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**STRUCTURAL ADJUSTMENT AND WELFARE
IN RURAL AFRICA: THE ROLE OF
RESOURCE CONTROL IN HOUSEHOLDS**

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I. INTRODUCTION

Structural adjustment programs supported by the International Monetary Fund (IMF) and the World Bank have been implemented in over thirty Sub-Saharan African countries. The goal of these programs is to rectify macroeconomic imbalances (fiscal and balance of payments deficits) and low economic growth associated with the economic crisis of the 1970's. Until recently, the programs' success was mainly gauged in terms of macro-level indicators, such as deficit reductions and increases in economic growth. For the effects of the policies on the people living in countries undergoing adjustment, it was assumed that economy-wide improvements would eventually lead to improvements in their welfare as well (Anyaoku 1989; Jolly 1988).

By the early 1980's it became apparent that the changes induced during structural adjustment can entail burdens for some groups of people and benefits for others: some people find themselves coping with the negative impacts of policy reforms, while others thrive by taking advantage of new opportunities for raising their incomes (Haddad 1991; World Bank 1991). Concern arose about the effects of the programs on economically poor groups of people in particular. In the 1990's, stemming the tide of poverty and enhancing the welfare of the poor through promoting their active participation in bringing about economic growth and through improving their access to social services has become a fundamental objective of (the World Bank's) structural adjustment programs (World Bank 1993a).

Numerous attempts have been made to gather evidence of the impacts of policies associated with structural adjustment programs on peoples' welfare. Many studies give evidence of strong negative impacts of the policies. A study undertaken by the Commonwealth Secretariat (1989:70), for example, claims that structural adjustment policies leading to "reductions in household incomes, increases in food prices and cut backs in health services ... have been the main causes for the deterioration in children's nutrition and health during the 1980's observed in many countries." The study cites evidence of increased incidences of malnutrition during the early 1980's in as many as twenty-five adjusting countries. Another study claims that there has been "a widespread deterioration in the nutritional status of children and pregnant and lactating mothers in both rural and urban areas in countries with IMF Stabilization and World Bank structural adjustment programs" (Elson 1989:16).

It is difficult, however, to verify whether current negative welfare patterns found in many adjusting countries result directly from structural adjustment policies themselves. They could stem from economic conditions and government policies that existed prior to the implementation of adjustment measures (Elson 1991; Behrman 1988). For this reason, in addressing welfare concerns surrounding the policies, economists in particular have taken an inferential as opposed to empirical approach. Detailed models linking macro-level changes to micro-level outcomes such as household incomes and consumption have been developed (see for example Sarris 1992; Sahn 1991).

Such models have been helpful for identifying the potential impacts of structural adjustment policies on household-level variables. However, they have been criticized for their failure to treat sub-household level processes and non-market processes as important and significant determinants of welfare outcomes (Elson 1991; Csete 1992). In particular, they fail to consider differences in the constraints and decision making processes of individual household members, which can place limits on the ability of households as a whole to react to adjustment policies in a way that maintains and/or enhances household welfare.

This paper contributes to the conceptual understanding of how structural adjustment policies impact rural Sub-Saharan African peoples' welfare by exploring the policies' intermediate impacts on the allocation of economic resources within households. Although the dependent variable of the study is household welfare, the study's examination of resource allocation is focused at the intrahousehold level. In particular, the differential resource allocation behaviors of women and men in households, including how they use the economic resources (time and income) they control to contribute to their households' welfare and how they obtain these resources, are examined. Recognizing the existence of households in which there is only one main adult decision maker (the proportion of female headed households in rural Sub-Saharan Africa, for instance, is estimated to be 25 percent (Due 1991)), the paper concentrates on households containing both male and female adults as primary decision makers.

Throughout the paper, "welfare" is defined to be the *physical* well-being of human beings.¹ Variables most closely associated with physical well-being are peoples' states of health and nutrition. Child and adult mortality rates in Sub-Saharan Africa, associated with low levels of health and nutrition, remain the highest in the world. In 1990, the number of lost disability-adjusted life years (DALYs), a measure combining the loss of life from premature death with the loss of healthy life from disability, was higher in Sub-Saharan Africa than in any other area of the world (World Bank 1993b). Attention to improving human welfare in Sub-Saharan Africa is timely and crucial, not only as a goal in itself, but also for maintaining the productivity of Africa's "human capital" in the coming decades.

The effects of two types of structural adjustment policies on human welfare will be investigated in this paper. These are policies that promote the production of tradeable goods in agricultural sectors (expenditure switching policies) and policies that reduce public provision of social services (expenditure reduction policies). Two main questions are examined: **(1) How are time and income allocated in households?** A general conceptual framework for understanding the micro-foundations of welfare provisioning in rural Sub-Saharan African households is developed. After concluding that many intrahousehold level processes related to gender differences are fundamental to welfare provisioning in households, this conceptual framework is used to ask: **(2) Given the intrahousehold level processes identified, what can be inferred about the possible welfare impacts of structural adjustment policies?** To be considered are the avenues through which adjustment policies, mediated by their effects on resource allocation in households, impact peoples' welfare.

II. STRUCTURAL ADJUSTMENT POLICY IN SUB-SAHARAN AFRICA

In the 1980's many Sub-Saharan African countries experienced severe economic distress in the form of balance of payments and budget deficits, high inflation rates, and low economic growth. Although the causes of these problems have varied by country, four major contributing factors have been identified. The first is external shocks stemming from higher oil prices since the 1970's, lower prices for countries' primary commodities, and increases in the real interest rate on commercial debt. The second is environmental shocks resulting from

¹The paper thus departs from the use of the term welfare in the field of welfare economics in which, under the nonpaternalism postulate, a person's welfare is identified with the person's (own perception of) the utility they receive from any resource allocation (Boadway and Bruce 1984).

increased variability in rainfall patterns. The last two factors are over-expansionary fiscal and monetary policies and domestic pricing policies biased against agriculture, the sector which is the greatest source of production in most Sub-Saharan African countries.

Structural adjustment² policies are aimed at rectifying macroeconomic imbalances and restoring sustainable economic growth. They include relatively short-term stabilization policies, which have the specific goal of reducing inviable fiscal and balance of payments deficits. They also include longer term policies that address the more fundamental distortions underlying macroeconomic imbalances, such as policies to improve resource allocation, increase economic efficiency, expand growth potential and increase resilience to shocks. The three main types of structural adjustment policies implemented in Sub-Saharan African countries are currency devaluation, liberalization of product markets and reductions in government expenditures.

Government expenditure reduction is aimed at reducing government budget deficits. It may take place in the form of reductions in expenditures on social services (for example, health and education services and staple foods subsidization) and/or on economic infrastructure (for example, road building and repair and investments in marketing facilities).

Devaluation and liberalization policies, together referred to as "expenditure switching" policies, induce a fundamental restructuring of a country's product and factor markets. The goal of currency devaluation is to depreciate an economy's real exchange rate (the price of nontradeables relative to tradeables³) inducing a shift from the production of nontradeable products into the marketed production of tradeable products. Devaluation also removes rationing in the foreign exchange market and increases supplies of consumer goods, giving producers incentives to increase their output for sale on the market. The goal of liberalization is to bring the domestic relative prices of tradeable products into line with world relative prices through removing controls on trade, such as import controls, tariffs, or export taxes and subsidies. Removing such controls generally leads to

²The term "structural adjustment" is used to encompass both stabilization and structural adjustment policies.

³ If the price of a product is determined by world market conditions, it is classified as a "tradeable" good. Tradeable products produced domestically include exports and unprotected import substitutes. If the price of a product is determined by domestic supply and demand, the product is classified as "nontradeable".

an increase in a country's terms of trade (the domestic price of exports relative to imports), shifting output towards the production of exports and unprotected import substitutes, which are tradeables, and out of protected imports substitutes, which are nontradeables (World Bank 1991). Thus, both devaluation and liberalization are expected to induce increases in the production of tradeable relative to nontradeable products. In order for such a shift to come about, reallocations of labor and other factors of production from nontradeable to tradeable production must take place.

Agriculture is the most important tradeable sector in Sub-Saharan African countries. It is in the agricultural sector that most export production and tradeable food production takes place. At the same time as it is the site of the greatest potential increase in tradeable production, the agricultural sector is the source of employment, income and consumption for the large majority of people in Sub-Saharan Africa. In the following section a conceptual framework for tracing the impacts of expenditure switching and expenditure reduction (specifically, reductions in expenditures on social services) policies on household welfare--including children's, men's and women's welfare--will be developed.

III. CONCEPTUAL FRAMEWORK: WELFARE PROVISIONING IN HOUSEHOLDS

Most agricultural production in Sub-Saharan Africa takes place on family farms, in which relations between people who are linked through family ties, including marriage, are important for the allocation of labor and other inputs into production. The African household is commonly composed of several nuclear families, each made up of a husband, one or more wives, and the children born to each wife. Complex economic interactions between members of separate nuclear families and, within families, between wives of the same nuclear family, may take place. In the following conceptual framework, this complex reality is sacrificed in order most clearly to illustrate the significance of the distinct behaviors of women and men for welfare provisioning in family-based production units of rural Sub-Saharan Africa. I consider a two decision maker economic unit or "household," made up of a woman and a man (the decision makers) and their children. I also assume that production takes place with only the use of the decision makers' labor. The conceptual framework is presented in diagrammatic form in Figure 1, which will be referred to throughout this section. Figure 1 shows, for our hypothetical two-person household, links between time allocation, income generation, income allocation, and household welfare.

A. Model of Time and Income Allocation

Patterns of time and income allocation in households are thought to be founded on social roles underlying household members' obligations to provide welfare. Social roles that are germane to welfare provisioning can be usefully classified into the categories of *production* and *reproduction*. The role of production is associated with the transformation of physical product to be used for direct consumption by household members, for exchange, or for sale on the market. The role of reproduction, which is directly associated with peoples' physical well-being, can be further broken down into subcategories of generational reproduction and daily reproduction. Generational reproduction involves the bearing and early nurturing of infants and the care and upbringing of children. Daily reproduction involves recurrent tasks of securing the day-to-day

material survival of the household, such as cooking, collecting water and firewood, and cleaning (Ellis 1992). These role categories will be employed below to provide useful distinctions between categories of time and income allocation.

Time Allocation Time is the most basic resource with which welfare is provided in households. How household members' time is allocated among different activities is thus key to human welfare. Individuals may spend time in the provision of services to others and to themselves by engaging in activities that directly enhance their and other household members' physical well-being, i.e., in "reproductive" activities. Time thus spent falls under the role category of *reproduction*. Individuals may also provide welfare indirectly by contributing to the availability of what will be termed "welfare inputs," defined to be material goods that enhance the physical well-being of household members. Time thus spent falls under the role category of *production*. Examples of welfare inputs are food, clothing, and medicine.

Welfare inputs can be provided in two ways. The first is through time spent producing goods, such as food, that are directly consumed by household members. Such time is referred to as time in "production for consumption". The second is through time spent in production for cash income, the income from which can be used to purchase welfare inputs. Reproductive activities and production for consumption are classified as "non-market" work, production for cash income as "market" work.

For our two-person hypothetical household, Figure 1 shows the links between, on the one hand, household members' time allocated among reproductive activities, production for consumption and production for cash income (market work) and, on the other, household welfare. Time spent in reproductive activities feeds directly into household welfare. Time spent in production for consumption feeds indirectly into household welfare through contributing to the quantities of goods available for consumption by household members. Time spent in market work also ultimately feeds indirectly into household welfare through contributing to goods consumed by household members. However, the manner in which the cash income generated is allocated among purchased welfare inputs and other goods depends on a complex decision making process involving transfers of income between household members. This process will be elaborated below.

The allocation of household members' time among the activity categories delineated above and their non-work time is constrained by their time endowments (twenty-four hours a day). Denoting the woman "agent f" (indexed i=f) and the man "agent m" (indexed i=m), household members' time constraints can be characterized as:

$$T_R^i + T_{PC}^i + T_M^i + T_O^i = T \quad i = f, m \quad T=24 \quad [1]$$

where T_R^i = agent i's time in reproductive activities
 T_{PC}^i = agent i's time in production for consumption
 T_M^i = agent i's time in market work
 T_O^i = agent i's non-work time
 T = agent i's time endowment.

Income Generation and Allocation In rural Sub-Saharan African households, agricultural production commonly takes place in a combination of joint, or "communal," and individual, or "personal," production activities. In personal production the majority of labor is provided by one individual household member; in communal production, labor is provided by all active household members.⁴ Traditionally almost all of both communal and personal agricultural production was of food for direct consumption by household members. In modern times in most areas of Sub-Saharan Africa, at least some agricultural produce is sold on the market for cash income. In addition, many people have become involved in non-agricultural income generating activities such as food processing, handicraft production for sale, and trade (these are mainly personal production activities). A communal-personal dichotomy in labor allocation to income generating activities, whether they be agricultural or non-agricultural, has evolved parallel to subsistence agricultural production.

⁴This common pattern is described in Whitehead (1990), Saul (1989), McMillan (1986), Roberts (1988), Koopman (1991), Guyer (1981), Davison (1988), David (1991), Webb (1989), and Dey (1992). Although in some areas men and women exchange labor in their personal production activities, in this analysis such labor exchanges will be ignored.

For our two-member household, agents' time in market work (T_M^i) can thus be further disaggregated into personal (MP) and communal (MC) market work (see Figure 1):

$$T_M^i = T_{MP}^i + T_{MC}^i \quad i = f, m \quad [2]$$

Composite production functions for communal and personal income generating production, respectively, can be characterized as

$$Q_{MC} [T_{MC}^f, T_{MC}^m, V_{MC}] \quad [3]$$

$$Q_{MP}^i [T_{MP}^i, V_{MP}^i] \quad i = f, m \quad [4]$$

where V_{MC} and V_{MP}^i are purchased inputs into communal and personal income generating production.

In Sub-Saharan African households, cash incomes received by different household members from income generating production are generally not pooled (Guyer 1988; Fapohunda 1988). Social norms govern who in households receives income from different activities and who pays for productive inputs. In general, for communal production this individual is a man, while for personal production it is the individual earner, which may be a man or a woman (see references in footnote 4). Although incomes received by household members are not generally pooled, household members often make transfers of cash income to each other.⁵ Thus, their income constraints can be characterized as being separate, yet linked through income transfers.

Let the categories into which cash income is allocated by agents m and f be their purchases of welfare inputs (denoted X_w^i), their purchases of inputs into income generating production (V_{MP}^f for agent f; V_{MP}^m and V_{MC} for agent m), and their purchases of "other goods" (denoted X_o^i).⁶ Agents' income constraints restrict their total expenditures on these goods to 1) the income they receive from income generating production, plus 2) the income transfers they receive from outside of the household (their exogenous incomes), plus 3) the income

⁵Discussion of income transfers can be found in Guyer (1988 and 1989), Jones (1986), Afonja (1990), David (1991), Roberts (1988), and Whitehead (1990).

⁶These variables represent composite commodities combining all of the agents' purchases falling into each category.

transfers they receive from the other agent. Let t be the net cash income received by agent f from agent m .

Then agent f 's and agent m 's income constraints, respectively, can be characterized as

$$p_w^f X_w^f + v^f V_{MP}^f + p_o^f X_o^f = q^f Q_{MP}^f [T_{MP}^f, V_{MP}^f] + E^f + t \quad [5]$$

$$p_w^m X_w^m + v^m V_{MP}^m + v_c V_{MC} + p_o^m X_o^m = q^m Q_{MP}^m [T_{MP}^m, V_{MP}^m] + q_c Q_{MC} [T_{MC}^f, T_{MC}^m, V_{MC}] + E^m - t \quad [6]$$

where E^i = agent i 's exogenous income

p_w^i = the price of welfare inputs purchased by agent i

p_o^i = the price of other goods purchased by agent i

v^i = the price of purchased inputs into agent i 's personal income generating production

q^i = the price of output from agent i 's personal income generating production

v_c = the price of purchased inputs into communal income generating production

q_c = the price of output from communal income generating production

Resource Control and Decision Making Resource control can be defined as the ability to decide how a resource is allocated. In the case of time allocation control is the ability to decide how time is allocated among different activities. In the case of income allocation control is the ability to decide how income is allocated among different purchases. Thus, resource control in households is germane to the decision making process in them. The degree of control over time and income by different household members is influenced by social norms governing decision making and by the balance of bargaining power in households.

In the literature on decision making in Sub-Saharan African households two major themes emerge. The first is that men and women often function in separate economic spheres in which they make independent decisions regarding the allocation of resources they control (Whitehead 1990; Guyer 1986; Saul 1989; Fapohunda 1988; Palmer 1988). The second is that with the rise of commercialization has come increased conflict between women and men over the activities and purchases to which time and income are allocated. This conflict is manifested in negotiation between women and men over resource control itself.

As noted above, the product of agricultural production traditionally remained primarily in the form of food. Customs and norms governed the distribution of this product to meet the consumption needs of households and their social obligations. With the rise of commercialization has come sales of agricultural produce and new non-agricultural income generating activities, along with a range of goods for purchase on the market.

Consequently, a portion of households' product is in the form of cash income rather than food, and a selection of goods to purchase with this income is available. Money, as a generalized means of exchange, typically brings with it wider choices for allocation than does physical product. The transformation from subsistence to semi-commercialized households has brought with it conflicts among household members over who earns income, who controls it, and how it is allocated.⁷ Thus, although men and women commonly function in separate spheres of economic activity in which they make independent decisions, at times they are brought into a joint decision making unit in which conflicts are resolved.

Social norms governing decision making over the allocation of inputs into communal and personal production influence control over labor in households. The primary decision maker for communal income generating production is usually a male adult, who makes decisions regarding the allocation of household members' labor and other productive inputs. For personal income generating production the individual earner is the primary decision maker for allocation of labor and other inputs. However, because men receive the income generated in communal production while women contribute labor to it, the conflict between women and men surrounding income is manifested in negotiation between them over the time women spend in communal income generating production (T_{MC}^f) and over transfers of income between women and men (t). Because neither men nor women make completely independent decisions regarding the allocation of women's labor to communal income generating production (this is negotiated), neither have full control over it.⁸

Although women do not fully control the amount of time they spend in communal income generating production, they do make independent decisions over the allocation of their time in other activities. In terms of agent f 's time constraint (equation [1] for $i=f$), the time agent f controls independently is the left hand side of

⁷Discussion of such conflicts and some examples are given in Whitehead 1990, David 1991, Dey 1992, Guyer 1989, Holmboe-Wattesen and Wandel 1988, Jones 1986, Obbo 1990, Roberts 1988, Saul 1989, and Pankhurst 1991.

⁸See references in footnote 4 and Guyer 1981, Roberts 1988, and Koopman 1991 for viewpoints on men's control of women's labor in Sub-Saharan African households.

$$T_R^f + T_{PC}^f + T_{MP}^f + T_O^f = T - T_{MC}^f \quad [7]$$

Since men generally make independent decisions regarding the allocation of their time among all activities, they fully control their own time (the left hand side of equation [1] for i=m).

Social norms governing who receives income from different income generating activities have been described above. Income accrual of household members is translated into income controlled by them through the mediation of income transfers. In general, a person who receives income from any activity is likely to be the person who controls it. However, where income transfers take place and are negotiated over, both men and women do not independently control all of the income they receive. By definition, they do make independent decisions over the allocation of the income they control, i.e., the income they receive net of transfers (the right hand sides of equations [5] and [6]).

The outcome of negotiation between agents with differing interests is thought to be determined by their relative bargaining powers. Bargaining power gives a person the ability to influence the outcome of negotiation with others in the person's own interests. In general, in the household context, bargaining power is thought to be determined by the opportunity cost of being a member of the household, or how "well" individual members could do if they were to leave the household. A significant economic determinant of this opportunity cost is thought to be the ability to earn income independently of other household members. Such ability gives a person a measure of independence from other household members, increasing their capability of providing for themselves if they leave the household (Folbre 1988; Pollack 1985).

Figure 1 lays out the process through which time spent by men and women in market work feeds into household welfare. The dashed lines indicate an arena of negotiation. Both women and men provide labor to communal market work. With changes in households' economic environments such as those which come with commercialization, negotiation takes place over women's labor allocated to communal market work. Men and women also provide labor to personal market work. Men receive income earned in communal market work and in their own personal market work, while women receive income earned in their own personal market work. The income controlled by women and men is made up of the income they receive from market work net of income transfers between them, over which negotiation takes place. Finally, men and women make independent

decisions over the allocation of income they control to purchased goods. If these goods are welfare inputs, they enhance household welfare.

The decision making process described above involves a combination of unilateral and joint decision making. Joint decision making (negotiation) takes place over the time and income controlled by different household members, i.e., over the *distribution* of resource control, while unilateral decision making takes place over the *allocation* of time and income they control. In the following section a formal mathematical model of this decision making process is presented.

Model of Decision Making Let welfare provisioning in households be governed by the following function:

$$W(X_W^f, X_W^m, T_W^f, T_W^m) \quad [8]$$

where

$$T_W^i = T_R^i + T_{PC}^i \quad i = f, m \quad [9]$$

The inputs into welfare provisioning are women's and men's purchased welfare inputs (X_w^i) and the time they spend providing welfare, either directly through reproductive activities (T_R^i) or indirectly through production for consumption (T_{PC}^i).⁹

Let agents' allocational priorities among household welfare (W), other purchased goods (X_o^i) and their and the other agent's non-work time (T_o^i) be governed by utility functions:

$$U^i (W, X_o^f, X_o^m, T_o^f, T_o^m) \quad i=f, m \quad [10]$$

In the model presented below, a game theoretic approach is taken, which allows modeling the decision making of multiple agents with differing interests. Game theoretic models can be classified into two types, noncooperative and cooperative. In noncooperative models each agent makes decisions unilaterally (given their expectations of other agents' choices), while in cooperative models agents make decisions jointly.¹⁰ The complexity of a decision making process involving both unilateral and joint decision making (the latter determining constraints for the former) can be simplified for modeling purposes by separating them into a two-stage game theoretic framework as do Carter and Katz (1994) in their "Conjugal Contract" model.

In the first stage, choice over the unilaterally-decided variables takes place. This is modeled as a noncooperative game.¹¹ Agents choose their allocation of time to welfare provisioning (T_w^i), personal market work (T_{MP}^i), and non-work (T_o^i) unilaterally. They also choose the allocation of the income they control among welfare inputs (X_w^i), productive inputs (V_{MP}^i), and other goods (X_o^i) unilaterally. In addition, agent m

⁹Household welfare is treated as a "z-good" as in Household Production Models (Becker 1965). Time in welfare provisioning could be modeled as entering indirectly into equation [8] as an input into a large number of production functions for produced welfare inputs. These could be, for example, food, cooked food, clean water, or child care. To simplify, the exact products being produced (in the case of T_{PC}^i) or service being provided (in the case of T_R^i) are not given explicit production functions. It is assumed that household members take into account the myriad of goods and services into which their welfare provisioning time enters as they allocate their time to welfare provisioning (T_w^i).

¹⁰Cooperative bargaining models were first adapted to the analysis of household decision making by Manser and Brown (1980) and McElroy and Horney (1981). Jones (1983) used a cooperative bargaining model for analysis of intrahousehold resource allocation in the African context. Noncooperative game theory has been used for the analysis of household decision making by, among others, Chiappori (1992), Ulph (1988), and Lundberg and Pollack (1992).

¹¹In particular, it is modelled as a two person strictly competitive game of complete information, meaning that no coordination between agents is needed for equilibrium strategies to be chosen (Carter and Katz 1994).

unilaterally chooses agent m 's time allocated to communal market work (T_{MC}^m) and income allocated to purchased inputs into communal income generating production (V_{MC}).

In the second stage, choice over the jointly-decided variables takes place. These are the net transfers of income from agent m to agent f (t) and the amount of time agent f spends in communal market work (T_{MC}^f). Choice over the jointly-decided variables is modeled as a Nash cooperative bargaining game in which agents negotiate over alternative Pareto optimal outcomes by maximizing a Nash objective function. Mathematically the objective function is the product of the agents' gains from membership in the household, represented by the differences between their utilities in the current state and their maximum possible utilities if the household unit were to dissolve. The latter are referred to as "fall-back positions". The Nash objective function reflects the bargaining power effects of the opportunity cost of being a household member: the more attractive an individual's opportunities outside of the household, the more strongly are the individual's allocational priorities reflected in the final levels of the jointly-decided variables.

Fall-back positions can be represented mathematically by specifying an indirect utility function for each household member giving maximum utility levels if they are no longer part of the household unit.¹² For women, economic variables affecting these fall-back positions are the prices associated with their personal income generating activities, the prices of the products they would purchase if they were to leave the household, and their exogenous incomes. For men, along with these variables are added the prices associated with communal income generating activities. The fall-back positions are determined by maximization of agents' utility functions subject to the time and income constraints they would face if they were to leave the household.

¹²Divorce is an option in many areas of Sub-Saharan Africa. See Pool 1972, Trincaz 1983, Guyer 1990, David 1991; Hanger and Moris 1973 and Capron 1973 for discussion of and examples of marital instability in African families.

Let the fall-back positions for agent f and agent m, respectively, be:

$$V^f(p^{f'}, v^f, q^f, E^f) \quad [11]$$

$$V^m(p^{m'}, v^m, q^m, v_c, q_c, E^m) \quad [12]$$

where p^i , $i=f,m$ are the prices of goods purchased by the agents if they are no longer part of the household unit.

The model is as follows.

STAGE ONE: *Unilateral Decision Making Over Allocation*

Each agent's utility function is maximized given fixed levels of (or given their expectations of) the other agent's choice variables and the jointly-decided variables.

Agent f chooses T_w^f , T_o^f , T_{MP}^f , X_w^f , X_o^f , and V_{MP}^f to maximize

$$U^f(W, X_o^f, X_o^m, T_o^f, T_o^m)$$

subject to

$$W = W(X_w^f, X_w^m, T_w^f, T_w^m)$$

$$T_w^f + T_{MP}^f + T_o^f = T^f - T_{MC}^f$$

$$p_w^f X_w^f + v^f V_{MP}^f + p_o^f X_o^f = q^f Q_{MP}^f[.] + E^f + t$$

Agent m chooses T_w^m , T_o^m , T_{MP}^m , T_{MC}^m , X_w^m , X_o^m , V_{MP}^m and V_{MC} to maximize

$$U^m(W, X_o^f, X_o^m, T_o^f, T_o^m)$$

subject to

$$W = W(X_w^f, X_w^m, T_w^f, T_w^m)$$

$$T_w^m + T_{MP}^m + T_{MC}^m + T_o^m = T^m$$

$$p_w^m X_w^m + v^m V_{MP}^m + v_c V_{MC}^m + p_o^m X_o^m = q^m Q_{MP}^m[.] + q_c Q_{MC}^m[.] + E^m - t$$

where the productions functions are given in equations [3] and [4].

This process yields a system of reactions functions, each giving agents' choice variables as functions of the other agent's choice variables (along with the jointly-decided variables). Solved simultaneously, the system

yields a reduced-form equation for each unilaterally-decided choice variable conditional on the levels of the jointly-decided variables (which are given as parametric in the first stage).

The conditional reduced-form equations are

$$\hat{T}_W^i = T_W^i(t, T_{MC}^f | p, v, q, E) \quad \hat{X}_W^i = X_W^i(t, T_{MC}^f | p, v, q, E) \quad [13]$$

$$\hat{T}_O^i = T_O^i(t, T_{MC}^f | p, v, q, E) \quad \hat{X}_O^i = X_O^i(t, T_{MC}^f | p, v, q, E) \quad [14]$$

$$\hat{T}_{MP}^i = T_{MP}^i(t, T_{MC}^f | p, v, q, E) \quad \hat{T}_{MC}^i = T_{MC}^i(t, T_{MC}^f | p, v, q, E) \quad [15]$$

$$\hat{V}_{MP}^i = V_{MP}^i(t, T_{MC}^f | p, v, q, E) \quad \hat{V}_{MC}^i = V_{MC}^i(t, T_{MC}^f | p, v, q, E) \quad [16]$$

where

$$p = (p_W^f, p_O^f, p_W^m, p_O^m) \quad v = (v^f, v^m, v_C)$$

$$q = (q^f, q^m, q_C) \quad E = (E^f, E^m)$$

These equations give the optimal levels of the unilaterally-decided variables for each possible (t, T_{MC}^f) combination.

STAGE TWO: Joint Decision Making Over Distribution

Agents jointly choose t and T_{MC}^f to maximize

$$[U^f(W, \hat{X}_O^f, \hat{X}_O^m, \hat{T}_O^f, \hat{T}_O^m) - V^f(\cdot)] [U^m(W, \hat{X}_O^f, \hat{X}_O^m, \hat{T}_O^f, \hat{T}_O^m) - V^m(\cdot)] \quad [17]$$

subject to

$$U^i - V^i > 0 \quad i = f, m \quad [18]$$

where the fall-back positions are given in equations [11] and [12], and equation [17] is the Nash objective function. Equation [18] limits resource allocation to outcomes in which both agents have positive utility gains from membership in the household.

Equilibrium reduced-form equations for the jointly-decided variables are:

where

$$t^* (\mathbf{p}, \mathbf{p}', v^f, v^m, v_c, \mathbf{q}^f, \mathbf{q}^m, \mathbf{q}_c, E^f, E^m) \quad [19]$$

$$T_{MC}^{f*} (\mathbf{p}, \mathbf{p}', v^f, v^m, v_c, \mathbf{q}^f, \mathbf{q}^m, \mathbf{q}_c, E^f, E^m) \quad [20]$$

$$\mathbf{p}' = (\mathbf{p}^f, \mathbf{p}^m)$$

The optimal levels of income transfers and of agent f 's time in communal market work are "constrained Pareto optimal." That is, *given* that time and income controlled by agents are optimally allocated to unilaterally-decided variables (from the point of view of their allocational priorities), no agent can be made better off without the other agent being made worse off.

Reduced-Form Equation for Household Welfare

Substituting equations [19] and [20] into equations [13] in turn yields equilibrium reduced-form equations for time and income allocated to welfare provisioning:

$$T_W^{i*} (\mathbf{p}, \mathbf{p}', v^f, v^m, v_c, \mathbf{q}^f, \mathbf{q}^m, \mathbf{q}_c, E^f, E^m) \quad i = f, m \quad [21]$$

$$X_W^{i*} (\mathbf{p}, \mathbf{p}', v^f, v^m, v_c, \mathbf{q}^f, \mathbf{q}^m, \mathbf{q}_c, E^f, E^m) \quad i = f, m \quad [22]$$

Finally, substituting equations [21] and [22] into equation [8] yields an equilibrium reduced-form equation for household welfare:

$$W^* (\mathbf{p}, \mathbf{p}', v^f, v^m, v_c, \mathbf{q}^f, \mathbf{q}^m, \mathbf{q}_c, E^f, E^m) \quad [23]$$

Without going into the optimality conditions and comparative statics effects which the above model generates,¹³ immediately apparent from equation [23] is the separate, rather than additive, appearance of the exogenous components of agents' incomes. Exogenous incomes enter separately into equation [23] for two reasons. First, agents do not pool their incomes. They make decisions over their expenditures independently

¹³A more formal analysis of similar models can be found in Katz (1992), Carter and Katz (1994), and Smith (forthcoming).

subject to separate budget constraints. Second, the incomes that accrue to them, including their exogenous incomes, enhance their bargaining powers.

Equation [23] is derived from a complex mathematical model of decision making, which remains a gross oversimplification of reality. Its usefulness lies in permitting identification of key contact points between changes in households' economic environments and household welfare. According to the model, changes in the prices (and exogenous incomes) faced by household members affect household welfare through changes in both market and non-market time allocation and, mediated by changes in income controlled by household members, through changes in household members' expenditures on purchased goods.

B. Gender-Differentiated Allocational Priorities, Access and Power

In the model presented above, agents are treated symmetrically with the exceptions that 1) agent m's allocation of labor to communal production is a unilateral decision while the allocation of agent f's labor to it is a joint decision and 2) agent m receives the income from communal production and purchases inputs into it. Three social factors underlay additional differences in the patterns of men's and women's time and income allocation in rural Sub-Saharan African households. The first factor is women's and men's differing responsibilities for allocating time to welfare provisioning (T_w^i , $i=f,m$) and for allocating income to welfare inputs (X_w^i , $i=f,m$). These responsibilities influence their allocational priorities. The second factor is men's and women's differential independent access to productive resources. The last factor is differences in women's and men's bargaining powers.

Men and women in Sub-Saharan African households tend to have distinct individual responsibilities for family maintenance (Guyer 1988). Many differences in the responsibilities accorded to them are thought to be founded on their differing social roles. Biophysical circumstances account for women's almost exclusive role in generational reproduction: only women can bear and breast feed children. Although both women and men are physically capable of carrying out tasks associated with the role of daily reproduction, in most societies this role is joined with generational reproduction as the almost exclusive domain of women. The role of production is by contrast shared by both men and women (Ellis 1992; Joekes et al 1988).

The role of reproduction is more closely linked with peoples' physical well-being than is the role of production. Correspondingly, women tend to be more directly involved in welfare provisioning than men (Lele 1991; Commonwealth Secretariat, 1989). Evidence from time allocation studies reveal that a far greater amount of women's time is spent in reproductive activities than men's (i.e., $T_R^f > T_R^m$). By contrast, both women and men are highly engaged in productive activities, i.e., in production for household consumption and/or in market work (World Bank 1991; Davison 1988), with differences in their time spent in these activities varying by region. Given such a division of labor in households, male and female labor can be characterized as having low substitutability in reproductive activities (Ellis 1992).

With regard to income allocation, the general consensus is that (in developing countries) men tend to use a larger proportion of income than women for productive, household maintenance and social investment, and for their personal consumption; women tend to use a larger proportion of income than men for meeting daily household consumption needs, such as food, clothing and health care (Kennedy and Bouis 1993; Joekes et al 1988; Blumberg 1989; Bruce and Dwyer 1988; Lele 1986; Koopman 1991). In many areas of rural Sub-Saharan Africa women are responsible for paying for food while men are responsible for paying for clothing, medical expenses and taxes (Elson 1990a), and men are more likely than women to spend income on luxury goods, such as alcohol and tobacco (Haddad and Hoddinott 1991; Holmboe-Ottesen and Wandel 1991; David 1991). Expenditure patterns vary from household to household. Both women and men may make necessary expenditures on welfare inputs. The key factor to note is that these expenditures tend to differ systematically, meaning that the levels of income controlled by different household members (the right hand sides of equations [5] and [6]) matters for the final mix of purchased welfare inputs (X_w^f and X_w^m).

The second social factor leading to differences in men's and women's resource allocation is that women tend to have more limited access to productive resources and markets than men. Examples of these resources are land, labor, technology, information and credit (Joekes et al 1988; World Bank 1991; Stamp 1989). Such limited access, along with constraints on women's time in other activities, constrains women's ability to engage in personal cash income generating production.

Finally, women are thought to have less bargaining power than men. This means that men's ability to influence the outcome of negotiations in their own interests is greater than women's. That Sub-Saharan African women spend more total time working than men (Koopman 1991; Mehra 1991) may be a manifestation of this balance of bargaining power in favor of men. Cultural norms and advantages and disadvantages based on gender are important factors leading to differences in women's and men's bargaining powers (Folbre 1991; Bossen 1989). In general, since women are more dependent than men on the resources which membership in households as marriage partners allows, the negative economic consequences of marital dissolution are often greater for women than for men (Blau 1989; Pollack 1985).¹⁴

C. Allocative Inefficiency

If household members had common allocational priorities, resource control and bargaining power differentials would not matter for resource allocation in households. Allocation of time would be based on these common priorities and on household members' comparative advantages in different activities. Joint rationality would prevail in the maximization of household income. Income accruing to household members would be perfectly substitutable and (given expenditure responsibilities) transfers would flow freely so as to meet common allocational priorities. Income allocation would take place as if it were subject to the constraint of pooled household income.

However, differences in men's and women's allocational priorities mean that resource control and bargaining power matter for resource allocation in households. They combine to produce two types of allocative inefficiency from the point of view of *total* household resources. The first is inefficiency in the allocation of time to income generating activities. The second is inefficiency in the allocation of time and income to welfare provisioning.

Allocative inefficiency in income generation exists because of incentive incompatibilities between women and men in providing labor to communal market work (Collier 1990). Since women do not receive the product of their labor in such work, if they do not expect to gain control of income generated through transfers from men, they may have low incentive to participate. Whether women are able to resist doing so (or to

¹⁴See Pankhurst (1991, p. 620 and footnote 5) for an example from Zimbabwe of women's post-divorce position relative to men's.

negotiate an acceptable level of income transfers) depends on many factors, among which is their bargaining power relative to men. If communal market work yields the highest returns to labor, where women are able to resist allocating labor to it in favor of their personal (less remunerative) market work, time allocation to market work is inefficient from the point of view of the household's total time endowment (Dey 1992; Jones 1983; Whitehead 1990).

Both men and women provide inputs into welfare provisioning and benefit from increased levels of household welfare. However, they tend to make separate decisions--from the point of view of their own allocational priorities--regarding the allocation of the time they control to welfare provisioning (T_w^i) and the income they control to welfare inputs (X_w^i). In addition to this underlying factor, inefficiencies in welfare provisioning stem from 1) the non-pooling of household income; and 2) the low substitutability of women's and men's time in reproductive activities, with women's contribution generally being to the exclusion of men.

Where household members have common allocational priorities, purchased inputs into welfare provisioning are chosen so as to maximize household welfare subject to the constraints of welfare provisioning technology (equation [8]) and total household income. However, if household members have differing allocational priorities and incomes are not pooled, the final mix of purchased welfare inputs may not maximize household welfare given these constraints. In this case, income allocated to welfare inputs is inefficient from the point of view of total household resources. Situations can arise where a reduction in one household member's real income (either the income they receive or the prices of goods they purchase) is not accompanied by increased transfers of cash income from other household members or changes in their expenditure patterns. A reduction in the welfare input purchases of the person whose real income is reduced could occur even when sufficient income is available in the household for these purchases. Similarly, an increase in one household member's real income may not be accompanied by increased transfers to other household members so that a corresponding increase in the latter's welfare input purchases does not take place (Elson 1990b; Guyer 1988).

Linked to the low substitutability of men's and women's time in reproductive activities, inefficiencies in the allocation of time to welfare provisioning may also arise. If changes in the prices associated with income generating production lead to women spending more time in market work ($T_M^f = T_{MP}^f + T_{MC}^f$ increases), they may

spend less time in reproductive activities (T_R^f may decrease). If substitute labor is not available, this shift could have an adverse impact on household, especially children's, welfare. However, reductions in women's time spent in reproductive activities, such as child care, could be compensated by increases in income earned and spent by women on welfare inputs, such as food (Cornia, Jolly and Stewart 1987). In a review of studies in developing countries, Leslie (1988) finds that overall there is not much evidence of a negative effect of maternal remunerated employment on children's nutrition, one measure of children's welfare. However, the studies reviewed presumably refer to income that is earned *and* controlled by women.

Women's reproductive activities are mostly to the exclusion of men, and women generally make independent decisions regarding the allocation of the time they control to such activities. However, in order to make *efficient* (welfare maximizing) decisions about the balance of their time between reproductive activities and market work from the point of view of their allocational priorities and constraints women need to be able to make *independent* decisions regarding their time in market work as well. Women do not make independent decisions over the allocation of their time to communal market work and over the allocation of the income they earn in it. Given women's lower bargaining power than men's, if women and men have differing allocational priorities, any increased time women spend in communal market work may not be accompanied by increases in the income they control. Transfers of income from men to women can be fluctuating and discretionary (see Guyer 1988), nonexistent, or lower than the value of the product women produce. Thus reductions in (women's) time allocated to reproductive activities in households due to increased time in communal market work may not be compensated by increases in purchases of welfare inputs.

IV. STRUCTURAL ADJUSTMENT POLICY IMPACTS ON HOUSEHOLD WELFARE

In this section, using the conceptual framework presented above, I examine the possible effects of structural adjustment policies--expenditure switching policies and reductions in government expenditures on social services--on rural Sub-Saharan African households' welfare. These measures can eventually impact household welfare through changing the level of purchased welfare inputs available in households and/or the amount of time spent by household members in welfare provisioning.

A. Expenditure Switching Policies

Expenditure switching policies, including devaluation and liberalization, shift relative prices in favor of tradeable products. Higher prices for tradeable products give incentives to producers to reallocate productive resources, including labor, towards tradeable production. In response, agricultural households which produce tradeable crops at the onset of adjustment are expected to increase their production and sale of these crops. Households that produce nontradeable crops are expected to shift crop composition towards tradeable crops.¹⁵

Increases in tradeables production in the agricultural sector could take place in the form of increases in the production of export crops and/or of tradeable food crops for sale on the market, both of which are cash crops.¹⁶ Expenditure switching policies thus promote not only increased production of tradeable products, but also increased production of cash crops (as opposed to products destined for consumption in the households in which they are produced) in general. If households increase their production of cash crops, a larger proportion of their product will be in the form of cash income, and a larger proportion of their consumption, including consumption of welfare inputs, will need to be met through purchases on the market. Such tradeable-led commercialization may thus bring with it conflicts between household members surrounding income allocation, along with corresponding allocational inefficiencies in both income generation and welfare provisioning.

In most rural areas of Sub-Saharan Africa, both men's and women's time are highly concentrated in agricultural production. Increases in both women's and men's time in market work may take place as a result of expenditure switching policy-induced incentives. Although the policies are pursued through changing market variables, i.e., prices, they may also have impacts on non-market variables through changing the allocation of time in households. Increases in the market work time of household members induce changes in their allocation

¹⁵The prices of intermediate inputs into production will affect the rates of return that can be obtained. Here it will be assumed that the net effect of relative price changes is to increase the profitability of tradeable relative to nontradeable production during structural adjustment.

¹⁶Whether food crops are tradeables or nontradeables depends on the degree to which world market prices influence their domestic prices. In some areas food is a tradeable product while in others it is not. Some staple foods produced in Sub-Saharan African countries, yams for example, are intrinsically nontradeables. Some foods that could be traded on world markets, such as many grains, are nontradeables within the rural economy due to storage and transportation costs. In countries where food produced is an unprotected import substitute, food is a tradeable commodity (Collier 1990). Food crops that are consumed primarily within households without entering the market are nontradeables.

of time to non-market activities, that is, to production for consumption, reproductive activities (for women), and/or non-work activities.

Increased tradeable crop production for sale by households will also likely lead to increases in their cash incomes. Depending on whether increased production takes place as part of personal or communal production, changes in the levels of income accruing to different household members will take place. If increases in the production of tradeables takes place exclusively in communal or men's personal production, the levels of cash income received by men will increase. Similarly, if increases take place exclusively in women's personal production, the levels of cash income received by women will increase. In turn, through changes in income transfers between men and women, changes will be induced in the distribution of income controlled by different household members. In the long run, expenditure switching policies, by changing the incomes earned and received by men and women in households, can lead to shifts in the balance of bargaining power between them.

Whether increases in market work in response to expenditure switching policy-induced incentives take place as part of personal or communal production depends on whether tradeable or nontradeable production is taking place in them at the onset of adjustment. If tradeable goods are being produced, their production is expected to increase. If nontradeable goods are being produced, increased tradeables production depends on whether it is possible to switch to such production. Prior to the onset of adjustment, communal production and women's and men's personal production may be differentially skewed towards nontradeable or tradeable products. In Sub-Saharan Africa, goods for sale on the market have often been concentrated in male managed (communal and men's personal) production. In addition, when cash crops are produced as part of male managed production activities, surpluses are more likely to be sold through official marketing channels, making them tradeable crops. In general, women's agricultural production has been concentrated in subsistence food crop production. However, a wide range of foods (including tradeable foods) and in some areas export crops are produced and sold by women as part of their personal production activities (Palmer 1988).

In this section I consider the possible outcomes for household welfare of two cases. The first is where increased tradeable production takes place as part of communal income generating production. The second is where increased tradeable production takes place as part of women's personal income generating production. For

each case, I first discuss the possibilities of response to incentives to increase tradeable production. I then consider potential changes in men's and women's time spent in production of food for household consumption, in women's time allocated to reproductive activities, and in income allocated to welfare inputs. I also consider the changes in the balance of bargaining power in households that may take place in each case.

In households where tradeable crop production takes place as part of communal production activities, incentives to increase production are mostly felt by men, who manage these activities and receive the income generated (Elson 1990b; Koopman 1991; Meena 1991). As mentioned in the last section, women may have little individual incentive to increase their time spent in them as, although they may receive some of the increased income through transfers from men, they do not directly control the income generated. Whether the time women spend in communal production of tradeables increases along with men's depends on how they expect men to spend any increased income generated, the amount of income transferred to them by men, and their bargaining power. Some examples from different areas of Sub-Saharan Africa show variation in responses. Although these are not examples of responses to price incentives associated with structural adjustment policies per se, they illustrate the inefficiency in time allocation to market work that may arise with increased communal production of cash crops.

A study by Jones (1983 and 1986) examined the allocation of women's time to newly introduced irrigated rice production in Cameroon. Both women and men provided labor to irrigated rice production, which took place on male managed communal fields. Most women received some of the income generated through transfers from their husbands. However, many did not receive sufficient remuneration to induce them to give up their less profitable personal production activities, from which they received and controlled the proceeds. Some women were "forced" to participate in the new activity at the expense of their personal production. Others were able to continue to engage in their personal production at the expense of their time in irrigated rice production. Jones observed a positive relationship between the amount of income transferred to women from their husbands and the amount of time the women spent in communal irrigated rice production. She also observed that women who did fully control the cash proceeds of irrigated rice production, mainly widows, spent more time in irrigated rice production than those who did not.

As part of Zaire's National Maize Program, a high yielding technical package was extended to men (including new seeds, fertilizer, and credit) to increase production of improved maize. The program's planners expected that both women and men would provide labor to improved maize production, the income from which was controlled by men. Among Zaire's Lemba ethnic group, however, women refused to provide labor to improved maize production. In the Shaba region by contrast, women began to produce more maize with their husbands, in the process decreasing their personal production activities. Lemba women's ability to resist providing labor to communal production activities has been attributed to their greater autonomy in decision making (Schoepf and Engundu 1991).

A final example is given by the introduction of irrigated rice in the Gambia, the goal of which was to increase domestic marketed rice (an import substitute) production in order to reduce rice imports. Although women were customarily responsible for rice production, it was mostly men who were given inputs, capital equipment and extension advice. Nevertheless men needed women's labor and skills for many operations involved in irrigated rice production. In order to induce them to provide labor to irrigated rice production men compensated their wives with money, presents or land. However this compensation was not enough to induce women to give up production of rainy season rice on their personal fields, the product of which they controlled. Low irrigated rice cropping and sales in the rainy season was attributed to a shortage of female labor and lack of money for paying them (Dey 1982).

With increased production of communally produced and marketed tradeable crops, increases in the time that both men and women spend in communal market work are likely to take place. If increases in communal market work time lead to increases in the total time women and men spend in market work, reductions in the time they spend in non-market activities (or non-work time) must take place. Reductions in the time they spend in production for consumption, for example of food, may occur. If increased purchases of food allowed by the increased income generated do not compensate for reduced production of food for consumption, household welfare will be jeopardized. With an increase in women's time spent in communal market work women may spend less time in reproductive activities. Similarly, if this reduced time is not compensated by increased purchases of appropriate purchased welfare inputs or substitute labor, household welfare may be jeopardized.

For women, increased time spent in communal market work means a reduction in the time they control independently (the left hand side of equation [7]). Such increased communal market work may be at the expense of their time in personal market work. If the loss in the income they receive from the latter is not made up for by increased transfers from men, the amount of income controlled by women may decrease along with the time they control. In such a case, if men do not take over some of women's expenditure responsibilities, the resulting mix of men's and women's purchased welfare inputs may not compensate for reduced output of food for consumption or for reductions in women's time in reproductive activities.

An illustration of this aspect of allocative inefficiency in welfare provisioning is given by the change in income control in favor of men accompanying the Mwea resettlement scheme in Kenya. Prior to resettlement, women had grown personal crops on their own fields from which they received and controlled the income earned. In the resettlement area land for personal production was not allocated to women, and women's agricultural production time was spent growing rice jointly with their husbands. Earnings from rice were paid to husbands. Total household income rose, but women became dependent on income transfers from their husbands to meet their expenditure responsibilities. Hanger and Moris (1973, cited in Blumberg 1989) observed in one resettlement village that nutritional levels fell in comparison to a nearby village where women grew food on their personal plots and controlled the income generated from surplus sales.

A second example from Kenya shows that increased income from cash cropping may not translate into increased welfare if income is not distributed to household members who spend it on welfare inputs. In a study of the effects of a smallholder sugarcane production scheme in Southwestern Kenya, Kennedy and Cogill (1987) found that the increase in income earned in sugar cane production by both men and women did not translate into improved health and nutritional status of children.¹⁷ The income from sugar cane sales was considered "men's income." The study found that incremental income from sugar cane production was spent on housing and school fees, expenditures which are the responsibility of men. It also found evidence that income controlled by women from sales of food and their trading activities correlated positively with improved nutritional status of children, indicating that women are likely to spend income on food and health care.

¹⁷Note that on average women did not spend a large amount of time in sugar cane production.

Due to the many social and cultural factors other than income which impact bargaining power (and perhaps to the perceived temporary nature of changes taking place under structural adjustment), changes in the balance of bargaining power between women and men in households due to changes in the incomes they receive may be slow to come about. In the long run, however, if the income received by men increases relative to that received by women during the adjustment process, women may experience a reduction in their bargaining power relative to men (Shultz and Hertz 1989; World Bank 1991). This means that women would be less able to bargain for control of their time and of household income. With more of household time and income under men's control, resource allocation in households would be even more reflective of men's allocational priorities than women's.

I now consider the case in which increased tradeable crop production takes place as part of women's personal market work. As discussed above, due to their limited access to productive resources and markets, and tight constraints on their time, women's ability to engage in personal income generating agricultural production is limited. Examples from across Sub-Saharan Africa show, however, that they have incentive to do so if constraints on resource access are not limiting and they expect to control the income generated.

Yoruba women of Nigeria traditionally engaged primarily in trading, with agricultural production (mainly with their husbands) being a secondary activity. In the mid 1970's only 10 percent of women in the Yoruba Ibarapa district engaged in personal agricultural production activities. However by the 1980's, in response to increased prices of and increased demand for food crops, 69 percent of women had entered into new income generating food production, the proceeds of which they controlled. Yoruba women's entrance into cash cropping is attributed by Guyer and Idowu (1991) to several factors: new transportation infrastructure increased marketing possibilities for women, new competition in trade decreased the possibilities of ensuring a secure profit in women's trading enterprises, and women's labor duties in male-controlled agricultural production were reduced.

A study by Koopman (1991) in southern Cameroon gives a further example of women's responsiveness to new opportunities for marketing crops. When farmgate prices for the foods they produced rose, and a major

new road opened which improved market access, women increased the food they marketed by 120 percent, increasing the incomes they earned and controlled by 85 percent.

As in the case of communal production, increased time spent by women in tradeables production as part of personal market work may increase the total time they spend in market work. This means they could spend less time in production for consumption or in reproductive activities, and household welfare could be jeopardized. An indirect effect of an increase in women's time in personal market work is that the income they receive increases. If this income is not transferred to men, the income which they control also increases. In such a case they can make efficient decisions from the point of view of their allocational priorities over their balance of time between welfare provisioning and market work. Positive consequences for household welfare may result if women spend a large proportion of income on welfare inputs as is claimed.

Studies of the effects of women's personal agricultural income generating activities on welfare outcomes are rare. Kennedy and Cogill's (1987) study in Kenya found that income controlled by women from their food sales (and trade) correlated positively with children's nutritional status (while income controlled by men from sugar cane sales did not). It also found that children of female headed households (in which all production is women's personal production) had better nutritional status than those of households with both male and female heads. The example of women traders in northern Ghana, although not of agricultural production, also illustrates the above point. These women control the income they earn in their personal trading activities, which provides a steady income mostly spent on food. Tripp (1981) found that women's trading activities were more positively associated with the nutritional status of their children than either men's trading activities or agricultural production, and that the loss of time women spent in child care due to the time they spent in trading activities was (in terms of children's nutritional status) more than balanced by the gain in the income they controlled.

Increased income earned and received by women may also have the long run effect of increasing their bargaining power relative to men, increasing their ability to provide for themselves if they were to leave the household. If women's bargaining power were to increase, they would be better able to negotiate with men for control of their time and control of household income. With greater time and income under women's control, the allocation of time and income in households would be more representative of women's allocational priorities.

In turn, if women's allocational priorities are more closely tied to welfare provisioning than are men's, a shift in the balance of bargaining power in favor of women could have positive consequences for household welfare.

B. Reductions in Government Expenditures on Social Services

Reductions in government expenditures on social services shift the burden of welfare provisioning from governments to households (Elson 1990a and b). They do so by reducing the accessibility of households to in-kind welfare inputs and by increasing the prices of welfare inputs which household members purchase. Public programs to ensure a supply of potable water and to provide health infrastructure in rural areas may be cut. Higher user fees may be charged for public health services and government subsidies on foods may be removed, raising the prices that households dependent on the market for some of their food needs face.¹⁸ If resources in households are not reallocated to compensate for these changes in their economic environments, their welfare may be jeopardized.

When faced with reductions in in-kind welfare inputs or increases in the prices of purchased welfare inputs, household members may find it necessary to compensate by spending more time in non-market activities. For instance, in response to rising food prices both women and men may increase the time they spend in subsistence food production. Some studies assert that there is more pressure on women than on men to increase time spent in non-market activities in reaction to social service expenditure reductions. This is because women are often responsible for providing welfare inputs whose accessibility is reduced. In response to food price increases, for example, women are known to spend more time in food preparation by buying less processed foods, instead processing them themselves and/or by spending more time finding less expensive foods (Commonwealth Secretariat 1989; Jolly 1988; Elson 1990b).

If women are responsible for providing welfare inputs for which accessibility is reduced, in the absence of compensating cash income transfers from men (or a switching of expenditure responsibilities from women to men), reductions in public sector provision of welfare inputs are more likely to reduce the real incomes controlled by women than men (World Bank 1989). The income allocation process in households may constrain the reallocation of total household cash income in response to prices increases (Elson 1990b; Joekes et al). Due

¹⁸Agricultural households in Sub-Saharan Africa are often net consumers of staple grains (see Sahn 1991).

to inefficiencies (from the point of view of total household income) in income allocation to welfare inputs, increases in the prices of goods lying within women's expenditure responsibilities are not automatically compensated for by increases in income transfers from men.

Increased demands on household members' time in non-market activities may lead them to spend less time in market work. The need to increase expenditures on previously publicly provided goods, on the other hand, may lead them to seek out more time in market work. The ability and incentives of women and men to engage in market work (both communal and personal), and the effect on household welfare of changes in the time they spend in market work were discussed in the last section.

The dependent variable of this study is "household" welfare, an aggregated measure of the physical well-being of all households members. So far questions of the intrahousehold distribution of welfare have not been addressed. However, children are more susceptible to malnutrition and disease than are adults. In addition, due to women's reproductive capability, women have special health and nutrition needs which men do not have. For instance, they are more dependent than men on health services because of their child bearing and rearing responsibilities (McGuire and Popkins 1990; Jolly 1988). Furthermore, the health and nutritional status of women are primary determinants of infants' health and nutritional status. Women's preconception weight and weight gain during pregnancy affect children's birth weight, which is the single most important factor in neonatal and child mortality and growth (Kennedy and Bouis 1993). These biological factors mean that women and children can be at more risk of welfare loss than men if government provided welfare inputs are reduced. Many studies also claim that increased hours of work from concurrent pressures on women to increase time in both market and non-market activities during structural adjustment have adversely affected women's health (Elson 1990b; Moser 1989; Commonwealth Secretariat 1989).

V. CONCLUSION

This paper has investigated the impacts of structural adjustment policies on welfare in rural Sub-Saharan Africa through an exploration of a conceptual framework for welfare provisioning in households. The conceptual framework, along with examples from across Sub-Saharan Africa, show how separate resource control by men

and women in households mediates their responses to changes in their households' economic environments. Allocative inefficiencies in income generation and in welfare provisioning--which stem from women's and men's separate control of and allocation of resources, and from conflicts in their interests--may occur. Such inefficiencies raise the possibility that even if rural households are able to increase their incomes during structural adjustment, their welfare may not be maintained or enhanced.

World wide trends show that peoples' physical well-being, indicated by their life expectancies, is likely to be improved as countries' per-capita incomes increase (World Bank 1993). In the long run, if households in adjusting countries are able to react to expenditure switching policy incentives by increasing their production of tradeable products, and are able to reallocate their time and income to compensate for social service reductions, their welfare may improve along with increases in their incomes. This paper points to the importance for the speed at which such welfare improvements take place of considering who controls increased income and who is responsible for providing welfare inputs in households. Past studies have shown how income control, along with conflicting allocational priorities, can lead to incentive incompatibilities among household members that curtail production and income increases. This paper shows how income control and conflicting allocational priorities can curtail increases in household welfare as well. Structural adjustment policies may not only restructure national economies. They may also restructure resource control in households. Due to women's lower access to productive resources, tighter time constraints, and lower bargaining power than men's, increased income from tradeable production, although earned by both women and men, is often controlled by men. If women lose control over income (and as we have seen, time) their own welfare and their ability to carry out their responsibilities for welfare provisioning may be reduced even as household income increases.

The net effect of structural adjustment policies on welfare is an empirical issue. The conceptual framework presented in this paper highlights important variables of interest for future empirical studies. It points to the need to investigate which household members are responsible for providing time to welfare provisioning tasks, and which household members are responsible for purchasing welfare inputs. It also points to the need to investigate the levels of time and income controlled by different household members, rather than only total household time and income. With such information it will be possible to detect if any household members are

likely to experience a tightening of constraints on their time and income during adjustment, due either to the need for increased expenditures or reduced resource control. In the interest of safeguarding and enhancing household welfare, measures can then be targeted to loosening these constraints.

Many studies evaluating both the potential welfare impacts of structural adjustment programs and the potential for their success in reaching their macro-level goals have noted the interdependence of the two. Measures that enhance human welfare can improve the efficiency of the adjustment process by strengthening the capacity of people to contribute to its success. In turn, if individuals are able to take advantage of the income generating opportunities that come with adjustment, they may be able to improve their households' welfare (World Bank 1990 and 1991; Cornia, Jolly and Stewart 1989; Gladwin 1991; Joekes et al 1988). The recommendations of the World Bank's latest World Development Report, Investing in Health, include promoting the economic empowerment of women (along with men's) and increasing the access of poor households to health services. This paper provides a theoretical rationale, backed by examples from rural Sub-Saharan Africa, for incorporating these recommended measures into structural adjustment programs. Due to the complementarity between enhanced human welfare and the success of adjustment policies, such an approach can increase the possibility that both of these international donor agency goals be reached.

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