Gender differences in time and resource allocation in rural households in Ethiopia

Diksha Arora   Codrina Rada

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Abstract

We discuss the estimation of a gender disaggregated Household Accounting Matrix for a typical rural household in Ethiopia. Data from the 1997 Ethiopian Rural Household Survey (ERHS) provides information on time-use of household head and spouse, on individual asset ownership and consumption management decisions. Our proposed methodology is a first step towards a gendered approach to account for intra-household allocation of labor and resources. The household accounting matrix provides both a framework for modeling gender relations within the household economy and for the data that describes these relations.

1 Introduction

A typical woman in rural Africa assumes the role of a food producer and processor, homemaker, caretaker and sometimes, a paid worker. Each of these roles imposes different demands and expectations on women. In conjunction with the lack of basic infrastructure in rural areas these responsibilities leave women time poor. A second aspect of gender relations within rural households in Africa is that women do not control the income they generate through their labor. Therefore, women are also more likely to be resource constrained or income poor.

Most economic perspectives pay little, or no attention to unpaid economic activities. This may explain the lack of policy prescriptions that draw on the household's gender-based dynamics and their impact on human development. As a result, women, who are over-represented in the unpaid sector of the economy, have been, often, omitted from the policy debate. Still, since Boserup (1970), there has been a growing recognition of women's role in agriculture and food security in Sub-Saharan Africa. The failure of many traditional policies targeting rural poverty in Africa have turned the attention of some economists to the role of gender relations within the household (Blackden and Bhanu, 1998).

The interest in gender power relations within the household has led to three main devel-

opments: conceptualization of gender division of resources and labor;[1] more gender disaggregated data collection at the household level and especially in surveys on time-use; and a buoyant literature on time poverty differences between men and women in developing countries[2].

Gary Becker developed one of the first economic models of the household. Becker (1965) assumes that households pool income and all members in the household have the same preferences and tastes. Making the same assumption of shared preferences, Singh et al. (1986) built the first agricultural household model accounting for the fact that crop production is meant both for sale and for own consumption.

The critical weakness of unitary models is the assumption of 'shared' preferences and the existence of 'altruism' in the household divisional patterns. For the rural economies in Sub-Saharan Africa, where household organization is subject to wide variation and distribution is far from equal, the unitary household model can be highly misleading.[3] Cooperative and non-cooperative frameworks have been introduced in household bargaining models, in an effort to analyze household relations in a more realistic manner (Chiappori, 1988; McElroy and Horney, 1981; Carter and Katz, 1997; Lundberg and Pollak, 1993).

Dictated by social norms, gender relations in Sub-Saharan Africa are far from being equal. The unequal intra-household allocation of resources and labor makes women disproportionately poor in terms of time, income and assets. Women supply the majority of the labor for food production, processing, and household chores including care work while men divide their time mainly between farm work and leisure with minimal assistance to women in domestic work (Evers and Walters, 2001; Pitcher, 1996; Sow, 2010).

In spite of their multiple roles and responsibilities to ensure food security and the well-being of the members of the household, most women do not gain an equal access to household resources (Brown, 1994; Evans, 1991). In agricultural societies where men and women farm separate plots, the ability of women to earn an income is usually hampered by two main factors - gender asymmetries in access to productive resources (Abbas, 1997; Udry, 1996) and aversion to risk. Women usually operate at a very small risk margin because of their responsibility to ensure food security of the household (Quisumbing, 1994; Brown, 1994; Abbas, 1997).

Additionally, the intra-household resource and labor division patterns can be critical in determining children's development. The competing claims on time and fewer household resources in the hand of women may negatively affect children's health and nutrition.[4]

An analysis of intra-household relations is crucial for understanding the factors that

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[1]See Becker (1965); McElroy and Horney (1981); Chiappori (1988, 1997); Carter and Katz (1997); William Darity (1995); Campbell and Warner (1997)

[2] See Bardasi and Wodon (2006, 2010); Gammage (2010); Zacharias et al. (2012)

[3] See Jones (1983); Fafchamps et al. (2009); Koopman (1991); Quisumbing and Maluccio (2003)

[4]See Hyder et al. (2005); Sen (1999); Zivin et al. (2006); Thomas (1997); Quisumbing and Maluccio (2003)

strengthen the woman's position in the economy and the society since *the household* is one of the primary places where gender inequality is practiced. We base this research on Sen (1999)'s approach whereby a woman's agency is the mean to her well-being. Equally important, increasing the agency of women allows them to be active agents of change which, through spillovers, can be a viable option in the quest for overall development (Sen, 1999; Seebens, 2011).

In this paper we propose a methodology for estimating the gender division of labor (GDOL) and resources (GDOR) in subsistence households. We apply this methodology to households in rural Ethiopia and use the Ethiopia Rural Household Survey (ERHS) data for 1997 to construct a Household Accounting Matrix (HAM). The 1997 round of ERHS was dedicated to intra-household issues and therefore it provides valuable information on time and resource allocation between the man and the woman in the household. Our proposed methodology is a first step towards a gendered approach to account for intra-household allocation of labor and resources. The household accounting matrix provides both a framework for modeling gender relations within the household economy and for the data that describes these relations.

2   Household accounting matrix: a brief introduction

Our main task in this paper is to present a methodology for estimating intra-household allocation of labor and resources. Our starting point is the social accounting matrix (SAM) which is "a framework both for models of how the economy works as well as for data which monitor its workings" (Pyatt (1991), p.315). Using the principles that govern the SAM, we propose a household accounting matrix (HAM) to analyze *transactions* within the household, and between the household and the rest of the economy. We see the household as a scaled down economy.

Table 1 here: A household accounting matrix

The structure of our household economy is described by the HAM in Table 1. We assume that the household is involved in two production activities or sectors - a cash generating activity and a non-cash or household activity. Cash generating activities along column (A) produce output that can be either consumed within the household or sold on local markets in return for cash. We include here farm work (land clearing, weeding, harvesting, threshing), livestock care, food processing for sale, pottery, weaving and marketing. Household activities in column (B) produce an output strictly destined for household consumption or maintenance. Activities in this sector are food processing (milling, cleaning and grinding the grains), cooking, cleaning and other maintenance works such as fetching water and collecting

firewood. Household activities also include care work. All these activities are labor intensive. Only the cash-generating sector uses intermediates inputs such as fertilizers and seeds which are purchased on the markets and are counted as imports into the household economy. The value of sectoral outputs appear in the first two cells of row (12). Total output in each sector is the sum of the value added and the value of imported inputs, in the case of cash-generating activities.

We evaluate the value-added in each sector by wage proxies for different types of activities given average hours spent for each activity on a daily basis. In other words, we assume that the value added by the man and the woman is the result of their labor regardless of whether the output is sold on the market or consumed within the household. Wages from cash-generating activities, as explained later on, can be different for woman and man, w_c^f and w_c^m. On the other hand, the subsistence wage, w_s, paid for labor in household activities is assumed to be the same for both genders. Overall, the value added by each gender in each sector is calculated as the hourly wage rate for a particular activity multiplied by the labor, where the labor is quantified in terms of the number of hours devoted to that sector. For example, in cell $3A$ the woman's value added in the cash-generating sector is given by the product of the hourly wage and the average number of hours she worked on a daily basis, $w_c^f L_c^f$.

Our household economy consists of three kinds of domestic *institutions*: the woman, the man and the household. The household consists of all the persons in the household including the man and his wife. Specifically, we count the man and the woman in the household sector only in terms of their food consumption.[5] Outside the household there is the rest of the economy which represents the external sector with which the household trades, and from which the household can receive income for its labor.

We now explain the income received by each of these institutions. Across row (5) the woman retains a share of her own cash-generating output represented by her value-added in non-agricultural cash-generating activities such as craft-making; in the secondary distribution of income she receives a transfer from the man from his cash-generating output;[6] and she receives income, $w_n^f L_n^f$, from the rest of the economy if she sells her labor outside the household economy. The sum of these incomes is the woman's overall income, Y_f. Given what we know about gender relations in Ethiopia and, more broadly, in many poor rural households across developing countries we assume that the man retains all the income from the agricultural cash-generating activities. Hence, along the *Factors* column C the woman transfers to the man all the value-added she has produced by working on the household's agricultural plot. In addition, along row 6, the man retains all the cash-generating output he produces; and he can earn an income from the rest of the economy, $w_n^m L_n^m$. All these incomes add up to the total income for the man, Y_m. The household in row (7) receives an income Y_h. The sources

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[5]This is necessary because the data does not allow the division of food consumption by individuals.

[6]As we will explain later on this transfer is related to the clothes bought by the man for the woman.

of the household's income are the following. The household receives the entire output from *household activities* produced by both the man and the woman, $w_s L_s^m$ and $w_s L_s^f$; and both the woman and the man transfer a share from their incomes earned from cash-generating activities or from the rest of the economy. The proportions in which all of these transfers are made will be discussed later. Finally, across row (8) the household economy purchases inputs from the rest of the economy, and each domestic institution purchase clothes and other consumable goods from the rest of the economy. These purchases can be thought of as the household's imports.

We turn now to the uses of incomes which appear in the *Demand* columns. The uses of *woman's* income along column (E) include transfers to the man and the household, purchases of goods for own consumption from the rest of the economy and savings. A similar description applies for the uses of *man's* income. The main uses of the *household's* income are: consumption of output from own production in the cash-generating sector, consumption of all subsistence output, and purchases from rest of the economy. A share of output from the cash-generating is sold to the rest of the economy and, in our HAM, it is recorded in the first cell of column (H). Finally, the rest of the economy can buy labor from the woman and the man in return for which it pays wages at the rate of w_n^f and w_n^m. The cash received in return for the crops, livestock or goods produced by the household together with wage incomes for the labor represent total income received from the rest of the economy. As an accounting rule the total for each row must equal the total for each column.

3   Data

Two reasons motivate our selection of Ethiopia as a case study. First, Ethiopia is a low income, mainly agrarian economy where women, not having access to the market system and the wider economy, are dependent on what happens in the household. Second, the Ethiopian Rural Household Survey (ERHS) provides several rounds of useful data. For the purpose of this study we focus on the 1997 round which includes comprehensive gender disaggregated and individual specific information.[7]

Specifically, the 1997 questionnaire is organized in two main modules: a core module and an intra-household module. The core module gathers information on the household's agricultural production, crop sales and consumption, and agricultural inputs.[8] For the purpose of this study the intra-household module provides information on transfers of resources between the man and the woman and from the man and the woman to the overall household.

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[7]For more information about the Ethiopian Rural Household Survey (ERHS) please see Dercon et al. (2011); Fafchamps and Quisumbing (2004).

[8]The survey provides information for the two main crop season, belg and meher, which we aggregate to obtain annual agricultural output

The intra-household module records data on livestock possession and income from livestock activities separately for men and women; income from other activities performed by men and women such as weaving, pottery and food processing for sale; consumption decisions disaggregated by gender identifying who buys food, who buys clothing, and who decides about education and health care expenditures; time-use for different activities for men and women; pre-marital human and physical capital of the man and his spouse; and information on assets brought into the marriage by each individual including transfers from their families. Given our research interest in intra-household allocation of labor and resources, this round of the ERHS is the most relevant one.

Our focus is on male headed households with one spouse. In other words, we eliminate female headed households and polygamous households. A major limitation of the survey is that, with respect to time-use, the survey instrument concerns the duration of various activities performed only during the *previous day*. Not all households in the sample undertake farm work everyday and, therefore, we have to clear out all households that did not engage in farm work according to the time use module. After cleaning the data for other inconsistencies and missing values, we are left with 633 male headed households with one spouse that engage in agriculture.[9] We use this list of 633 households as a final list for other modules in our analysis.

The overall sample consists of 3973 individuals. The average household size is 6.3 and the average number of adults in a household are 3.1.[10] The gender distribution in the sample is fairly equal. The age distribution is illustrated in Table 2. As expected, the population across poor rural households in Sub-Sahara Africa tends to be very young - about 53% are younger than 16 years of age while only 2.7% are over 60. The remaining 44% consist of working age adults.

Table 2 here

Within the working-age group of 15-65 years, only 46% report *earning income* as their main activity. Given that these are subsistence households, practicing agriculture and allied activities is the main occupation of most adults. Close to 90% of individuals who report income earning activities as their main activity are farmers; the remaining 10% perform non-agricultural work usually outside the household.[11] When we disaggregate the data by by gender we find out that 84% of the men have an income earning activity as their main activity, while only 6% of the women fall in this category. In contrast, 84% of the women report domestic or household work as their main activity while less than 1% of the men are

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[9]e.g. Some men reported breastfeeding as an activity performed on the last day

[10]Aside of the head of the household and his spouse, we count adult children as adults in the household.

[11]Non-agricultural work consists mainly of occupations such as factory workers, craftsman, mechanic, manual worker, blacksmith etc.

in this section.

Obviously, in subsistence societies the concept of *main activity* can be misleading when applied to income earning activities. The categorization becomes even more problematic when we refer to women: a woman provides an important source of labor on the farm and in other income generating activities. However, it is rarely recognized as such by the society or, as a matter of fact, by women themselves. The woman is often perceived as being responsible for the day-to-day sustenance of the family and of the household, while the man is responsible for bringing in cash income.

4 Estimation of a HAM for a typical rural household in Ethiopia

In this section we describe the estimation of the HAM for a typical rural household in Ethiopia. Our goal is to present the assumptions, proxies, limitations and a brief descriptive analysis of the household accounting matrix and its potential uses. We begin with a description of intra-household allocation of labor time. Together with proxies for wage rates for various economic activities, the statistics on labor time allow us to estimate the value added by men and woman to the two household activities or sectors (non-cash/household and cash-generating), and the income received from working outside the household economy. Next, we discuss transactions with the rest of the economy related to the sale of crops and crafts and purchases of intermediate inputs. Finally, we describe the allocation of consumption and transfers between the man and the woman and from both to the rest of the household.

4.1 Gender roles and intra-household labor allocation

Gender division between work inside and work outside the house may not be unfair, as long as both demand a comparable amount and intensity of labor. A problem appears when the demand for women's labor cuts across activities. Our analysis suggests that women also provide significant amount of labor on the farm, for livestock activities and for other cash generating activities.

The distribution of time for a typical day of work for women and men is presented in figures 1 and 2.[12] An average work day for a woman requires more than 10 hours of work compared to 8.5 hours a day for the man. The pattern of intra-household labor allocation in the Ethiopian society is not much different from other countries in Sub-Saharan Africa. In Uganda, women supply 80% of the household labor time for food production, 60% for production of cash crops and most of labor for household and care work (Evers and Walters, 2001). Koopman (1991) shows that in Southern Cameroon men spend close to 22 hours per

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[12]Unfortunately, we are not able to capture the family labor provided by young children and other relatives in our time use analysis as the data reports time use only for the head and his spouse.

week on income generating activities and only 9 hours per week on household food production or household work in contrast to women who spend close to 12 hours per week on income generating activities and more than 50 hours per week on household food production and chores. In Mozambique, men's work time amounts to 6.4 hours per day, while women put in almost double that time, at 11.54 hours per day (see Arora (2013)).

Figures 1&2 here

4.2 Value added, production and the rest of the economy

In order to calculate value added in each sector disaggregated by gender we first estimate wage rates for each category of work. The first two columns of Table 3 report the hourly wage rate by gender for different categories of work. The average hourly wage rates are then multiplied by the numbers of hours reported in the time-use module to get the daily contribution to the value added of the household economy. We use a similar approach to calculate the income earned when the individual is employed outside the household.

Table 3 here

The average hourly income earned by a domestic servant as reported in the survey is used as a proxy for the value-added in the non-cash/household sector. We assume that the subsistence wage rate is the same for the woman and the man.[13] Based on responses from 27 women employed as domestic servants the hourly wage rate for domestic activities comes to an average of 0.33 birr. As discussed above, women spend considerably more time in activities related to household chores and activities. Thus, they are the main contributors to *value-added* in the non-cash/household sector - 2.20 birr compared to only 0.23 birr by the man.

The cash-generating sector comprises of agricultural and non-agricultural activities which, later on, are aggregated in the HAM. The wage rate in the cash generating agricultural activities comes to 0.50 birr for the woman and 0.60 birr for the man. To get these numbers we use wage rates for adult females and males for different farm activities such as harvesting, weeding, or livestock herding, reported by peasant associations in each region.[14] We obtain an overall wage rate by activity from the average wage rates across different peasant associations. Overall, the men contribute 7.24 hours to agricultural activities compared to about 3 hours daily on average by the women.

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[13]There is no data for men working as domestic servant, and therefore we use women's income from domestic servant to estimate the subsistence wage rate and assume it to be equal for women and men.

[14]There are missing values for some of the peasant associations, probably because in those areas certain farm activities are not undertaken for wages.

The household economy consists also of non-agricultural cash-generating activities. These are food processing, selling dung cakes, firewood, handicraft, pottery and others. For this category of work we calculate the wage rate using the module on business activities[15] and the module on female activities. The average daily income earned by women and men across different activities is then divided by the number of hours spent on these activities. To get the hourly wage rate we divide the daily wage rate by 8. We find significant differences in the wage rates between men and women - 1.32 birr for man compared to only 0.46 for the woman.

Although not prevalent across Ethiopian rural households, some individuals are employed outside the household economy. Our estimates of the income received from the rest of the economy use non-farm labor data on the number of days worked and amount earned in cash and kind for different occupations. We divide incomes of professional workers, laborers, traders, unskilled workers and religious workers by the number of days worked in their respective occupations to get a daily wage rate. For hourly wage rate, we divide the daily wage rate by 8. Hourly income earned and days worked is reported individually for the average woman and man in the last row of Table 3.

4.3   Production and sales of crops and livestock products

Subsistence households are predominant across rural Ethiopia. These households engage in agricultural production for own consumption and for sale. In this subsection we discuss transactions with the rest of the economy related to the sale of, mostly, agricultural goods and the purchase of intermediate inputs. The crops these households sell are either the surplus of the food crops or the cash crops. Generally, households produce teff, wheat, barley, maize, sorghum, chick peas, lentils, haricot beans, horse beans, tomato for own consumption and sell any surplus they have. On the other hand, crops like coffee, chat, enset, linseed, nigerseed, sugarcane and tej, are conventionally considered as cash crops because of their significant demand from urban and international markets.[16]

Across different cash crops, there is a wide variation in the proportion of total production sold on the market. For pulses and oilseeds, the proportion of total produce sold is as high as 75% while more than 90% of the coffee production is sold. Chat and enset, although cash crops, are also consumed in high proportions and less than 40% of their produce is sold in the market.

Table 4 here

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[15]This module reports the ID number of the individual undertaking the activity. Using the base file we can determine whether the household head (male) or his spouse (female) is involved in the activity.

[16]We assume that if more than 50% of the production of a crop is sold in the market, then it is a cash crop.

The 1997 household survey provides statistics for the average value of total crop production in the last meher and belg seasons. Evaluated at prices reported in the survey the value of total production for the average household was 1876 Birr. About 37 % or 688 Birr of total production is the value of crops sold, 4 % is the value of crops given out as payment and the rest of 59 %, or 1119 Birr, is the value of crops used for consumption within the household. This shows that subsistence households depend largely on crop production as a means of earning cash income. 44% of households also engage in some of sort of animal husbandry that brings in cash income. The main animal products that are sold in the market are hides/skins, milk and milk products, chicken and meat, dung-cakes and eggs. The average monthly revenue from sale of livestock products is 15 Birr.

Unfortunately, the dataset does not report who controls or keeps the income from the sale of crops. We are therefore forced to make the questionable assumption that all the income from the sale of crops is retained by the man who is the head of the household. This assumption is based on the following reasoning. First, the data on time-use indicates that farming is, overwhelmingly, the man's main activity unlike women who report household work as their main activity. Second, existing social norms prohibit women from undertaking any cash generating activity as a main activity and therefore, even if they participate in farming activities, they are unlikely to control the income from sale of crops.

The last items in Table 4 capture payments to the rest of the economy for imported inputs such as fertilizer and seeds, or for hired labor. These numbers will be counted as costs of production in the cash-generating sector.

4.4 Consumption expenditure and household finances

In this section we discuss the estimation of intra-household allocation of resources. Specifically, we look at the consumption expenditure on food and non-food items, and spending with health care and education. The survey reports consumption expenditures for the entire household, except for expenditure on clothes and fabrics which are reported separately for women, men, girls and boys in the household.

For a gender disaggregated analysis of consumption expenditures, we use data on household consumption management. This module reports who administers finances in the household and who buys different goods for household consumption. Overall, men play a leading role in household finances and spending. We construct an index to measure the involvement of an individual in consumption decisions. This index is a reflection of the balance of economic power within the household. It takes a value of 0 (no involvement), 1/2 (partial involvement) or 1 (full involvement) for each category of consumption expenditure. Overall the index is valued between 0 and 8. For women, the value of this index is less than 1.4 and for men it is 6.5. Our assumption is that the person who buys a particular category of

goods also pays for it. This assumption applies only to non-food commodities. When there is partial involvement, we assume that both the man and the woman contribute equally to that particular expenditure. Because of the significant share of food in the household budget and the prevailing income inequality between the man and the woman, we assume that the man pays for all food regardless of who is actually purchasing it.

Table (5) reports daily household consumption expenditure disaggregated by gender on several categories of goods and the joint expenditure on the rest of non-food items. The expenditure incurred by men on all categories is substantially higher than that for women. This result suggests that the division of resources within the Ethiopian households may be highly unequal; women control a meager share of total household resources. Since most of our sample consists of low-income households, it is not surprising that major part of the household budget is allocated to food. This finding is consistent with the evidence from other parts of Africa (Hoddinott and Haddad, 1995; Fafchamps, 1992; LeMay-Boucher, 2007). The food purchased from the market accounts for 52% of total household food consumption, with the rest being fulfilled by the household's own production of food.

Table 5 here

We use the index of involvement in consumption decisions to generate the transfers made by the household head and his wife to the household, to themselves and to each other. Total transfers by both woman and man to the household based on the consumption decision index amount to 7.59 birr per day. These transfers refer to expenditure on food, children clothes, health care, medicine and education. Since the woman transfers all her agricultural income to the man, we assume that food is being paid entirely from the man's income. As a result the woman's transfers to the household amount to only 1 percent. We use these shares to estimate the amount contributed by the woman and the man to fulfill the needs of the household as discussed in the next section. The spending on clothes for man and women make up the rest of the data in table 6.

Table 6 here

4.5   A daily HAM for a typical rural household in Ethiopia in 1997

Our gender disaggregated HAM is estimated for an average day using the numbers discussed in the previous sections – see Table 7. Imported inputs and contributions to the sectoral value-added from section 4.2 appear along the first two columns of the HAM. Produced output can be either consumed or sold on the local markets. All output produced in the non-cash/household sector is meant for household consumption and it appears as such – 2.43 birr consumed in the cell $2G$. The household also consumes 4.04 birr worth of cash-crops. This

11

amount was calculated as a residual by subtracting 3.13 birr, the amount of crops sold to the rest of the economy, from 7.17 birr, the total value of output produced in the cash-generating sector (the cash crops). Adding up the numbers along column (G) we obtain the total value of demand for goods and services. Almost 77 percent of consumption is supported by output produced within the household economy, while the rest, or 1.94 birr, are goods and services bought from the rest of the economy.

Table 7 here

We now discuss the estimation of incomes received by the three domestic institutions following primary and secondary distribution of income. In other words, an income can be the result of a contribution to output production or the result of transfers. The household, along row 7, receives all non-cash/household output in addition to transfers made by both the man and the woman. Transfers can take the form of spending on behalf of the household or of cash-crop output retained for household consumption. The transfers add up to 0.07 birr by the woman and 5.90 birr by the man. We estimate these transfers using the shares in total transfers from Table 6 and the cash needs of the household. The cash needs of the household are assumed to be 5.98 birr and are calculated as the sum of imports and the value of cash crops consumed within the household. The overall income of the household comes to 8.41 birr.

The woman earns an income from non-agricultural activities such as craft-making, and from being employed outside the household economy. The woman also receives transfers from her husband. These transfers are estimated from the consumption and spending module and relate to the man's spending on clothes for his wife. The income earned by the man can be described in a similar manner with the only difference that he retains all the income from the cash-generating agricultural sector. As a result, the income earned by the woman is significantly below the income earned by the man - 0.46 birr compared to 6.55 birr. On the other hand, the man is assumed to provide all the food consumed within the household.

Our household economy also trades with the rest of the economy. It *imports* goods and services such as clothes, food, health care, education and intermediate inputs worth of 3.45 birr. At the same time the household exports cash-crops as discussed above and it receives income in return for the labor hired outside the household. Our estimations suggest that the household has a slight trade surplus of 0.13 birr that is almost equally divided between the man and the woman.

5 Going forward

So what can be done with a household accounting matrix? We have already mentioned that this tool can be used to model the workings of the household economy. We are particularly

interested in tracing the effects of external shocks on the household allocation of labor and resources. For example, it would be interesting to gauge the effects of access to better infrastructure on women's allocation of time and consequently on household production. Or, the effects of higher prices for cash crops on the labor supply disaggregated by gender. Other aspects such as the increase in the HIV incidence and its effects on women's care burden are of interest when studying poor rural households in Africa. All these exercises require setting up a model that describes individual and household behavior in terms of production and consumption patterns, transfers, and transactions with the rest of the economy. Econometric studies can provide some of the parameters that describe economic behavior, while calibration of the model to the current data can fill in the rest. Still, even the most thorough approach can not compensate for the fact that social norms, a crucial variable for our research, are difficult to formalize in a satisfactory manner. Therefore our efforts remain confined to simulation exercises meant to answer *what-if* type of questions.

A   Tables

Table 1: A Household Accounting Matrix

	Costs of production (Activities)		Factors		Institutions			Rest of the economy (ROE) (H)	Totals (I)
	Cash-generating (A)	Non-cash/household (B)	Woman (C)	Man (D)	Woman (E)	Man (F)	Household (G)		
(1) Cash-generating sector							Production for household consumption	Surplus production	Cash sector output
(2) Non-cash or household sector							Non-cash production for household consumption		Non-cash sector output
(3) Woman	Cash-generating output by woman $w_c^f \times L_c^f$	Subsistence output by woman $w_s \times L_s^f$							Output produced by woman
(4) Man	Cash-generating output by man $w_c^m \times L_c^m$	Subsistence output by man $w_s \times L_s^m$							Output produced by man
(5) Woman			Retained *non-agricultural/cash* output by the woman			Transfers to woman from man's cash-generating output		Income earned from ROE by woman, $w_n^f \times L_n^f$	Income received by woman, Y_f
(6) Man			Transfer to man from *agricultural* cash-generating output	Retained output by man	Transfers to man from *non-agricultural* cash-output			Income earned from ROE by man, $w_n^m \times L_n^m$	Income received by man, Y_m
(7) Household			Woman's subsistence output	Man's subsistence output	Transfer from woman's income	Transfer from man's income			Income received by household, Y_h
(8) Rest of the economy	Fertilizer, seeds from ROE				Non-food expenditure by woman	Non-food expenditure by man	Imports by the household		Payments to ROE
(9) Savings					Woman's saving	Man's saving		Trade balance	
(10) TOTALS	Cash sector output	Non-cash sector output	Output produced by woman	Output produced by man	Use of woman's income, Y_f	Use of man's income, Y_m	Use of household income, Y_h	Income received	

15

Table 2: Age distribution of the sample

Age Group	Percentage
0 to 5 years	25.4
6 to 15 years	27.8
16 to 25 years	16
26 to 40 years	16.6
41 to 65 years	11.5
66 years and older	2.7
N = 633	

Table 3: Wages, time-use and value-added by activity.

Activity	wage rate per hr		hrs per day (avrg)		income per day	
	Woman	Man	Woman	Man	Woman	Man
non-cash/household	0.33	0.33	6.68	0.70	2.20	0.23
cash-generating			3.39	7.44	1.68	4.61
agricultural/animal husbandry	0.50	0.60	3.02	7.24	1.51	4.34
craft/food processing	0.46	1.32	0.37	0.20	0.17	0.26
rest of the economy	0.65	1.02	0.06	0.40	0.04	0.41

Table 4: Transactions with the rest of the economy.

	Avrg (for a day in Birrs)
Sales to ROE	3.12
Crop produce sold to the rest of the eocnomy	1.88
Livestock products sold to to the rest of the economy	0.50
Income from sales of crafts and other products	0.74
Inputs in production	0.88
Purchase of seeds, fertilizers etc.	0.69
Payment to hired labor	0.19

Table 5: The household's daily expenditures (in Birr).

Category	Expenditure per day (avrg)	
	Man	Woman
Food	6.90	
Clothes & shoes	1.52	0.13
Man	0.31	0.02
Woman	0.25	0.045
Children	0.34	0.06
Health care/medicine	0.24	0.03
Education	0.01	0.002
	Joint expenditures per day	
Other non-food items	1.94	

Table 6: Transfers between man and woman and from the man and the woman to the household (in Birr).

Transfers received by	Transfers made by			Proportion transferred by	
	Man	Woman	Total	Man	Woman
Household	7.50	0.09	7.59	99%	1%
Man	0.31	0.02	0.33	94%	6%
Woman	0.25	0.05	0.30	85%	15%

Table 7: A daily Household Accounting Matrix (in Birr).

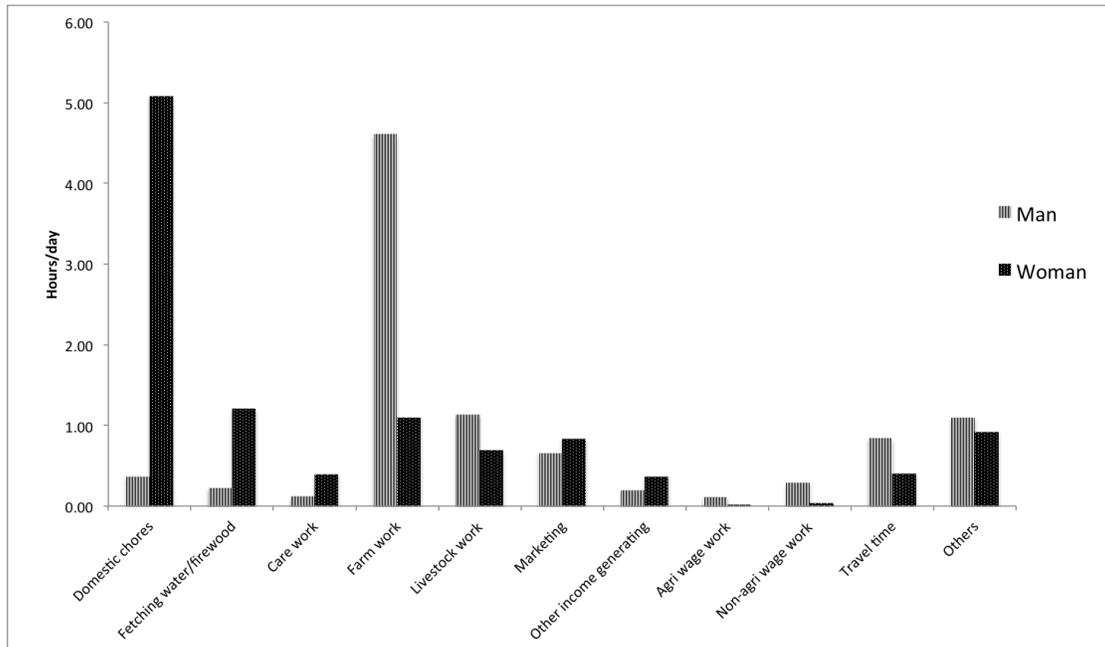|	Costs of production (Activities)		Factors		Institutions				Total
	Cash-generating	Non-cash/household	Woman	Man	Woman	Man	Household	Rest of the economy (ROE)	Total
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1) Cash-generating sector							4.04	3.13	7.17
(2) Non-cash or household							2.43		2.43
(3) Woman	1.68	2.20							3.88
(4) Man	4.61	0.23							4.84
(5) Woman			0.93	0.25				0.04	1.22
(6) Man			0.77	4.61				0.41	5.78
(7) Household			2.20	0.23	1.27	4.71			8.41
(8) Rest of the economy	0.88				0.30	0.33	1.94		3.45
(9) Savings					-0.35	0.75		-0.13	
(10) Total	7.17	2.43	3.88	4.84	1.22	5.78	8.41	3.45	

B   Figures

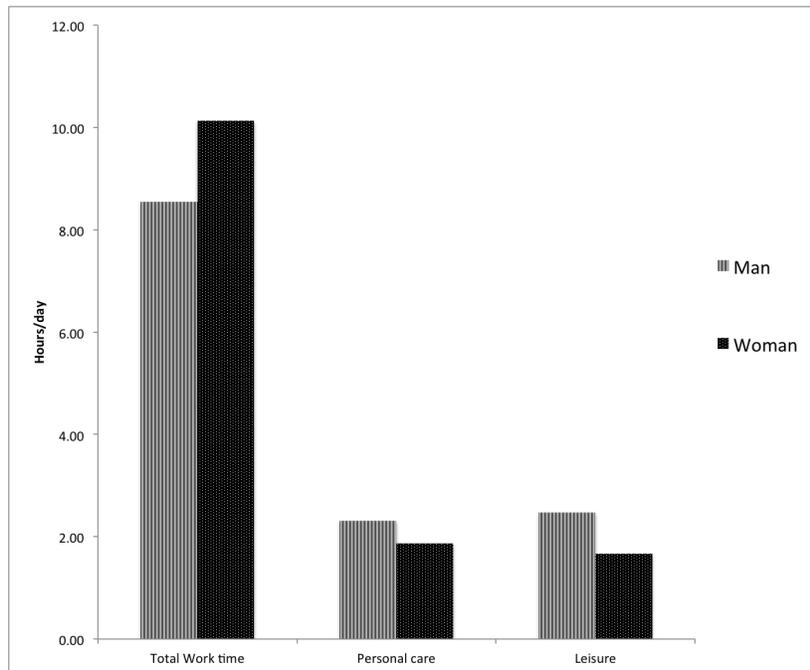**Figure 1: Time spent by a Woman and a Man on different activities (hours in a day)**

Figure 2: Leisure and Work Time for women and men (hours in a day)

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