwan, Thomas and Chen (1994) nevertheless reject Pareto efficiency for some allocations. Taken together, these results constitute evidence in favor of the collective model of the household, leading Alderman et al. (1995) to urge analysts to think seriously about collective model alternatives to the unitary model.

Early work by Jones (1983, 1986) and a recent paper by Udry (1996a) nevertheless suggest that farming households in Africa fail to efficiently allocate productive resources within the household. Rather than relying on the complicated consumption-based tests proposed by Chiappori and coauthors, Udry (1996a) focuses on the production side and tests whether yields are equalized across plots managed by different household members. He finds conclusive evidence that plots in the hands of women and young adult males have lower yields than those operated by male heads of household. His results and those of Jones, obtained in African farming households where individual members are known to operate in separate spheres (e.g., Lundberg and Pollack (1994, 1993), Katz (1994), Carter and Katz (1993)), cast doubt on the efficient collective model of the household.

The reason for allocative inefficiency is unclear, however. Balsvik (1995) suggests that it

may be due to commitment failure: because the head of the household is unwilling or unable to credibly commit to reward the work of his wife and dependents after harvest, the latter prefer to divert their labor to their own fields and income earning activities. Similar ideas permeate the works of Jones (1983) and Lundberg and Pollack (1994). In a repeated long-run union, the threat of future non-cooperation should in principle induce voluntary collaboration and solve the commitment failure problem.⁶ If, however, certain promises are not credible and certain Pareto improving trades are not feasible, the achievement of allocative efficiency may be prevented. One of the objectives of this paper is to examine the precise conditions under which a commitment failure may arise. We leave for future work the enforcement difficulties arising from the presence of multiple wives or nuclear households within the production unit, as in the case of polygamous or vertically integrated households (e.g., Jacoby (1995)).⁷

Section 2. A Neo-Classical Model of Intrahousehold Allocation

To capture the essence of the allocative issue, consider the following stylized model of a collective household operating in separate spheres. The household is assumed comprised of N members, each of whom is endowed with total time T_i , land A_i ⁸ and labor efficiency e_i -- representing schooling, skills, and experience (e.g., Becker (1981)). For the moment, individual land endowments and the mapping of individuals into households are taken as exogenously given. Non-productive members of the household are ignored for simplicity. Individual household members allocate their time between work on their own account, work for other members of the household, outside wage work, and leisure. They choose how to spend their income.⁹

⁶ Indeed, in many societies, laziness is often an accepted motive for divorce.

⁷ It is immediately apparent that many concepts developed for firms can be applied to complex household structures, such as multiple agents models, theory of hierarchies, information circulation issues, etc. Patrimonial law -- e.g., rules of devolution of assets upon death or dissolution -- also becomes more complicated in multiple households.

⁸ Without loss of generality, variable A_i can also be thought of as a vector of land qualities and productive assets including farm equipment, working capital, and livestock.

⁹ In other words, we rule out paternalism, that is, the possibility that a particular household member may decide the consumption of another member against his or her will. How individual consumption is decided is irrelevant, as long as individual preferences dictate how money is spent on someone's consumption bundle. The production and consumption of household public goods singularly complicates the analysis without adding to our results; it is not considered here (see, for instance, Bergstrom (1994)).

Individual consumption expenditures are financed through income from own production and wages, net of transfers to and from other household members.

We begin by assuming that factor markets are totally absent. This assumption is lifted later on. Formally, the decision problem facing each individual member of the household can be denoted as follows:

$$\underset{c_i, L_{ij}, g_{ij}}{\text{Max}} \quad U^i(c_i) + V^i(T_i - \sum_j L_{ij}) \quad (1)$$

subject to a budget constraint

$$p c_i = F(A_i, \sum_j e_j L_{ji}) + \sum_j g_{ji} - \sum_i g_{ij} \quad (2)$$

and non-negativity constraints $L_{ij} \geq 0$ and $g_{ij} \geq 0$. Variables c_i stands for consumption (possibly a vector); L_{ij} is the labor time provided by individual i on j 's income earning activity; and g_{ij} is the transfer from individual i to individual j . Utility is assumed non-altruistic and separable between goods and leisure. Preferences may vary across individuals but all have access to the same production technology $F(\cdot)$, which depends on total effective labor $\sum_j e_j L_{ji}$ and land A_i . Leisure l_i equals total time T_i minus total labor $\sum_j L_{ij}$. When deciding their own labor and consumption,

individuals take transfers from others L_{ji} and g_{ji} as given. First order conditions yield the usual

$$\frac{\partial U^i}{\partial c_i} = \lambda_i p \quad (3)$$

$$\frac{\partial V^i}{\partial l_i} = \lambda_i e_i \frac{\partial F}{\partial L_i} \quad (4)$$

where $L_i \equiv \sum_j L_{ji}$. Variable λ_i is the Lagrange multiplier associated with the budget constraint; it measures the marginal utility of income. Voluntary transfers of labor and money are against individual's self-interest since they subtract from own consumption. In equilibrium therefore, $L_{ij} = 0$ and $g_{ij} = 0$ for all $i \neq j$.

In this world of isolated individuals, production efficiency is not achieved. Individuals with low land A_i and thus low returns to labor would be better off exchanging labor for consumption

with better endowed individuals who would themselves benefit from hiring other people's labor. The absence of market implies that production decisions are a function not only of individual assets A_i but also of tastes $U^i(\cdot)$ and $V^i(\cdot)$ and of individual efficiency of labor e_j . This result is a well known feature of unitary household models with missing markets (e.g., Singh, Squire and Strauss (1986), de Janvry, Fafchamps and Sadoulet (1991)).

Suppose now that a complete competitive market exists in which individuals can freely exchange labor at the same wage w per unit of effective labor. The production and consumption choices of individuals operating in their separated spheres becomes:

$$\underset{c_i, L_{ij}}{\text{Max}} U^i(c_i) + V^i(T_i - \sum_j L_{ij}) \quad (5)$$

subject to a budget constraint

$$p c_i = F(A_i, \sum_j e_j L_{ji}) + \sum_j w e_i L_{ij} - \sum_i w e_j L_{ji} \quad (6)$$

and the usual non-negativity constraints $L_{ij} \geq 0$. First order conditions yield the usual

$$w = \frac{\partial F(A_i, L_i)}{\partial L_i} \quad (7)$$

Labor use and thus output no longer depend on individual preferences and labor efficiency, but they still are a function of individual land endowments A_i . The wage rate w clears the market for labor. Labor flows from resource-poor to resource-rich individuals. Everybody is at least as well off and many are strictly better off, although better endowed individuals continue to enjoy a higher level of welfare. How gains from trade are divided across buyers and sellers of labor depends on labor supply and demand elasticities.

The existence of a competitive labor market implies that labor resources are allocated efficiently within the household as well: since all household members face the same opportunity cost for effective labor, workers are efficiently allocated to individual production units. There is no need for intrahousehold bargaining. Intrahousehold labor transactions need not, however, take the form of an explicit wage contract. Household members may be compensated for the work

they provided to others in an implicit manner, e.g., through gifts or a larger share of household consumption expenditures. Formally, this situation can easily be represented in our model by letting the size of the gifts from other household members to i be a function of the labor provided to them, i.e.:

$$g_{ji} = we_i L_{ij} \quad (8)$$

As long as the 'brownie points' that individuals gain by helping out other household members are commensurate to the wage they would earn outside the household, their labor is allocated efficiently within the household. In equilibrium, if households are sufficiently similar, labor transactions between households may be infrequent without necessarily implying that labor is not put to the best use.

The existence of a labor market does not, by itself, ensure productive efficiency, however, unless A_i is not a vector but a single land input and the production function $F(A, L)$ exhibits constant returns to scale (CRS). In this case, the existence of a competitive labor market ensures that expected yields are the same for all individuals on all plots -- maintaining our assumption of common technology. Evidence that yields differ then constitutes an indication that labor markets are inefficient (e.g., Gavian and Fafchamps (1996), Udry (1996b)). When A_i is a vector of inputs, however, markets for all factors of production except one must exist for production efficiency to be achieved. Short of that, output will continue to depend on individual resource endowments.

If production is not CRS, efficiency in production requires that markets exist for all factors of production.¹⁰ Exchange can take a variety of forms (e.g., rentals, sales, or partnerships) which, for our purpose, are largely irrelevant so long as efficiency is achieved. Assume that it does. What will efficient production look like? The answer depends on returns to scale. If they are decreasing, the atomisation of production is optimal: each individual should be an independent producer.

¹⁰ There are many reasons why production techniques may not be perfectly replicated from field to field and thus why returns to scale in agriculture may not be constant. All ultimately have to do with the presence of imperfectly traded inputs, such as credit, management, experience, and rental services of indivisible equipment and infrastructure (e.g., Feder (1985), Eswaran and Kotwal (1986)).

If they are increasing, all production should be undertaken by a single individual who will buy and rent all factors from the market. If returns to scale are first increasing then decreasing, the optimal size of the production unit may require that several, though not all individuals pool their productive resources together; individual production will be sub-optimal.

These results, although hardly original, seem to have been overlooked in much of the lay discourse on intrahousehold allocation. Efforts by heads of household to centralize farm management and gather control over land and other productive resources are customarily interpreted as a devious ploy to deprive women of their rights. This may very well be the case, as we shall argue when we discuss commitment failure. But one should also be open to the possibility that centralization is in fact efficient, especially, as von Braun and Webb (1989)'s work suggests, when new technologies are introduced. Financial outlays for fertilizer, improved seeds, and pesticides raise marginal returns to labor and increase the penalty for untimely performance of agricultural tasks, especially if the household is risk averse. New agricultural technologies may also raise the returns to education, and hence the comparative advantage of better educated household heads as farm managers (e.g., Jamison and Lau (1982)). In these cases, technology adoption is expected to trigger a concentration of control over household labor into the hands of a single individual, typically the head of household (e.g., von Braun and Webb (1989)).¹¹ If concentration is efficient, then it should be possible for household heads to improve everyone's lot while at the same time compensating other members for their loss of individual output. From an economic point of view, such compensation can be regarded as a payment for the use of productive resources controlled by individual household members.

The structure of production is also likely to be affected by returns to experience (e.g., Becker (1981)). Suppose that production requires that various tasks be performed, e.g., planting,

¹¹ This of course begs the issue of who in the household is most suitable person to assume management responsibilities. For instance, if schooling and experience raise effectiveness in management, the better schooled and most experienced member of the household ought to be the one to take over management duties. Some of these issues are addressed below.

weeding, harvesting, threshing. Further suppose that, thanks to learning by doing, individuals with a lot of experience in a certain task k are more proficient in that task, i.e., that:

$$e_{ik}^t = g_k\left(\sum_{s=1}^{\infty} \sum_j \gamma^s L_{ijk}^{t-s}\right) \quad (9)$$

where e_{ik}^t denotes the labor efficiency of individual i in task k at time t , $\gamma \leq 1$ is a depreciation factor, and $g_k(\cdot)$ is some increasing function. In the presence of returns to experience, it is in society's interest to encourage individuals to specialize in particular tasks and to make sure that a task is always performed by the person most experienced to undertake it. To achieve this result, individuals may have to work on each other's fields, e.g., men clearing women's fields and women weeding men's fields. Alternatively, they may become exclusively responsible for particular activities involving closely connected tasks, such as food preparation or beer brewing, for instance (e.g., Fafchamps and Quisumbing (1998)).

From the point of view of efficiency, how tasks are distributed among people is largely irrelevant as long as gains from learning by doing are achieved. This may account for the existence of extremely wide variations in the distribution of agricultural tasks by gender and age: in northern Nigeria, for instance, women do not participate in field work (e.g., Hill (1977), Fafchamps (1986)); in much of Zaire, they perform almost all agricultural tasks with the exception of land clearing. Individual comparative advantage in learning and performing particular tasks may nevertheless dictate who specializes in what. It would be unwise, for instance, to assign children to tasks that require much physical strength, such as clearing fields. But they are perfectly adapted to herding livestock. In countries where women bear many children and breastfeed them for extended periods of time, one may argue that activities around the home constitute their comparative advantage. In stable pre-industrial societies where the range of tasks and activities to be undertaken does not change over time, the allocation of people to specific tasks is achieved largely through age and gender casting. Gender-specific role models often reinforce gender casting (e.g., Collier and Yanagisako (1987)). Certain societies push this principle even

further by restricting particular tasks or activities to individuals belonging to a specific lineage or caste (e.g., the caste system in India or Yemen; marabouts, griots, and blacksmith in Sub-Saharan Africa.)

Age and gender casting to match individuals with particular tasks also dictates a particular pattern of land allocation and, thus, of land inheritance and disposition *inter vivos*. For instance, when men are responsible for clearing the land and do most of the land preparation while women do most of the weeding, harvesting, and processing, as is true in parts of South Asia, there is no need to allocate land by gender; it is optimal for men and women to farm together under the management of a single head. In this case, inheritance customs are expected to ensure that household have a viable farm size, without much concern for gender. Of course if farm management itself is a task that is the full responsibility of the household head, the devolution of land, either by inheritance or *inter vivos* transfer, should be tightly linked to household formation: land will be passed from heads of households to heads of households.¹² To the extent that household heads are married men, access to land by women will be *de facto* restricted.

In contrast, when women are responsible for growing vegetable crops while men cultivate staple food crops, as is the case in Burkina Faso for instance (e.g., Matlon and Fafchamps (1988)), most land should go to men; women should only receive small vegetable gardens -- which is precisely what we observe. When women take care of producing the staple food while men produce a cash crop, as occurs in Central Ghana for instance, then one would expect women to have larger plots and a more equal access to land. The contrast that Egyir draws between Central Ghana and Northern Ghana where little cash crop production takes place is consistent with this pattern: women have less access to land and are more subordinated to their husbands in the North. Finally, if women are not participating to crop production at all but look after livestock in

¹² It is so natural to think of a farm as being managed by the household head that survey questionnaires often assumes this to be the case. This stands in sharp contrast with off-farm activities such as crafts and trade which are often undertaken by dependents and are not linked to household formation: while the creation of a new farming unit occurs simultaneously with the creation of a new household, the creation of a new trading or craft enterprise is not.

and around the house, as is the case in Ethiopia and Pakistan, for instance (e.g., Fafchamps and Quisumbing (1998)), all cultivable land ought to go to men. Women may nevertheless hold grazing rights as a result of their involvement in livestock production. The same is true for secondary land rights that women derive from their responsibilities for firewood and water collection. What gender casting cannot explain, however, is why male and female members of the same households would grow the same crops on different, individually managed plots -- as reported by Udry (1996a).

In the presence of learning by doing, sorting people among multiple activities cannot easily be achieved in a decentralized manner. Letting individuals decide what to specialize in may lead to over or under provision of certain skills.¹³ Age and gender casting can thus be seen as a means of solving the coordination problem involved in achieving gains from specialization. It nevertheless raises two serious objections. First, it seldom is equitable. Certain tasks are more pleasant than others, and the return from certain skills higher than others. Those forced to undertake unpleasant and undervalued tasks are likely to resent the allocation process and oppose it if they can. Second, age and gender casting is unlikely to be fully efficient because it prevents many individuals from expressing their full potential. The efficiency loss will be larger when new economic opportunities arise and traditional casting rules no longer ensure a match between the supply and demand for task specific skills. This may explain why age and gender casting have been more successfully challenged in modern societies than in traditional ones.¹⁴

It would be erroneous to assume that economic growth necessarily leads to a loosening of gender roles, however. In many societies, a sizeable gap exists between ideal gender casting as specified in the dominant ideology, and the actual division of tasks by gender. Local culture may,

¹³ See Matsuyama (1991) for an illustration of how occupational decisions can lead to multiple Pareto ranked equilibrium paths in the presence of sunk costs.

¹⁴ Gender casting may be less rigid than sometimes assumed. von Braun and Webb (1989) showed, for instance, that the introduction of modern irrigation method along the Gambia river led men to rapidly replace women in rice cultivation in spite of strong taboos regarding male involvement with rice.

for instance, stipulate that women should not work in the field because such work is thought demeaning. Yet many poor households may fall short of the social ideal simply because they cannot afford to abide by it (e.g., Hill (1977), Matlon (1977)). In such an environment, increased prosperity is likely to result in a closer match between social ideals and social realities and thus to reinforce gender casting in practice. Good examples of such processes can be found in many Islamic countries where higher standards of living translate into a tighter separation of the sexes (e.g., Saudi Arabia, Pakistan).¹⁵ Efforts by trade unions and other progressive political forces to have strenuous jobs declared unsuitable for women in turn-of-the-century Europe can be seen in a similar light. A complete discussion of these issues is left for future work.

Section 3. Missing Land and Labor Markets and Voluntary Exchange

In Section 2 we argued that land and other productive resources are allocated efficiently within the household if outside markets exist and are competitive. In practice, however, factor markets are notoriously subject to transaction costs, information asymmetries and enforcement problems. Can the household efficiently allocate resources within its confines even in the absence of outside markets? The answer is yes, provided traditional gender casting rules ensure a perfect match between the demand and supply of skills and rewards for work on household enterprises equate the marginal return to labor. In the absence of an outside market to set clearly identifiable wage rate w and factor prices r_i , household members may, however, disagree as to how gains from resource reallocation ought to be shared among themselves.

To see this, consider the model presented in Section 2 and suppose for a moment that the economy is limited to the household.¹⁶ Formally, nothing has changed. There exists, therefore, a wage rate w and land price r_i that equilibrate the household factor markets and ensure allocative

¹⁵ I observed similar trends in rural Morocco and Northern Nigeria (see also Matlon (1977)).

¹⁶ The argument is by and large unchanged if certain goods can be bought from the market while others, such as child care and food preparation, are produced directly by the household. That certain goods are not traded may be due to transaction costs, imperfect information, or enforcement problems. The pattern of transactions costs would, in turn, determine the optimal size and composition of the household (e.g., Binswanger and McIntire (1987)).

efficiency within the household. Given the small number of people involved, however, it is unlikely that the household will resort to explicit wage labor transactions. It can, in principle, achieve the same outcome through implicit contracts. Furthermore, the household economy being small, perfect competition is unlikely; there is scope for parties to bargain over the distribution of the gains from resource reallocation. If bargaining is efficient, however, productive resources will nevertheless be allocated such that their marginal returns are equalized across all activities undertaken by the household.

Thanks to the second welfare theorem, any Pareto efficient resource allocation can be represented as a price system combined with lumpsum transfers. Any efficient bargained outcome can thus be written as the solution to a series of individual maximization problems of the form:

$$\text{Max}_{c_i, L_{ij}} U^i(c_i) + V^i(T_i - \sum_j L_{ij}) \quad (10)$$

subject to a budget constraint

$$p c_i = F(A_i + \sum_j \hat{A}_{ji} - \sum_j \hat{A}_{ij}, \sum_j e_j L_{ji}) + \sum_j (w e_i L_{ij} - w e_j L_{ji} + r \hat{A}_{ij} - r \hat{A}_{ji} + G_{ji} - G_{ij}) \quad (11)$$

and the usual non-negativity constraints $L_{ij} \geq 0$, $G_{ij} \geq 0$, and $\hat{A}_i \geq 0$. Variable \hat{A}_{ij} denotes a temporary transfer of productive resource A_i from i to j and G_{ij} is a lumpsum transfer from i to j . The wage rate w and the rental price r can be thought as the shadow cost of labor and resource A_i that individuals face in their bargaining over consumption with other household members.¹⁷

For a bargaining equilibrium to be both efficient and voluntary, individuals must internalize the true opportunity cost of the land and labor they command. This is achieved by providing rewards or transfers $w e_i L_{ij}$ and $r \hat{A}_{ij}$ for labor and land contributed to other members' productive activities, and by demanding rewards and transfers equivalent to $w e_j L_{ji}$ and $r \hat{A}_{ji}$ for labor and land contributed by others to i . In practice, of course, these transfers are netted out, so that

¹⁷ \hat{A}_i, L_{ij}, w and r can be vectors without affecting the argument.

they are not separately observed.¹⁸ What matters is simply that household members perceive that, at the margin, an additional unit of labor or resource that they provide to others or receive from others is matched by an increase or decrease in individual consumption equivalent to the economic usefulness of these assets in household production. In an efficient bargaining framework, differences in bargaining power only determine the size of lumpsum transfers G_{ij} between household members, not shadow prices w and r .¹⁹

Without specifying the bargaining process, we now examine the conditions under which individual household members will voluntarily agree to an incentive scheme $\{w, r, G_{ij}, G_{ji}\}$. For readers familiar with general equilibrium or cooperative game theory, this is akin to constructing the core of the household economy (e.g., Hildenbrand (1974), Friedman (1990)). We consider three possible threat points: (1) non-cooperation within the household; (2) separation from the household; and (3) domestic violence (e.g., Lundberg and Pollack (1993), Kevane (1996)). In the case of non-cooperation within the household, we assume that individual members can refuse to exchange labor and land with others and choose to rely on their own labor and land A_i . In the case of separation from the household, we allow for the possibility that laws and customs may request that land A_i and other resources be redistributed²⁰ and that compulsory transfers be imposed on one of the parties.²¹ Finally, we examine how the threat of domestic violence may induce someone to 'voluntarily' agree to a distribution of the gains from resource reallocation that they would otherwise reject.

Let W_i^a be the discounted utility of a non-cooperating household member i :

$$W_i^a = \sum_{t=0}^T \delta_i^t U^i(c_i^a) + V^i(T_i - L_{ii}^a) \quad (12)$$

¹⁸ Jones (1983, 1986) nevertheless reports that Cameroonian women who work in their husband's field customarily receive a share of the harvest that is proportional to the work they have contributed. In Papua-New Guinea, it is customary for all household members to receive a share of crop revenue that is commensurate to their contribution to output (private communication from John Gibson).

¹⁹ The size of lumpsum transfers may nevertheless affect the supply of labor and thus the equilibrium wage rate w .

²⁰ E.g., some customs specify that the bride price must be returned in case of repudiation.

²¹ E.g., alimony and child support.

where c_i^a and L_{ij}^a are the levels of consumption and labor that solve equations (1-2) and δ_i is the discount factor of individual i . Let W_i^c be the discounted payoff of a cooperating household member:

$$W_i^c = \sum_{t=0}^T \delta_i^t U^i(c_i^c) + V^i(T_i - \sum_j L_{ij}^c) \quad (13)$$

where c_i^c and L_{ij}^c are the solution to the individual's optimization problem when facing incentive scheme $\{w, r, G_{ij}, G_{ji}\}$. Individual i will voluntarily agree to the incentive scheme if:

$$W_i^c \geq W_i^a \quad (14)$$

This condition, called the household participation constraint, sets limits to the redistribution of welfare that can credibly take place within the household.

Since cooperating households allocate resources more efficiently than non-cooperating ones, individuals can be made to cooperate to incentive schemes that specify lumpsum transfers to others. Lumpsum transfers can be thought of as an entry fee that individuals have to pay to join the cooperating entity. Some household members may be able to capture most of the gains from better resource allocation even if participation by others is voluntary. The maximum size of voluntary transfers is large when gains from cooperation are large, e.g., in the presence of returns to scale and specialization.

Individuals may object to transfers G_{ij} that would make them worse off than what they could guarantee themselves by leaving the household. For this reason, rules regarding access to land are likely to have a paramount effect on the intrahousehold distribution of welfare. Let W_i^l represent the discounted payoff after separation. Depending on current asset endowments A_i (themselves a function of patterns of inheritance and *inter vivos* land transfers) and on laws and customs regarding the rights and obligations of separating households members (e.g., laws regarding divorce, minors, support to the elderly; see Egyir (1998))), W_i^l may be larger or smaller than W_i^a . If $W_i^l > W_i^a$, individual i can credibly threaten to separate from the household unless the intrahousehold distribution of consumption is such that $W_i^c \geq W_i^l$. What happens if $W_i^l < W_i^a$? Can

the household member credibly threaten to refuse to cooperate without leaving the household? This depends on what happens upon separation. Suppose that separation only entails a redistribution of household land A_i and direct transfer obligations. In this case, $W_j^l > W_j^a$ for some j whenever $W_i^l < W_i^a$: taking resources away from one must make the other better off. Consequently, any threat by household member i to refuse to cooperate without leaving the household will be met by j 's threat to leave the household. In this case, all that matters are the W_i^a payoffs. Threats to remain within the household while refusing to cooperate have no power.

The situation is different if household members must relinquish control over some of their land A_i and other assets upon household separation. For example, upon repudiation the bride price may have to be returned to the wife's parents, not to the wife herself. Court fees in case of divorce also subtract from the household assets.²² In these cases, it is possible that $W_i^a > W_i^l$ for all i 's in the household. If this condition is satisfied, no household member can credibly threaten to separate from the household; W_i^a payoffs are the relevant bounds to the household participation constraints. If, however, $W_i^a < W_i^l$ for *any* household members, then the relevant payoffs are the W_i^l 's.

Household members may also try to affect the distribution of gains from cooperation through the threat or use of verbal and physical violence (e.g., Egyir (1998), Kevane (1996)). Domestic violence is unfortunately too common for this possibility to be discounted. Let P_{ij} denote the pain and suffering that i can inflict to j and let $W_i^a - \sum_j P_{ji}$ be the payoff of a non-cooperating household member who is 'punished' by the others through domestic violence. Whether or not the threat of violence is credible depends on social attitudes and on the legal protection (or lack thereof) that is granted to victims. Clearly, if the threat of violence is credible, $W_i^a - \sum_j P_{ji} < W_i^a$ and the threatened household member is more amenable to intrahousehold dis-

²² Another example would be if a young adult who has received land from the chief must return it to the community in case of dispute with his father.

tributions of leisure and consumption that are detrimental to himself or herself.

Depending on the social context,²³ a household member may be able to escape violence by leaving the household, provided of course that violence ceases once the victim leaves. This is not always true, as numerous cases of ineffective restraining orders against violent spouses amply demonstrate in the U.S. If the threat of violence after separation is credible, the payoff upon separation becomes $W_i^l - \sum_j P_{ji}$, thereby further reducing bargaining power. If violence against runaway household members is not credible, perhaps because of physical distance, it is then possible that $W_i^l > W_i^a - \sum_j P_{ji}$. If the above inequality holds, the threat of violence to non-cooperating household members is ineffective -- provided individuals can flee the household fast enough to avoid ever incurring P_{ji} .

Given that most domestic violence takes place behind closed doors, deterrence by outside institutions is only feasible if victims choose to report it. Reporting is not problematic after separation since, by definition, $W_i^l - \sum_j P_{ji} < W_i^l$. In the case of violence to non-cooperating members within the household, however, complaining to an external agency may not be individually rational if it leads to the dissolution of the household (e.g., husband or father arrested) and if life after separation is not an attractive option, i.e., if $W_i^c > W_i^l$. As a corollary of this principle, a poor wife might optimally choose not to report a beating rather than starve. If this is the case, the threat of domestic violence is credible and effective even though external deterrence is available at no cost. In other words, household members can only be protected against the threat of physical violence if their outside payoff W_i^l is high enough. This reasoning explains why domestic violence might be more readily tolerated by poor, illiterate women in environments characterized by widespread unemployment.

²³ In some societies runaway wives are hunted down and brought back to their husband (e.g., Kevane (1996)). The same treatment is reserved to runaway children almost anywhere.

We have seen that bargaining power partly determine intrahousehold transfers and thus the relative influence that household members have on household decisions. Credible threats thus affect whose preferences have the largest weight in consumption choices (what Chiappori calls the sharing rule). This idea is implicitly behind much of the discourse about the potentially beneficial consequence of empowering women. For instance, it is often argued that women are more concerned about child nutrition and education than men. If true, this implies that child nutrition and education can be improved by raising the bargaining power of women within the household. Women have similarly be assumed to care more about vegetables and less about beer and cigarettes than men. To the extent that policy makers identify more readily with (supposed) female preferences, they may choose to increase women's bargaining power even if they do not care about female welfare per se.

In Section 2 we argued that age and gender casting are a convenient way of capturing gains from specialization but that, judging from the wide diversity of rules encountered in practice, the allocation of tasks by age and gender is largely arbitrary. In other words, in any given society, there are many different ways of dividing tasks among men and women, the young and the old, all of which capture returns to specialization and are equally efficient. We also pointed out that the choice of age and gender casting rule dictates a particular set of rules regarding access to land. The arguments presented in this section indicated that access to land (and other income earning opportunities) is expected to have a dramatic impact on the intrahousehold distribution of welfare. Putting the two sections together implies that combinations of rules of gender casting and access to land that are equivalent from an efficiency point of view need not yield the same intrahousehold distribution of welfare. An immediate policy implication is that the relative welfare of a particular group, e.g., women or young adults, can be modified by redefining rules of role casting and access to land (and other income earning opportunities). To be successful, however, efforts to challenge the status quo need to satisfy two requirements. First, rules regarding

role casting and access to land must remain 'in sync': there is little point insisting that women inherit land if they are not allowed to cultivate it, and vice versa. Second, the new rules must ensure that returns to specialization are achieved. In this respect, efforts to eliminate age and gender casting altogether and replace it with a Jeffersonian ideal of equal opportunity for all may be ill suited to traditional societies with little economic progress. Replacing one role casting system by another that is more beneficial to the target group may be more acceptable by all than the 'chaos' of equal opportunity for all.

Section 4. Discrimination and Collusion in Labor and Land Markets

Throughout the previous section, we assumed that markets do not exist for labor, land, and other productive resources so that the only way efficiency gains from resource reallocation can be achieved is for individuals to form households.²⁴ In this section we investigate the effect of various market configurations on intrahousehold allocation. We begin by noting that, if complete markets exist and there are no household public goods, there are no efficiency gains to be made from the formation of households.²⁵ There is, therefore, no room for the cooperative payoff W_i^c to be higher than the non-cooperative payoff W_i^a for all i . The only way W_i^c can be greater than W_i^a for some i is for W_j^c to be below W_j^a for some j . In this case, if separation is costless²⁶ and domestic violence cannot be exerted on separated household members, cooperative payoffs must equal autarky payoffs:

$$W_i^c = W_i^a \quad (15)$$

for all i 's. If separation is costly for the household, there is room left for negotiation on the distribution of household leisure and consumption. But if it is not, individual welfare is entirely dic-

²⁴ Or other, looser structures such as co-residence units (e.g., compounds) and social networks.

²⁵ This simple but powerful observation may account for the erosion of the family in developed countries. See Binswanger and McIntire (1987) on vertically integrated households.

²⁶ i.e., if household members do not have to incur costs to separate (e.g., legal costs), they do not have to relinquish household assets to non-household members (e.g., brideprice returned to wife family), and they do not lose entitlement benefits (e.g., tax break).

tated by factor prices and the distribution of household resources after separation.

The above suggests that legal provisions governing the attribution of household assets and providing for alimony and child support should have a direct effect on the relative welfare of household members (see Egyir (1998) for a description of these provisions in Ghana). In a world of complete markets, however, individuals should refuse to voluntarily join households unless they are guaranteed a payoff after separation that is equivalent to their expected payoff, should they remain on their own. Once laws and customs affecting intrahousehold welfare are fully anticipated, they should result in side payments (e.g., bride price, dowry) at the onset of the union itself, making it difficult for an equity-minded policy maker to durably affect the intrahousehold distribution of welfare (e.g., Becker (1981), Lundberg and Pollack (1993)).

We just saw that the existence of perfect markets makes it harder for a particular household members, e.g., the male head of household, to appropriate the efficiency gains from the redistribution of land and productive resources. It may, therefore, be tempting for, say, male heads to collude and deny their wives and dependents the right to get land of their own and to work outside the household (e.g., Kevane (1996), Egyir (1998), Fafchamps and Quisumbing (1998)). So doing, they lower females' W_i^q and W_i^l and more easily extract transfers from them. The prohibition to get land and work outside the home or farm further raises the bargaining power of household heads if the members who specialize in domestic or household-based chores become less well informed about possible exit option, less able to secure a job through job market contacts, and thus be more fearful of the consequences of dissent.²⁷

The allocation of labor resulting from collusion among male heads need not be inefficient, however, provided that heads of household spend at least part of their time on their own farm or

²⁷ Formally, the lack of information about job market opportunities translates into flat (i.e., high variance) priors which, if the person is risk averse, lower the expected utility of exit. The lack of network contacts has the same effect by reducing the probability of finding a job. See also Schaffner (1995) for evidence that servility shifts preferences against exit.

business.²⁸ Indeed, as long as captive and non-captive workers work together on the same production activity, the opportunity cost of captive labor is the same as the market wage. Aggregate labor resources can thus be allocated efficiently by ensuring that captive workers are given an implicit incentive to work equivalent to $w e_i$. Only when non-captive workers spend all their time outside the household is the allocation of labor inefficient: the household no longer is at an interior solution and the marginal return to captive labor falls below the market wage. In this case, all could be made better off by letting underemployed captive workers rent in land or hire themselves out for a wage. If Pareto gains from letting women and children work for other households are large enough, the redistributive gain that household heads obtain by colluding not to rent land or hire each others' dependents is smaller the efficiency gain that they could achieve by letting them work as laborers or independent farmers. Such a situation is likely to arise in villages and regions with lots of landless workers and sub-marginal farmers. Collusion to keep dependents out of the land and labor markets then loses much of its attraction and can reasonably be expected to collapse or take another form. Heads of household may, however, continue to extract transfers from dependents by colluding to restrict access to the best land and to pay women and dependents a low wage. Formally, the situation is akin to forming a cartel of employers and is discussed in Akerlof (1976).

Both types of collusive arrangements among heads of household -- captive labor or lower wage and bad land -- are, of course, vulnerable to free riding. In both cases, it is in the interest of a single employer or landlord to circumvent the collusive arrangement. Employers could attract captive workers by paying them a wage below the market rate or by renting them land at higher than market price because, by securing an independent source of income, captive workers would avoid paying the lumpsum 'tax' imposed by the household²⁹ and could thus be better off.

²⁸ As Basu and Van (1996) argues in the case of child labor, prohibiting certain household members from working outside the household may also be efficient if the withdrawal of their labor raises total wages. See also Anderson and Francois (1996).

²⁹ Either directly by leaving the household, or indirectly by renegotiating their obligations within the household.

Similarly, by raising the wage paid to women and children slightly above that paid by others, employers could attract a larger number of low wage but equally productive workers and thus make more profit. Cartel-like arrangements are thus not self-enforcing and require a meta-punishment to be sustained. The form that the meta-punishment may take is unclear, although one can imagine things like social ostracism by other male heads, sabotage, violence, poisoning, etc (e.g., Platteau (1997), Kevane (1996)). Women and children who work in violation of social prohibition may also face various forms of harrassment, including sexual harrassment by co-workers.³⁰

Another, more subtle way to lower the wage of dependents and thus their exit payoff is to lower their e_i by restricting their access to education and by inciting them to learn tasks with low potential for wage employment, such as household chores. As we have argued in section 2, age and gender casting of this type need not be inefficient,³¹ even though they clearly have detrimental effects on equity. Finally, in places where income earning opportunities mostly take the form of farming and self-employment, access to individual income requires personal finances. In that case, another way of lowering the compensation for dependents' labor is to restrict their access to credit and hence to remunerative uses of their time other than collaboration to household production (e.g., Egyir (1998), Groote and Kebe (1995), Goetz and Gupta (1996), Smith (1994)). Udry (1996a) gives yet another example in which it is access to organic fertilizer which is the key factor to which women have unequal access.

Section 5. Time and Commitment

In the two preceding sections we argued that individual household members will object to a

³⁰ In such a setting, non-discriminatory employment opportunities for women can be created by setting up rural public works programs open to all (e.g., Deolalikar and Gaiha (1992) and the references cited therein show that women often constitute an important proportion of public works employees).

³¹ With the same caveat as before, namely that age and gender casting are restrictions to the freedom of opportunity and prevent individuals from achieving their full economic potential, e.g., as entrepreneurs, leaders, researchers, inventors, and the like.

distribution of gains from resource reallocation that makes them worse off than what they could guarantee themselves by leaving the household or refusing to cooperate. This idea was captured in a household participation constraint of the form $W_i^c \geq W_i^k$ where W_i^k denotes the credible threat point of household member i , which is either W_i^a or W_i^l , with or without violence, depending on circumstances (see Section 3). We now examine how participation constraints are affected by the passage of time between the reallocation of land and other productive resources, and the enjoyment of consumption. Throughout this section we assume that household first allocate labor, land, and other productive resources to production (period one). Output is then realized and the proceeds used to finance consumption (period two).

Consider the following arrangement between household members: i agrees to work on j 's field in period one in exchange for a share of output in period two -- i.e., a "gift" at harvest time (e.g., Jones (1986), Boe (1996)). As we have seen in the preceding section, it is rational for i to accept such an arrangement if $W_i^c \geq W_i^k$. For j to voluntarily compensate i , however, the agreement must be self-supporting, that is, it must also be rational for j to fulfill his or her promise in period two:

$$U_j(q_j^c) - U_j(q_j^e - e_i L_{ij} + G_{ij} - G_{ji}) \leq \delta (W_i^c - W_i^k) \quad (16)$$

In other words, for j 's promise to be credible, it must be in j 's interest to share output with i afterwards. As the above equation shows, j will do so only if the short term loss from having to compensate i is smaller than the long term gain from a continued relationship.³² This is unlikely to be true if the promised compensation $e_i L_{ji} + G_{ij} - G_{ji}$ is large, the gain from cooperation $W_i^c - W_i^k$ is small, or j 's time horizon is short, i.e., δ is low. If equation (16) is not satisfied, j is unable to credibly commit to compensate i and the agreement will not be fulfilled. Anticipating this, i should refuse to cooperate. There is commitment failure: a Pareto improving transaction does not take place because one party cannot credibly commit to honor the contract (e.g., Coate and

³² We have implicitly assumed that if j fails to pay i , individual i responds by not transferring G_{ij} and refusing to cooperate in the future.

Ravallion (1993), Balsvik (1995)).

Clearly, the possibility of commitment failure puts additional constraints on the type of resource reallocation and compensation schemes that are self-supporting (e.g., Pollack (1985)). First, for a household member to credibly commit to any ex post payment, that member must not have been pushed to his or her exit payoff; he or she must derive some benefit from participating to the household. Put differently, for the household head to credibly commit to compensate dependents for participating to farming or household chores, the head must be strictly better off in a functional household than outside of it. If the welfare gains from household formation are small, this may require that most if not all these gains go to the head for intrahousehold labor transfers to take place. When this condition is not satisfied, members are likely to insist on operating in strictly separate spheres with little or no labor exchange -- a feature that many would associate with dysfunctional households. Of course, the refusal to collaborate on a common project further reduces the gains from household formation and fragilizes the household even more.

Second, for any distribution of the gains from collaboration $W_i^c - W_i^a$, there are limits to the ex ante redistribution of productive resources. If equation (16) is binding, production efficiency may be impossible to achieve: i may refuse to work more than a certain number of days L_{ij} on j 's field because any promise of payment in excess of $w e_i L_{ij}$ is not credible. Of course, it may be possible to redistribute the gains from cooperation differently and raise $W_j^c - W_j^k$ so as to satisfy equation (16). But this would mean taking something away from i , a prospect i is likely to object to.

Third, commitment failure may be mitigated by allowing for an external enforcement mechanism. One possible mechanism is for household members to pass among themselves market transactions that are at least theoretically enforceable by courts.³³ One conceivable

³³ Market transactions among spouses are common in parts of Sub-Saharan Africa, notably the coastal areas of Ghana and Nigeria. It is, for instance, frequent for women traders to purchase the output of their husband farmers or fishermen.

mechanism is reliance on legal institutions, such as nuptial agreements, business partnership agreements, joint ownership of assets, joint holding of bank accounts, etc. When small amounts are involved, however, court action is seldom attractive because it is too costly and time consuming. Alternative legal institutions at the village or community level -- such as chiefs and marabouts -- may exist that have jurisdiction to adjudicate matrimonial disputes and can put pressure on a recalcitrant spouse to honor a promise. Proving that a promise has been breached and that one spouse is at fault is often difficult to verify, given that households often engage in complex implicit arrangements. If breach of promise cannot be established, external agents may choose to rely on general standards of fairness instead. Given the paucity of data on these issues, providing empirical evidence of what these standards are and how matrimonial disputes are adjudicated in practice is a promising area of research.

Fourth, agreements are more difficult to enforce if compensation is promised only in a distant future (i.e., δ low). In some cases, compensation may be delayed until the death of the spouse or until dissolution of the marriage (e.g., Egyir (1998)). In this case, rules and customs about the devolution of assets limit the forms that compensation may take, while at the same time making some forms of credible commitments possible. For instance, if laws and customs stipulate that the wife inherits half of the household assets upon death or divorce, it will be easier for the husband to convince his wife to help build up joint assets than if the wife has no right upon them. In this case, asset devolution rules can be seen as providing a crude commitment mechanism. For such a commitment mechanism to be effective, husbands must have no discretion to change the devolution of joint assets; efforts to circumvent rules must be regarded as a form of fraud and punished accordingly.

Credit constraints also matter. Household members who are credit constrained may be unable to promptly pay for labor services and may have to wait until sufficient output has been generated before doing so (e.g., Egyir (1998)). Their production activity may also be subject to

shocks, in which case they may be unable to pay in period two. One would therefore expect commitment problems to be more severe and the intrahousehold allocation of resources to be less efficient in poor, credit constrained households. Finally, commitment failure is more likely when j 's time horizon is short, as would be the case if j expects to leave the household in the near future. Implicit agreements among household members are thus less likely to be made and more likely to be broken in households that are dysfunctional or are breaking apart.

For the same reason, commitment failure is more problematic for individuals who expect to migrate, exit, or marry out of the household: these individuals are more likely to free-ride and less likely to take a long-term interest in the prosperity of the household. Laws and customs about inheritance, brideprice and dowry, etc, can be regarded as an effort to mitigate this form of free riding. Societies in which daughters marry before they are old enough to rationally choose to free-ride, also typically deny daughters a right to inherit. In contrast, sons often continue to contribute to household production until they are much older and are typically given, through customs regarding inheritance and *inter vivos* transfers, a stake in their father's farm (e.g., Egyir (1998)).³⁴

Another possible way that commitment problems can be solved is by trading labor against land or other productive resources.³⁵ Suppose j tries to convince i to work full time on his field but i objects that she does not believe she will be fully compensated for her effort -- i.e., equation (16) is violated. Given this state of affairs, it may be in j 's interest to let i cultivate part of his land and keep the proceeds in exchange for a payment after harvest $r\hat{A}_{ji}$. The transfer of user right over land can then be seen as a way of giving an immediate payment and thus of bypassing commitment failure (see Egyir (1998) for an illustration). Since the land transfer partly or fully can-

³⁴ For a discussion of how the concentration of land into the hands of the elder affect family organization and sectoral employment, see for instance St-Amour and Vencatachellum (1996).

³⁵ Other give-and-take arrangements can be found as well, e.g., letting women take some of the grain to brew it into beer and sell it (e.g., Haggblade (1987)).

cells out the implicit wage payment $w_i L_{ij}$, equation (16) is more easily satisfied and the exchange of labor can take place.

Whether or not this arrangement is efficient depends on returns to scale and specialization: if returns to scale are increasing, it is inefficient to divide the farm into distinct units. Even so, the efficiency gain from a better allocation of labor may compensate the efficiency loss from a worse allocation of land, so that the net effect of the arrangement is beneficial. Udry's (1996a) finding that women work harder on their fields than on their husband's is consistent with the existence of incentive problems such as the ones generated by imperfect commitment. Other features described by Udry are also more consistent with commitment problems than role casting. For instance, Udry finds that dependents often grow, on their individual fields, the same crop as the head on the household fields; this is inconsistent with a pure role casting rationale for dependents' plots. Descriptive accounts also point out that dependents who cultivate their own plots are entitled to use the money as they wish -- provided they contribute to household expenditures. This is in line with the role of dependents' plots as financial compensation devices: capturing gains from specialization does not require financial independence but commitment failure does. Finally, the fact that dependents' plots are only granted on a temporary basis, mostly by the household head himself, is further indication that commitment failure is the motivation. If role casting was the rationale, there would be little reason for dependents' plots not to be allocated on a permanent basis. All in all, the preliminary evidence is thus highly suggestive that the practice of dependents' plots, which is widespread in much of Western and Central Africa, is primarily an effort to overcome commitment failure within the household. More work is nevertheless needed before we reach a definitive conclusion.

Conclusion and Prospect for Empirical Work

This paper has examined the conditions under which land, labor, and other productive resources might not be allocated efficiently within (and across) households. We noted that,

depending on returns to scale, specialization and experience, efficiency may require the centralization of production -- and thus land -- under the authority of the head, and the specialization of individual household members in certain tasks and activities. In this context, age and gender casting can be understood as an institution meant to resolve the allocation of tasks among household members. Because gender and age seldom confer a strong comparative advantage in any particular task, role casting is largely arbitrary, as indicated by the wide variety of task allocation rules that one finds in poor rural areas.

Role casting can thus be seen as an efficiency enhancing institution that attempts to capture gains from specialization by providing a focal point for intrahousehold task allocation. So doing, however, it introduces a potential mismatch between the tasks allocated to particular individuals and their innate talent. The welfare loss from such a mismatch is probably low in unspecialized, undifferentiated societies such as poor rural areas of the Third World. But it is likely to be high in highly diversified, rapidly evolving societies. Consequently, we expect role casting to become increasingly costly and ill-adapted as societies become more differentiated -- and thus to be progressively repealed as development takes place. More work is needed on this issue.

A good grasp of role casting is necessary before one can make sense of rules of access to land because role casting often dictates a particular pattern of land allocation across individuals and, thus, of land inheritance and disposition *inter vivos*. For instance, when women are responsible for certain crops such as vegetables or food crops, it is natural that they be granted access to a comensurate piece of land. In contrast, when women do not participate in crop production -- or where their participation is restricted to certain agricultural tasks, not certain crops -- then female access to land is not required to capture returns from specialization. In that case, one would expect only household heads to receive land.

Role casting and access to land do not only affect intrahousehold efficiency, they also are important determinants of intrahousehold welfare through their effect on exit options and bar-

gaining power within the household. Combinations of rules of gender casting and access to land that are equivalent from an efficiency point of view need not yield the same intrahousehold distribution of welfare. An immediate policy implication is that the relative welfare of a particular group, e.g., women or young adults, can be modified by redefining role casting and rules of access to land (and other income earning opportunities). To be successful, however, efforts to challenge the status quo need to ensure that returns to specialization are still achieved.

We also investigated the relationship between intrahousehold land allocation, voluntary participation constraints, efficiency, and equity and showed that commitment failure within the household may lead to inefficiency. Granting dependents temporary rights to cultivate their own plot of land, as discussed for instance in Udry (1996a), may be used to mitigate intrahousehold commitment problems. If this is the case, women and other dependents are expected to apply more labor to their farm and business than is efficient. Udry (1996b)'s results are consistent with this prediction. Second, the head of household is expected to mitigate commitment problems by allocating individual plots and other productive resources on a discretionary basis, as documented by Egyir (1998). Third, inefficiency is expected to be fostered by factors that exacerbate commitment failure, such as short time horizon (sons and daughters who expect to leave the household; dysfunctional families), low assets (low gains from intrahousehold exchange), unequal stakes in the household (some members have low welfare gains from household participation), and poor external enforcement. This is consistent with the observation that adult dependents work in general less hard than the household head and his wife (e.g., Cleave (1974), Fafchamps (1986), Fafchamps and Quisumbing (1998)). Finally, our framework predicts that the allocation of consumption and leisure should reflect participation constraints. It therefore provides the basis for a test of the effect of determinants of exit options -- such as access to land -- on the intrahousehold allocation of leisure and nutrition. Providing empirical verification for these predictions is the object of future research.

We finish with a few words about a topic that was ignored here, that of female headed households. As pointed out by many authors (e.g., Egyir (1998), Gladwin and McMillan (1989), Jiggins (1989), female headed households have unequal access to land and credit. Similar problems, although not as severe, afflict female operated households. The question is: why? One possible answer is that denying women access to land and credit is a way to lower their exit payoff. Making exit less attractive for women has two effects. First, it reduces their bargaining power within the household, and thus is likely to affect women's welfare even in male headed households. This issue was discussed in Section 4. Second, it also makes commitment failure less likely and thus mitigates incentive problems and inefficiency within households. This is because allocating most of the welfare gains from household formation to male heads gives them a stake in the preservation of the household. As a result, household heads have an incentive to honor their commitment to redistribute part of the joint output to dependents in exchange for their participation in household activities.

If the above interpretation is correct, denying women access to land and credit indirectly serves to stabilize households -- although it does so, arguably, at women's expense.³⁶ This opens another question, namely, what is the reason for the existence of female headed households and for the apparent rise in the proportion of female headed and female operated households in some African countries? Is it a result of efforts to empower women? Is it a consequence of male migration to cities, mines, and plantations? These issues deserve empirical investigation as they undoubtedly have serious implications on the welfare of children and other social issues (see Akerlof et al. (1996), Korenman and Neumark (1991), and Akerlof (1998) for a similar emphasis in the U.S.). Before encouraging equal access to land and credit for women, one would like to know what impact this will have on household stability.

³⁶ Because households with two or more adults benefit from cost savings in the provision of household public goods, it is conceivable that women benefit in the absolute sense from being denied access to land if without it there would be many more households headed by a single adult, male or female. A thorough treatment of this issue is left for future research.

To make this clear, consider the following stylized example: suppose that all land goes to male heads of household, that heads marry to get access to female and child labor, and that they can credibly commit to compensate their dependents because they gain from marriage. Suppose further that a reform grants women half of their husband land upon divorce. While this reform would probably raise the welfare of wives in existing households, its net long term effect may be null or negative. For instance, men may respond by refusing to marry and by hiring women and children as wage workers instead. In this case, the long-term net welfare impact of the reform on women is essentially zero,³⁷ but its effect on out-of-wedlock birth and thus on illegitimate children is likely to be very negative. Only by simultaneously ensuring that daughters gain equal access to land through inheritance and transfers inter vivos can this negative effect be avoided. This example serves to illustrate that tampering with family law should not be attempted without considering the effect on household formation.

³⁷ In equilibrium, the wage women get as workers is equal to the intrahousehold compensation they get when their only asset is labor.

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