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The Ethiopian Economic Association  
P. O. Box 34282  
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ETHIOPIA

OR

Economics Department  
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# THE SUPPLY RESPONSIVENESS OF PEASANT AGRICULTURE IN ETHIOPIA: SOME MACROECONOMETRIC RESULTS FROM CEREALS PRODUCTION

Abebe Haile Gabriel\*

## ABSTRACT

*In view of the strategic role that 'food supply' plays in economic development, this paper sets out to estimate the supply responsiveness of peasant agriculture, particularly cereals production, to price levels. A time series data on area cultivated, yield as well as price and other relevant variables are used. Cultivated area was taken as a response variable while effects of own-price, cross-price, factor (input) availability and costs, and yield expectations are considered as explanatory variables. A log-linear dynamic response equation is specified in which ad hoc specifications of supply response including partial adjustment and expectations formation are integrated. Results indicate that cereals, which are the single most important source of food supply in Ethiopia, are found to be inelastic to prices either in their aggregates or considered individually. On the other hand, relatively larger responses (which are also elastic for maize and sorghum) with respect to the movement of real exchange rate were observed perhaps suggesting that food imports have been competing more with cereals that mainly make up the poor's consumption bundle.*

## 1. INTRODUCTION

With market orthodoxy gaining wide currency, the role of market signals in influencing the behaviour of economic agents has been highly stressed and spoken of perhaps too freely. Since the past sluggish agricultural performance in the poor countries is ascribed mainly to the distortion or absence of such signals, 'market liberalisation' has become the primary catchword in influential policy discussions and practices. The bottom-line of such an argument is that peasants, like any other 'economic men' are behaving rationally by responding to market forces; and since they are presumed to be at the price-receiving end of the agricultural product market transactions, they would expand production and increase sales as their erstwhile unfavourable terms of

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\* Assistant Professor, Ethiopian Civil Service College. The final version of this article was submitted in July 2000.

trade which resulted from suppressed markets are improved when markets are allowed to function 'freely'.

There has been much controversy around the issue of whether or not peasant agriculture is responsive to prices. Several researchers attempted to measure the supply responsiveness of agricultural production; however much of the emphasis has been on cash crops rather than on food crops. Although Ethiopia has been a late-comer to the SAPs, it has put the set of economic reforms in place that accompany the SAPs, with the exception, so far, of land privatisation. On the other hand, a comprehensive analysis of supply response of peasant production is lacking in. This paper attempts to make a modest contribution in addressing the problem.

The main thrust of the paper is to grapple with the issue of whether or not peasant agriculture (particularly cereals production) has been responsive to prices. The analysis focuses on macro level figures (both aggregate and individual cereals). The paper is organised into two sections: first the conceptual and methodological issues related to modelling peasant supply response are presented to be followed by a presentation of the supply response estimates for cereals production in Ethiopia. Finally a summary of the main points is provided.

## **2. PEASANT SUPPLY BEHAVIOUR AND THE SUPPLY RESPONSE MODEL**

### **2.1. What is to Model? Choice of the Response Variable**

Peasant supply response measures the degree to which level of production and/or marketed surplus changes in response to stimuli provided by changes in some important variables, mainly prices. In essence, it seeks to explain the behavioural changes of producers with respect to the production, consumption, and exchange decision of a certain product or set of products due to changes in economic incentives. Rational price sensitivity on the part of peasants would presuppose desirable responses to changes in prices. Conversely, insensitive producer behaviour is construed as insignificant or absence of output responsiveness despite notable changes in prices. Therefore, arguments surrounding the question that 'how much of a given product or set of products should be produced in response to changes in economic incentives' are predicated upon certain predetermined perceptions regarding the objective functions of the producer and that of the behaviour of markets. The analysis of supply response heavily draws from the neo-classical economics tradition of optimisation problem in which the supply behaviour of the 'firm' is often extended and metaphorically equated with the peasant 'farm'; while at the same time rural markets are deemed, with some qualifications, to assume resemblance of the features exhibited by the 'competitive markets'.



Strictly speaking, the primary concern of agricultural supply response is about marketed surplus, which varies with levels of production, or consumption, or both. For example, marketed surplus might directly vary with production (if consumption is maintained constant). On the other hand, marketed surplus might not necessarily fall even if production falls (it might even rise at the expense of consumption hence varying inversely with production). The available theory suggests that price elasticity of marketable surplus can be estimated directly through the construction of a string of structural functions involving marketed surplus, consumption, production, and prices after which a reduced form could be derived; or indirectly by deriving it from functions of total production and household consumption (Medani 1975; Behrman 1968; Hassel 1975). This requires that detailed data be available on production, household consumption and price levels. In the Ethiopian context, however, such kind of data is simply unavailable rendering estimation of marketed surplus response quite difficult if not impossible. When they are available, estimates of marketed surplus assume a fixed proportion of total production in which case no difference could be observed between changes in the two. In view of the strong dependence of the level of marketed surplus on total production (especially at a very low level of household consumption), the behaviour of total production might approximate peasant supply response behaviour. Therefore, total production is considered as a basis for modelling supply response.

What supply response seeks to measure would be producers' intentions in response to changes in certain key explanatory variables. But plans or intentions are not tangible and cannot be measured directly; nor could they be attained or materialised in fullness of magnitude. So, in practice actual performances are considered as their proxies in which output is regressed on a set of explanatory variables using econometric models whose functional forms would be specified taking into account both *a priori* theoretical considerations as well as specific circumstances. Then, the estimated coefficients (parameters) would become the basis upon which elasticities are to be derived.

The difficulty associated with not only measuring producers' intentions but also the conceivable disparity between intentions and actual performances has led analysts to dwell more on cultivated area rather than actual production as an appropriate index of dependent variable with which peasants' responsiveness could be modelled and estimated. This is underpinned by the fact that there is a very low degree to which peasants could exercise control over certain variables affecting production. Since producers' decision behaviour could be approximated by the amount of effort they are willing to put into (or withdraw from) the production process, size of area worked could be a better proxy to producers' intentions rather than actual output whose volume could be influenced by factors which lie beyond peasant's control. In other words, the type and amount of crop that the peasant intends to produce may better be estimated by the area allocated (and worked) to such a crop rather than the actual harvest. This



is because the area actually cultivated with a particular crop is, to a much greater degree than actual output, under farmers' control and thus presumably a much better index of expected output in response to economic incentives such as prices. This is further supported by the evidence that cultivated area and expected output are strongly correlated on the one hand, and actual output is usually subject to the changes due to factors that are uncontrollable to farmers on the other hand (Behrman 1968; Nowshirvani 1962; Singh and Rao 1973).

The relationship between output and cultivated area of a given crop might be discerned by looking at the relationship between their respective elasticities. By definition, output of crop  $i$  at time  $t$  ( $Q_{it}$ ) is a product of its cultivated area ( $A_{it}$ ) and yield per unit area ( $Y_{it}$ ):

$$Q_{it} = \sum A_{it} Y_{it} \quad [1]$$

The impact of changes in a certain variable, say price ( $P$ ) on output can be perceived from three possible points of views: it might induce changes in  $A$ , or in  $Y$ , or in both  $A$  and  $Y$ . Under ideal circumstances, i.e., if desired output ( $Q^D$ ) would not differ from actual output (i.e.,  $Q^D = Q$ , therefore no partial adjustment), and if data were permitting, the impact of price changes on output could be directly measured by taking  $Q$  as a dependent variable. In actual practice, however, divergences between expected and actual output are of a higher order of magnitude, and reliable data are often wanting (it is much easier to accurately measure area than output). If that is the case, then other possibilities ought to be sought to capture the different routes through which the stimulus could get into the system and bring about the perceived behavioural response, if any. In the context of poor countries, where technological stagnation characterises peasant production, yield is supposed to mostly remain insensitive to price incentives. Expressing  $A$  and  $Y$  as functions of  $P$ , i.e.,  $A = g(P)$ , and  $Y = h(P)$ , it can be shown that price elasticity of output,  $\xi_{QP}$  is the sum of the price elasticity of cultivated area  $\xi_{AP}$ , and price elasticity of yield  $\xi_{YP}$ . Given equation [1], a complete differentiation of  $Q$  with respect to  $P$  gives:

$$\frac{dQ}{dP} = Y \cdot \frac{dA}{dP} + A \cdot \frac{dY}{dP}$$

Multiplying both sides of the equation by  $(P/Q)$ , and substituting  $(A \cdot Y)$  for  $Q$  on the right hand side of the resulting equation, we get:

$$\frac{dQ}{dP} \cdot \frac{P}{Q} = \frac{dA}{dP} \cdot \frac{P}{A} + \frac{dY}{dP} \cdot \frac{P}{Y}$$

Which is nothing but:

$$\xi_{QP} = \xi_{AP} + \xi_{YP} \quad [2]$$

It can be assumed that  $\xi_{YP}$  is insignificant for cases where yield per unit area has been relatively independent of price changes and that producers exercise high degree of control over cultivated area so that actual cultivated area equals desired cultivated area,  $A^D$  (i.e.,  $A=A^D$ ), then  $\xi_{QP}$  would become equivalent to  $\xi_{AP}$ . That is, the noticeable way in which output could respond to changes in prices would be through changes in cultivated area (i.e., if  $\xi_{YP} \approx 0$ , then  $\xi_{QP} \approx \xi_{AP}$ ). If  $\xi_{YP}$  were not significantly different from zero, then  $\xi_{AP}$  would better approximate  $\xi_{QP}$ . Therefore, elasticities calculated from models in which cultivated area is the dependent variable probably better approximate the desired elasticities of planned output for agriculture, *ceteris paribus*, than actual output.

Nevertheless, it is important to note that the use of cultivated area as a dependent variable has certain limitations. Some of these would include that, first land is but one of the many factors of production required for production to take place. Due to the possibility of factor substitutability, a decision to allocate a certain area of land to the production of a specific crop may result in a wide range of planned outputs<sup>1</sup>. A possible way-out would be to employ an index of all inputs to be devoted to the crop. But, contrary to land, which is committed to a specific crop, most of the inputs utilisation can be altered throughout the production cycle in response to factors, which lie beyond peasants' control.

Secondly, land itself is often far from a homogenous factor of production. If land is sufficiently heterogeneous in quality and if other inputs constrain production, a situation is conceivable in which a farmer might decide to increase the planned output of a specific crop by devoting less, but better land to that crop.

The third problem is associated with absolute and relative scarcity of cultivable land. That is, the supply of cultivated area is not indefinitely elastic. This is particularly important where the size of cultivated land per household is very small on the one hand, and where food crops predominate it on the other. In other words, whether or not there exists an excess capacity with which to sufficiently expand area under a crop or group of crops in response to changes in relative prices is too important an aspect to ignore. Scarcity of land constrains peasants from increasing cultivated area when prices are increased. Alternative possibilities would include land reallocation and redistributing effort in favour of the crop whose relative profitability has increased, or raising yield per unit area through technological improvement, or expanding cultivated area through entering land markets; or some combinations of these. However, most of these (with the exception probably of reallocation) would significantly depend not only on the existence and functioning of rural factor markets, but also on capacities of



peasant households to muster enough resources which would enable them to lay claim on those factors.

## **2.2. The Supply Response Model**

A number of alternative approaches to estimation of elasticities of supply response are available both at the structural and reduced form levels (see Sadoulet and de Janvry 1995:84-86). The former concerns estimation of the structure of production functions and derivation of the supply response from it with the help of such analytical tools as production function estimation, linear programming, profit function approach, and complete structural models. The latter, on the other hand, involves a direct estimation of supply response of which the ad hoc specifications of supply response including partial adjustment and expectations formation is an integral component. This paper adopts the latter approach in which the relationship between output supply as a dependent variable and prices and a number of shifters as a set of explanatory variables could be directly modelled using time series data. This is partly because the microeconomic approach is relatively more data demanding which is not available as well as more stringent on assumptions of the behaviour of markets (e.g., wage labour is assumed rather than family labour). In addition, the latter approach permits some comparative evaluation with actual empirical estimates reported elsewhere. However, this is not to claim that the latter approach is without problems. Some of its drawbacks would come precisely from its comparative minimal theoretical and data demands.

Following Nerlovian (1958, 1979) traditions, with specific functional forms to be determined based on *a priori* theoretical considerations and particular circumstances, the general supply response model can be presented as:

$$Q_t^D = \alpha_1 + \alpha_2 P_t^E + \sum \alpha_3 X_{it} + \varepsilon_t \quad [3]$$

Where,  $Q^D$  is desired level of output;  $P^E$  is a vector of expected level of prices, and  $X$  represents the set of non-price factors;  $\alpha$ 's are parameters with  $\alpha_2$  being the long-run coefficient (elasticity), and  $\varepsilon_t$  accounts for unobserved random factors with zero expected value. The Nerlovian models are constructed to handle two dynamic processes: adaptive expectations and partial adjustments.

$$Q_t - Q_{t-1} = \delta(Q_t^D - Q_{t-1}) + v_t \quad 0 \leq \delta \leq 1 \quad [4]$$

Where  $\delta$  is the *partial adjustment coefficient* and  $v_t$  is a random term. Specification of a model that explains how price expectations<sup>2</sup> are formed based on differences between actual and past prices assumes:

$$P_t^E - P_{t-1}^E = \gamma(P_{t-1} - P_{t-1}^E) + w_t, \quad 0 \leq \gamma \leq 1 \quad \text{or}$$

$$P_t^E = \gamma P_{t-1} + (1-\gamma) P_{t-1}^E + w_t \quad [5]$$

Where  $\gamma$  is *adaptive expectations coefficient* and  $w_t$  is a random term. However, if we assume that peasants make their planting decisions based on their knowledge about prices that prevailed immediately the preceding period (i.e., inelastic expectations) then,

$$P_t^E = P_{t-1}^E \quad [6]$$

Then substituting equations [3] and [6] into [4] would eliminate the unobservable variable ( $Q_t^E$ ) to yield a structure that describes dynamically a supply response model for which parameter estimates can be obtained using either maximum likelihood procedure or least squares technique on an equation of the reduced form (Askari and Cummings 1976:32-33; Sadoulet and de Janvry 1995:87) such that:

$$\begin{aligned} Q_t - Q_{t-1} &= \delta(\alpha_1 + \alpha_2 P_{t-1} + \sum \alpha_3 X_{it} + \varepsilon_1 - Q_{t-1}) + v_t, \quad 0 \leq \delta \leq 1 \\ &= \delta\alpha_1 + \delta\alpha_2 P_{t-1} + \sum \delta\alpha_3 X_{it} - \delta Q_{t-1} + \delta\varepsilon_1 + v_t \\ Q_t &= \beta_1 + \beta_2 P_{t-1} + \sum \beta_3 X_{it} + \beta_4 Q_{t-1} + \mu_t \end{aligned} \quad [7]$$

where,  $\beta_1 = \alpha_1\delta$ ;  $\beta_2 = \alpha_2\delta$ ;  $\beta_3 = \alpha_3\delta$ ;  $\beta_4 = 1-\delta$ ; and  $\mu_t = \delta\varepsilon_1 + v_t$

Hence,  $\alpha_1 = \beta_1/\delta$ ;  $\alpha_2 = \beta_2/\delta$ ;  $\delta = 1-\beta_4$ ; etc.

Short-run and long-run elasticities could then be derived from these relations as follows. In the linear form of the equation, short-run and long-run price elasticities are given respectively by  $\beta_2 \times (P/Q)$  and  $(\beta_2/\delta) \times (P/Q)$  where  $P$  and  $Q$  are mean values of prices and output respectively. In the log-linear form of the equation,  $\beta_2$  and  $(\beta_2/\delta)$  would directly measure short-run and long-run price elasticities respectively (see, Askari & Cummings 1976; Behrman 1968; Sharma 1992; Sadoulet and de Janvry 1995).

### 3. SUPPLY RESPONSE ESTIMATION FOR CEREAL PRODUCTION IN ETHIOPIA

#### 3.1. The Data

Area cultivated under cereals and yield of cereals per unit of area cultivated were found from reports of Central Statistical Authority and that of the National Bank of Ethiopia. The latter contains corrected versions of output data for the discrepancies of



measurement between the periods of pre-1979 and after. Cereal price index was obtained from CSA reports and used to estimate aggregate cereals price after deflating it by the non-food general consumer price index. This is the only available price information that could be useable. However, Addis Ababa's grain market price is consequential to price determination in the regions (see, EHRS 1986). Fertiliser quantity and price is obtained from reports of the Agricultural Inputs Supply Corporation. Fisher's ideal quantity and price indexes were computed as proxies to the 'true' index since the latter lies somewhere in between the Laspeyres (which overestimates the increase and understates the decrease in the true index) and Paasche Indexes (which does the opposite). Nominal fertiliser prices are deflated by the general consumer price index to derive weighted fertiliser price index. Rainfall data were assembled by averaging the annual levels for 18 stations that could be available.

For individual crops, average producer prices were obtained from CSA reports and used after adjusting them by the non-food components of the national rural consumer price index ( $191/82=100$ ). Nominal official exchange rate is multiplied by the ratio of US wholesale price index to Ethiopia's GDP deflator to derive real exchange rate.<sup>3</sup>

### **3.2. The Response Variable: Trends of Cultivated Area, Yield and Production**

It is important to inquire whether or not the relationship between production and area cultivated could satisfy the foregoing discussion; that is, how could the problem of choice of dependent variable be resolved in the Ethiopian context? In order to identify the contributions of area and yield to changes in output, a distinction has to be made between area elasticity of output and yield elasticity of output, which are quite different from price elasticities. For instance, in cases where inelastic supply of land prevails, variation in output would result mainly from changes in yield; and it does not require a price elastic yield response for this to come about. Yield may vary due to changes in technology, weather, and other factors even though it is price inelastic. In fact, this has been the case in the Ethiopian condition where, notwithstanding fluctuations in cultivated area, the major source of fluctuation in cereals production has been yield rather than area. Between the years 1973 to 1995, cereals production, cultivated area and yield have on average grown at rates of 3.33%, 0.82%, and 2.56% per annum respectively (Table 1). Such an association can also be seen from Figure 1.

Table 1. Average per Annum Growth Rates of Area, Yield and Output of Cereals (1973-95)

	Cereals	Teff	Wheat	Barley	Maize	Sorghum	Total <sup>1</sup>
Area	0.82	1.66	1.39	0.56	3.14	3.43	1.34
Yield	2.56	2.26	3.32	2.02	5.19	6.31	2.74
Output	3.33	3.79	3.63	1.29	7.96	10.44	3.63

<sup>1</sup>includes cereals, pulses and oilseeds. Source: CSA, various reports.

Figure 1a. Growth Rates of Cultivated Area, Output and Yield of Cereals (1974/75-1995/96)

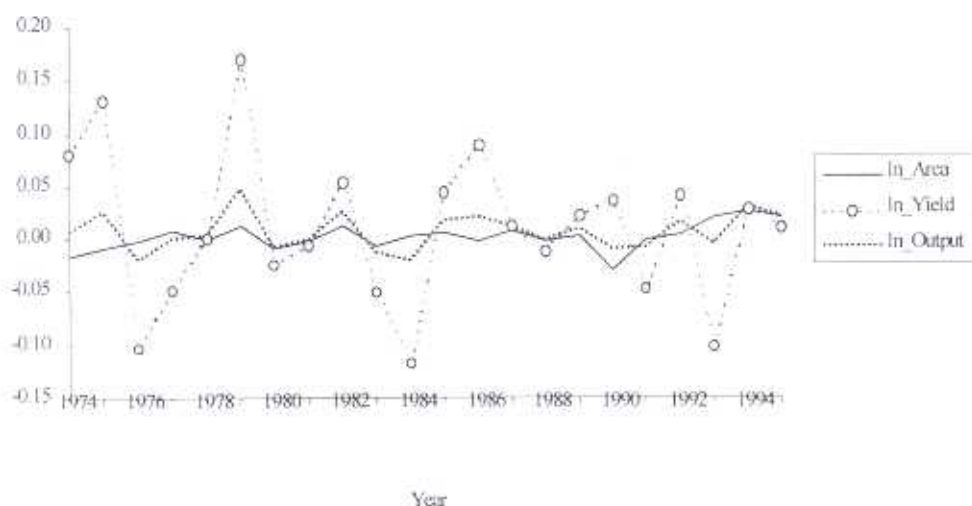


Figure 1b. Growth Rates of Cultivated Area and Output of Cereals (1974/75-1995/96)

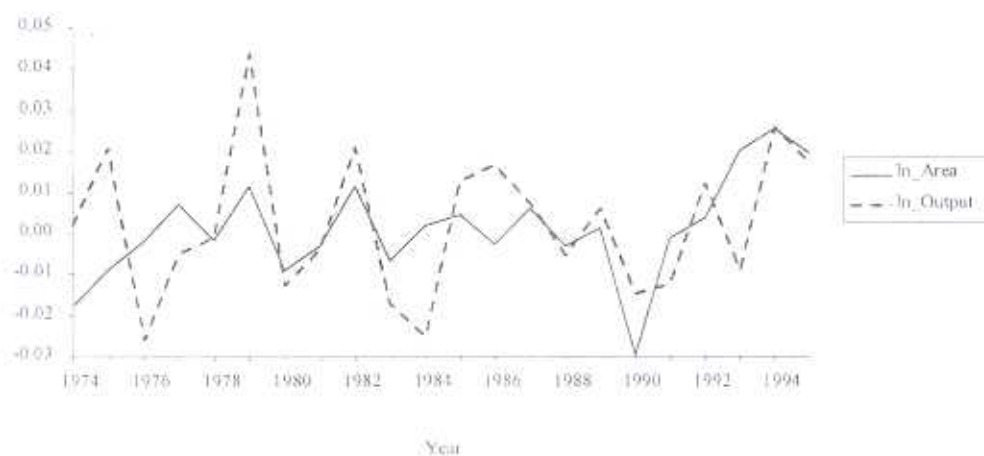
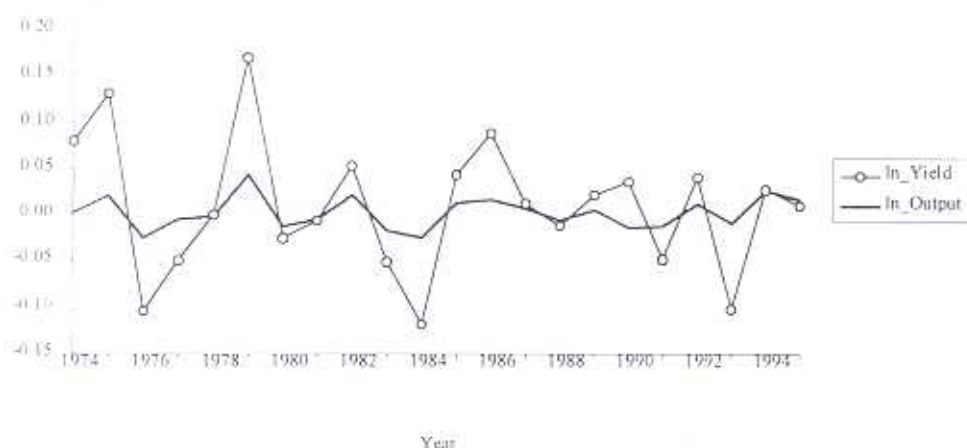
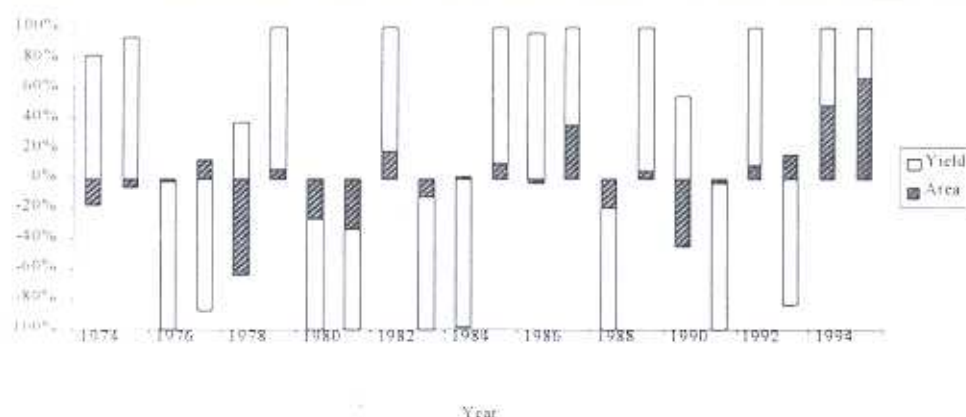


Figure 1c. Growth Rates of Output and Yield of Cereals (1974/75-1995/96)



While fluctuation of output is more salient, that of area was not that expressive (Figures 1a & 1b). In contrast, not only does yield fluctuate notably but also its pattern tends to correspond fairly to that of output (Figures 1a and 1c). Indeed, the correlation between output and yield is stronger (0.65) than that between output and area (0.55). The respective contribution of yield and area growth rates to that of output is shown in Figure (1d).

Figure 1d. Contribution of Area and Yield Growth Rates to Output Growth Rate





As could be seen from Figure (1d) with the exception of two years (1978/79 when cultivated area significantly declined and 1995/96 when it expanded) the contribution of yield growth to output growth has been by far more conspicuous than area growth. Hence, the scenario at hand would seem to be one of a relatively less flexible supply of cultivated area of land coupled with marked yield fluctuation determining level of production. Therefore, in such circumstances, it will be useful not only to model the area response behaviour but also inquire into the sources of observed yield fluctuations. To do so would be advantageous because it enables one to disentangle the area response behaviour (which is mainly a function of expectations) from the yield response behaviour (which is mainly a function of interactions and interplay of uncontrollable factors which would reduce yield, and peasants' efforts and capacities (or the lack of them) in counteracting them).

Yield response is usually perceived to be a function of technological change (trend variable) or an index of natural conditions (such as rainfall) or risk variables (Behrman 1968; Burton 1992:35), or sometimes treated as an exogenous variable in the equations to estimate the area response (Rajagopalan 1967; Parikh 1971, quoted in Weichang 1995:128). This is because of the assumption that yield response is too vulnerable to changes in weather conditions<sup>4</sup> and technological improvement, and is too weak to be identified econometrically (Weichang, *ibid.*).

The Ethiopian experience would reveal that marked yield fluctuations have strongly been associated with changes in weather conditions. Total amount of seasonal rainfall together with its length is the main yield determinant. Ethiopia's climate is predominantly bi-modal, with seasonality and variation in rainfall rather than temperature being the limiting factors; and about 85-95% of the food crop production in the country depends on precipitation that occurs during the main season. Late arrival of rains or its stoppage shortly before plant maturity would result in substantial crop failure. The distribution of rainfall during the season is also important since crops need different amount of water during different stages of their growth cycle. An important characteristic of Ethiopia's rainfall is that it exhibits high variability in time and space. Annual rainfall averages range from between 500 and 1500 mm. Although both shortages as well as excess rainfall are equally detrimental to cereals production, the Ethiopian experience reveals that it is the shortage rather than the excess which had adverse impacts. Weather data show rather conclusively that the lower the annual total rainfall, the greater the degree of variability.

Several severe drought years have been recorded in recent years (1973-1975, 1983-86, and 1993-94) in which one could notice a sharp fall in yield and output of cereals. Assigning a dummy (1 for these years, and 0 otherwise) and regressing yield of cereals on this binary variable would show that the impact of weather on yield has been significant. On the other hand, yield was found to be uncorrelated with prices (with insignificant coefficients and/or with wrong signs). A notable vulnerability of yield



to changes in weather would imply that aggregate output would also be quite vulnerable to such changes. Therefore, much of the source of yield, hence output, fluctuation could clearly be explained by changes in weather conditions. This would leave us with cultivated area as a proxy with which to estimate peasant supply response to prices.

### **3.2. Explanatory Variables**

The first set of explanatory variables to be considered in supply response analysis is the price level. Depending on the type of price-elasticity to be estimated, the price variable could enter in different ways, either in groups or separately, into supply response models. These include (a) own-price effect, (b) cross-price effect, and (c) relative price effect, etc. Each of these would involve dissimilar interpretation. For example, own-price elasticity measures the responsiveness of output to changes in its own price; cross-price elasticity estimates the responsiveness of a given output, say  $X$ , to changes in the prices of a competing output, say  $Y$ ; and relative price elasticity measures the responsiveness of output to changes in relative prices of the output vis-à-vis that of the inputs used. Therefore, rational behaviour on the part of producer presupposes that the coefficient of own-price and that of relative prices (if favourable) in the supply model would assume a positive sign, while that of the cross-price a negative (if substitute). The presumption is that peasants positively respond to own-price and favourable relative price changes, and inversely to cross-price (if substitute) changes.

The second group which are classified as non-price factors might include a wide array of explanatory variables such as technology, rural labour force, excess capacity in terms of availability of resources (e.g. land), infrastructural development, pervious level of production, policy changes, index of availability of non-agricultural consumer goods in rural areas, etc. This requires that data be available on each of these variables. In reality however, only a fraction of these information would be available rendering the use of their proxies inevitable.

In this paper, the following effects are considered as important explanatory variables for area response (a) own-price effects, (b) cross-price effects, (c) factor (input) availability and costs effects, and (d) yield expectations.

#### ***Own-Price Effects***

At an aggregate level, cereals' own-price is estimated by taking the retail cereal price index and deflating it by the non-food consumer price index to arrive at an estimate of real cereal price index. For individual cereals, the availability of average producer prices for major cereals and national rural consumer price index covering the years 1981/82-1994/95 permitted the derivation of real producer prices through deflating the

former by the non-food rural consumer price index. It is expected that the coefficient of this variable would take a positive sign.

### ***Cross-Price Effects***

For cereals as a whole, the nearest competitive crops in production are cash crops such as coffee, t'chat, oilseeds and/or pulses. It is also known that these (perhaps with the exception of pulses) constitute the major export crops. The other competitive items would include food imports. It is expected that the movement of real exchange rate would capture the substitution effects both in production and consumption (between traded and non-traded goods such as cash crops and food crops or between food imports and domestic production). Since the impact of changes in real exchange rate would be a mixed one for exportable cash crops and food imports, it will be difficult to make an *a priori* assumption about the sign that its coefficient would assume. For example, it might assume a negative sign as the real exchange rate appreciates leading to an improvement in the competitiveness of export crops (making exports cheaper abroad); but the same movement would make food imports more expensive domestically, hence improving the competitiveness of domestic food production *vis-à-vis* food imports. The net effect could be determined by the relative changes in the competitiveness of food *vis-à-vis* cash crop production and the flexibility with which substitution could be made possible.

### ***Factor (inputs) Availability and Costs***

Since early 1970s, the most important purchased input used by peasants has been chemical fertilisers. The volume of fertiliser import as well as its use by peasants has been steadily increasing over the period despite the fact that even at present the rate of application remains to be one of the lowest by many standards. Most of the available fertiliser is also used for cereal production. Improved varieties of wheat, teff, maize, and sorghum have also been introduced since long time ago, but still their application has been restricted to certain limited areas and few peasants within these areas

The volume index of chemical fertilisers (DAP and Urea) distributed to peasants is considered as a proxy to the availability of purchased inputs. In order to combine its profitability impact, the fertiliser volume index is multiplied by its price index and then divided by the value of output (price index times volume of output). Two alternative ways of measuring the quantity and price indexes of fertiliser were evaluated: (a) taking the simple sum of DAP and Urea for volume index and weighted price of fertiliser as derived from the respective quantity shares and prices of DAP and Urea for price index; and (b) constructing a quantity and price index in such a way that changes in both variables are taken into account. However, no significant difference was observed between parameter estimates obtained by using either (a) or (b) to



measure the variables; therefore, option (a) was considered in the estimation equation. It is expected that as the availability of fertiliser per unit cost improves, peasants would expand the area under cereals (as opposed to other crops, e.g., pulses, which do require less chemical fertilisation).

### ***Yield Expectations***

It is hypothesised that one of the factors that would influence peasants' decisions with respect to the amount of area they intend to cultivate is the yield level that they expect from planting the crop in question. Several ways of estimating yield expectations are available<sup>5</sup>. Two alternative ways of capturing the potential effects of expected yield ( $y^e$ ) are evaluated here: (i) expected yield estimated as a function of rainfall deviation and time trend such that:

$$y^e = d_0 + d_1 \bar{R} + d_2 t + d_3 t^2 + u_{2t} \quad [8]$$

where  $\bar{R}$  measures the difference between annual rainfall in time  $t$  and the average rainfall over the period; and (ii) taking the previous yield level as a proxy to  $y^e$  assuming that peasants decisions as to the size of area they intend to allocate to a particular crop (or groups of crops) depends on the previous yield levels achieved. It is expected that the coefficient of this variable would turn positive such that cultivated area varies directly with expected yield.

### **3.3. Estimates of Aggregate Cereals Area Response**

Several variants of specifications of the basic model were tried after which the following log-linear dynamic area response equation gave better results.

$$\log A_t = \beta_1 + \beta_2 \log OP_{t-1} + \beta_3 \log RER_t + \beta_4 \log FERT_t + \beta_5 \log Y^e_t + \beta_6 \log A_{t-1} + e \quad [9]$$

where  $OP$ ,  $RER$ ,  $FERT$  and  $Y^e$  are respectively own-price, real exchange rate, fertiliser quantity and expected yield. The results of the regression are reported in Table (2).

The regression results show that the coefficients of all the explanatory variables in the model with the exception of expected yield<sup>6</sup> were highly significant and have positive signs. That is, cultivated area of cereals varies directly with output price, real exchange rate, fertiliser availability per unit of cost, and past level of cultivated area. As these variables increase, cultivated area tends to increase; and conversely, as the variables decline, cereals cultivated area tends to fall. This makes economic sense because producers tend to expand area as cereals price rise and vice versa. The impact of the real exchange rate is that producers tend to expand cultivated area of

cereals as it appreciates (improving its competitiveness) and vice versa which is understandable in view of the fact that the country is a net importer of food. It seems that the competitiveness between domestic food production *vis-à-vis* food imports was more important than that between food and cash crop production. Similarly, the availability of fertiliser input per unit of cost tends to raise cultivated area under cereals.

Table 2. Regression Results of Aggregate Cereals Area Equation (1974/75-1995/96)

Variable	Coefficient	t-Statistic
Constant	1.9142	1.1096
$\log(OP_{t-1})$	0.3181*	2.6813
$\log(RER)$	0.3058*	2.9029
$\log(FERT)$	0.0675*	2.7326
$\log(Y^*)$	-0.2118	-0.5550
$\log(A_{t-1})$	0.5346*	3.1024
R-squared	0.74	
Adjusted R-squared	0.66	
F-statistic	9.3017	
Prob(F-statistic)	0.0003	
Durbin's h-statistic	-1.98 <sup>§</sup>	

\*significant at less than 0.05 probability level.

<sup>§</sup>No serial autocorrelation at 0.05 probability level

Based on these estimates, short-run and long-run price elasticities of area response for aggregate cereals would be 0.32 and 0.68 respectively<sup>7</sup>. This implies that a 10% increase in cereal prices would lead to a 3.2% and 6.8% expansion of cultivated area of cereals in the short-run and long-run respectively. Supply elasticity due to movements in real exchange rate is somewhat comparable to own-price effect (0.31 in the short-run and 0.66 in the long-run). On the other hand, the impact of fertiliser availability per unit of cost is quite weak (0.07 and 0.15 respectively). In general, at an aggregate level, it could be shown that the supply responsiveness of cereals cultivated area has been fairly inelastic.

However, working with such an aggregate data, as total cereals which encompass a number of crops each with its specific characteristics, has its own inherent problems. This is because the price responsiveness of one cereal might behave differently from another, as for example an elastic response of one crop running parallel to an inelastic response of another; in which case averaging would only become unusable. Secondly, 'cereal price index' as a proxy would measure the price of each crop weighted by their respective quantities where the assumption is that such a proxy



might reflect the movement of the average price for all cereals. In practice, the signal that this figure might throw would be different for each crop. For this reason, disaggregation of supply response into each cereal crop is imperative to which we now turn.

### **3.4. Estimates of Individual Crops Area Responses**

As we move from modelling supply response of aggregate cereals to that of individual cereals, certain adjustments would become inevitable. This is because there are some advantages that are associated with working with disaggregated data. First, it is more meaningful to talk about the price of an individual crop (say wheat) than a composite price index of a group of cereals. Nominal producer prices of each crop are deflated by the non-food rural consumer price index to estimate the real producer prices making it possible for real producer prices of each crop to enter into the model. Secondly, it is also easier to introduce the cross price effects of potential substitutes since differences in relative price movements have impacts on peasant production, consumption and exchange decisions.

On the other hand, there are some shortcomings to be dealt with. First, data on individual crops is harder to obtain and derive than for aggregate cereals. For example, price data (producer prices, rural consumer price index) is available only after 1981/82; information on actual fertiliser distribution and rate of application by crops is unavailable; data on the amount of precipitation and its distribution for each crop is hard to come by, etc. This problem of data unavailability would diminish the number of years to be considered from 22 to only 14 (i.e., from 1981/82 to 1994/95 only) with the effect that regression estimates would be less conclusive<sup>8</sup>. However, from the aggregate cereals response equations one could get an impression that expected yield was not a significant variable. For individual cereals, like in the aggregate response equation, previous yield levels as proxies to expected yield are found to be negatively but weakly correlated with respective areas (-0.08, -0.14, -0.16, -0.32, and -0.43 respectively for maize, sorghum, teff, wheat and barley) suggesting that it could perhaps be dropped from the estimation equations. Similarly, since the quantity of fertiliser actually applied to each crop cannot be known the omission of the aggregate volume of fertiliser from the estimation equations would not affect the result significantly. Besides, aggregate cereals area was found to be quite inelastic to fertiliser availability per unit cost.

Two indicators are provided below in order to determine whether or not inter-crop competition for land, therefore inter-crop cross-price effects are important. The first is the altitudinal range within which different crops are cultivated in Ethiopia (Table 3), while the second has to do with correlation matrix among the cultivated areas of different crops (Table 4).

For example, in the altitudinal range below 1500 meters maize and sorghum are the only crops grown. Similarly in the range of above 2500 meters only barley is to be grown. Between 1700 and 2300 meters, barley, teff, and wheat are the important crops. It could also be seen that all crops tend to overlap at around 1700-2200 meters above sea level. From such a rough distributional sketch one would be tempted to think that barley seems to compete with wheat and teff; maize with sorghum, teff and wheat; sorghum with maize and teff; teff with all crops; and wheat with teff, maize and barley. However a correlation matrix would suggest that such a competition among the different crops within the respective altitudinal ranges has been an exception rather than the rule.

Table 3. Altitudinal Range of Some Cereals  
Altitude in Meters Above Sea-level

Crops	500	1000	1500	2000	2500	3000	3500	4000
Barley								
Maize								
Sorghum								
Teff								
Wheat								

Source: Westphal, 1975, pp. 84.

Table 4. Correlation Matrix of Area Cultivated of Individual Cereals  
(1981/82-1995/96)

	Teff	Barley	Wheat	Maize	Sorghum
Teff	1.000				
Barley	-0.026	1.000			
Wheat	0.700	0.472	1.000		
Maize	0.511	0.382	0.421	1.000	
Sorghum	0.631	0.472	0.888	0.473	1.000

As could be seen from Table (4) all the correlation coefficients but one (barley with teff) were positive implying that movement of area cultivated for all crops tends to move in the same direction. This can be further corroborated with evidences from the correlation matrix between cultivated area and lagged cross-price levels. Considering those cross-prices with negative signs, correlations were found to be (a) -0.01 for sorghum area and maize price; (b) -0.01, -0.05, -0.12 between teff area and prices of



wheat, sorghum and maize respectively; and (c) -0.03, -0.10, and -0.30 between maize area and prices of wheat, barley, and sorghum respectively. On the other hand, wheat area was positively but weakly correlated with prices of all cereals. These would indicate that the correlations are too weak to be reckoned with thus making inter-crop cross-price effects less important in supply response estimates.

Therefore, only three variables are considered, namely own-rice, real exchange rate, and lagged cultivated area (this might help minimise errors of estimation; i.e., due to small number of years included in the time series). Area cultivated is expected to vary directly with own-price changes. The inclusion of real exchange rate in the estimation equation is intended to evaluate the relative competitiveness of each cereal *vis-à-vis* the observed pattern in the aggregate response. The equation is estimated thus:

$$\log A_t = \beta_1 + \beta_2 \log OP_{t-1} + \beta_3 \log RER_t + \beta_4 \log A_{t-1} + e_t \quad [10]$$

The regression results are reported in Table 5 in which it could be shown that (a) own-prices have the expected signs in their coefficients in all equations, but only in two cases (wheat and teff) were they significant; (b) the coefficient of real exchange rate is also positive in all equations and significant in all but one (barley); (c) in likewise, previous level of cultivated area has positive coefficients in all equations and is significant except in teff equation.

**Table 5. Regression Results for Individual Cereals Area Response Equations**

Regressors	Barley	Maize	Sorghum	Teff	Wheat
Constant	1.975 (0.997)	2.132 (1.359)	1.718 (1.479)	1.916 (0.802)	2.544* (1.821)
$\log(OP_{t-1})$	0.157 (0.717)	0.1587 (0.990)	0.108 (0.744)	0.236** (1.814)	0.227* (2.503)
$\log(RER)$	0.207 (0.992)	0.460* (2.783)	0.823* (4.171)	0.286** (2.006)	0.359* (3.008)
$\log(A_{t-1})$	0.589* (2.381)	0.555* (2.742)	0.571* (3.201)	0.574 (1.651)	0.436** (2.014)*
$R^2$	0.41	0.59	0.80	0.71	0.75
Adjusted $R^2$	0.23	0.47	0.73	0.63	0.68
F-statistic	2.299	4.864	12.904	8.319	9.999
Prob (F-stat)	0.1390	0.0245	0.0009	0.0045	0.0024
Durbin's h-statistic	0.627 <sup>§</sup>	-0.99 <sup>§</sup>	-2.61	not defined <sup>§§</sup>	-0.64 <sup>§</sup>

Numbers in parenthesis show t-values.

\*Significant at less than 0.05 probability level; \*\*significant at less than 0.10 probability level.

<sup>§</sup>No serial autocorrelation at 0.05 probability level.

<sup>§§</sup>Durbin's h-statistic could not be calculated due to negative square roots. However, Breusch-Godfrey Serial Correlation LM (Lagrange multiplier) test shows the absence of serial autocorrelation.

Table 6. Short-run and Long-run Elasticity Estimates for Individual Cereals

E with respect to	Barley		Maize		Sorghum		Teff		Wheat	
	short-run	long-run	short-run	long-run	short-run	long-run	short-run	long-run	short-run	long-run
Own-Price	0.16	0.38	0.16	0.36	0.11	0.25	0.24	0.55	0.23	0.40
RER	0.21	0.51	0.46	1.03	0.87	1.92	0.29	0.67	0.36	0.64
$\delta$		0.411		0.444		0.428		0.426		0.564

On the basis of these results both short-run and long-run elasticity estimates are summarised in Table (6) from which the following observations could be made: (i) Notwithstanding the non-significance of the own-price coefficients of barley, maize and sorghum, it could be generalised that both short-run and long-run price responses are fairly inelastic. Even for the 'superior' crops (teff and wheat) where price coefficients have been significant, price elasticities seem to be somewhat better but still low in absolute terms. A 10 percent increase in the price of teff and wheat would respectively lead to an expansion of cropped area by 2.4 and 2.3 percent in the short-run and by 5.5 and 4.0 percent in the long-run. (ii) Individual own-price elasticity estimates seem to be somewhat lower than aggregate cereals elasticities. However, sufficient care should be exercised in comparing these estimates due to discrepancies of the price data used between aggregate cereals and individual crops; and (iii) Responses with respect to the movement of real exchange rate are not only larger than own-price responses for all crops but also elastic for maize and sorghum in the long-run perhaps suggesting that food-aid has been competing more with crops which mainly make up the 'poors' consumption bundle than the 'superior' crops.

### 3.5. Result Comparison with Estimates from Other Similar Studies

Bond (1983) estimated output elasticities<sup>9</sup> for various crops in several countries of sub-Saharan Africa, and reported that price elasticities range from 0.1 to 0.5 in the short-run and from 0.6 to 1.8 in the long-run, and that aggregate supply elasticity in seven of the nine countries examined was not statistically significant. Comparable figures for the same set of crops in other LDCs would include: in India for the period 1951-64 short-run elasticities of food grains varied from -0.06 to 0.42; while for wheat (1950-67) it was 0.10 and 0.13 respectively in the short-run and long-run. Short-run and long-run elasticities for wheat in Kenya (1950-69) and Egypt (1953-72) were respectively 0.31 and 0.65 and, 0.91 and 0.44. Elasticities for barley in India (1960-69) ranged between 0.11 to 0.13 in the short-run and from 0.14 and 0.16 in the long-run. Short-run and long-run elasticities for maize in Kenya (1950-69), Egypt (1953-72), and Sudan (1951-65) were respectively 0.95 and 2.43, 0.04 and 0.09 and 1.09 and 1.09. Similar estimates for sorghum for India (1947-65) ranged between 0.02 to 0.20 in the short-run, while for Sudan (1951-65) it was estimated to be 0.31 (short-run) and 0.59 (long-run) (see Scandizzo and Bruce 1980, quoted in Sadoulet and de Janvry 1995:91).



A limited number of studies were conducted to study the supply response of Ethiopia's agriculture. The study by the World Bank in the mid-1980s reported that aggregate short-run and long-run elasticity for Ethiopia's agriculture were 0.24 and 0.558 respectively. The same study estimated, using Nerlovian dynamic model, responses for cereals as well as for some individual crops such as teff and barley. The short- and long-run elasticity estimates respectively were 0.147 and 0.264 for cereals, 0.027 and 0.080 for teff, and 0.219 and 0.318 for barley. Compared to the present study, these estimates are lower for aggregate cereals as well as for teff and higher for barley both in the short- and long-run. Given certain drawbacks<sup>10</sup> in the World Bank's study with respect to the number of years covered (only less than six years), the price data used, and the modelling approach employed (modelling output directly), such a divergence in estimates is to be expected. Fernando (1992 quoted in Zerihun 1995), used quarterly data on crops like teff, maize, sorghum, barley, and wheat, and regressed output only on producer prices and reported that Ethiopian peasants responded positively to price incentives. Zerihun (1995) studied, using Nerlovian partial adjustment model, the supply response of total agriculture as well as individual crops for 12 years covering 1981/2 to 1992/3. In addition to producer price, dummies for weather and policy change, time trend and lagged production level have entered into supply equation. Output index was directly taken as dependent variable. However, non-significance of the price coefficients shunned from undertaking elasticity computations. It was reported that, in a nutshell, parameter estimates like weather and previous period production level have the expected signs, and explain about 99 percent of the variation in agricultural production.

The present approach differs from the above studies in several ways. Methodologically, output response is disaggregated into its constituent elements. That is area response (which is mainly a function of expectations) was separated from yield response (which is largely a function of uncontrollable variables) whereby the former could be the basis upon which peasant responses to prices are to be estimated. Second, cross-price effects as well as input availability per unit of cost have been included in the set of explanatory variables. Third, the time covered for aggregate cereals is by far longer than the above studies.

#### **4. CONCLUSION**

This paper set out to estimate the supply responsiveness of peasant agriculture, particularly cereals production, to price levels. A time series data on area cultivated, yield per hectare as well as price levels and other relevant variables are used. Cultivated area was taken as a response variable while effects of own-price, cross-price, factor (input) availability and costs, and yield expectations are considered as explanatory variables. Supply responses are estimated at aggregate cereals level as well as for individual cereals. A log-linear dynamic response equation is specified in

which ad hoc specifications of supply response including partial adjustment and expectations formation are integrated.

Results suggest that, notwithstanding some limitations with respect to the quality of data used, both short-run and long-run peasant supply responses were inelastic to prices. This is also true when cereals are considered in their aggregates or treated individually; however comparison between aggregate and individual responses should be made with the necessary precaution since there are differences in the number of years considered as well as in the type of prices used to measure them. Responsiveness varies with crop types but not that important. Even where elasticity coefficients were significant (e.g., teff and wheat), it is low in absolute terms. On the other hand, relatively larger responses were observed with respect to the movement of real exchange rate. These responses are also elastic for maize and sorghum in the long-run, perhaps suggesting that food imports have been competing more with domestic cereal production, particularly those making up of the poor's consumption basket.

Such a result would perhaps hint that the primary motive behind peasant production of food crops might transcend into extra-market considerations which include food security, risk aversion, patterns of accessing and use of resources, etc., which would fairly be understood by a careful investigation of several aspects including the historical evolution and the characteristics of the whole farming and agrarian systems in which linking it with historical entitlement issues is a crucial step. Peasants might be *willing* but *unable* to increase supply, and questions as to why would peasants are willing to produce more of a particular crop, and how would they be able to do so should be the leading issues in addressing problems of food supply.

Estimation of peasant supply responsiveness hinges on certain assumptions regarding the way in which the characteristics and operation of markets in terms of providing sufficient space for flexibility and in shaping the behaviour of producers in making production, consumption and exchange decisions. Such assumptions are very strong in the light of depressed and imperfect land markets that prevail in many rural areas. Indefinite expansion of the frontier of cultivated area through the operation of land markets seems to be unrealisable. Reallocation might be feasible, but then one would be forced to stick to the assumption that peasant households intend to specialise production and purchase other crops that are necessary for household consumption - an assumption that is also rather hard to justify in view of the available evidence. Even though specialisation in some crops could be perceived, there is a maximum limit beyond which it cannot be pushed further due to the fact that households do allocate their land for various products (cereals, pulses, oilseeds, vegetables, pasture, etc.). The validity of this assumption much depends on how far it comes to terms with household's overriding objective functions. Numerous factors, which are beyond the reach of control of peasants, would render it impossible to



cultivate a particular crop in all plots as the latter vary in terms of soil properties, etc. Therefore, supply response has a lot to do with not only output prices but also with the quantity, quality, and the way of organisation of efforts (inputs, management, etc.) as well as the way uncontrollable factors influence these efforts and the outcomes. Often such considerations are considered as a black box in supply response analyses. While reiterating the inelastic nature of peasant supply response to prices, it has to be stressed that the importance of the non-price factors in determining supply behaviour cannot be overemphasised. At the same time, that supply response has been price inelastic does not mean that price is not an important factor at all. It is important to realise that both price and non-price factors should be seen as complementary rather than as substitutes in production organisation, particularly for peasant agriculture.

## NOTES

<sup>1</sup> If only one fixed coefficient activity were available for a given crop and if the only effective constraint on production of that crop was the amount of land available, then (until some of the constraints became effective) the amount of land devoted to that crop would be an excellent index of the planned production of the crop. In the agriculture of the real world, however, innumerable activities are available (or, alternatively) substantial substitution between factors is possible (see, Behrman 1968).

<sup>2</sup> In a formulation that represents a learning process, farmers adjust their expectations as a fraction  $\gamma$  of the magnitude of the mistake they made in the previous period, that is, of the difference between the actual price and expected price in  $t-1$  (see, Sadoulet and de Janvry 1995:87).

<sup>3</sup> This is a bilateral real exchange rate. Multilateral real exchange rate (considering all trading partners) would be much more appropriate to use. However, taking into consideration the fact that the USA has been historically a major trade partner on the one hand and due to the fact that birr is pegged to the US\$ on the other, the resulting bilateral real exchange rate would not significantly deviate from the multilateral one.

<sup>4</sup> Drought affects up to 80% of the total crop area in the tropics. Even minor droughts can have great impact, especially in the humid tropics since soils are often rather poor and have limited water storage capacity. In the sub-humid and semi-arid tropics serious droughts occur often (ranging from 1:2 to 1:5 years) (see, Beets 1990).

<sup>5</sup> See, for example, Behrman (1968), Cuddihy (1980 quoted in Sadoulet & de Janvry 1995).

<sup>6</sup> Previous yield level did not improve the regression estimates any better than that obtained from equation (10). For this reason the yield variable that entered the area response equation is expected yield.

<sup>7</sup> The partial adjustment coefficient,  $\delta = 0.4654$ .

<sup>8</sup> One of the most serious problems would be that there would be too small degrees of freedom to work with.

<sup>9</sup> Bond used output per capita as dependent variable. It is obvious that, unless population is uncorrelated with output, the coefficient obtained is based on estimate of the elasticity parameter. The fact that both output and population increased overtime meant that a positive correlation between them resulted in a downward bias in the elasticity estimate (see, Schiff 1997).

<sup>10</sup> The WB ascribed the weaknesses of its study to non-availability of time series data on producer prices (for individual crops) and aggregate price index (for overall agriculture). Individual crop elasticity estimates were approximated using price indices, obtained after Addis Ababa price index was deflated by Addis Ababa cereal price index. In the case of overall agriculture, producer price was proxied by Addis Ababa food price index. Observation of less than six years was used for analysis.



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# MICRO-FINANCE INSTITUTIONS IN ETHIOPIA: ISSUES OF PORTFOLIO RISK, INSTITUTIONAL ARRANGEMENTS AND GOVERNANCE\*

Gebrehiwot Ageba<sup>+</sup>

## ABSTRACT

*The paper looks at the portfolio risk and resource allocation implications of the region-based nature of MFIs; implications of some regulatory restrictions in place on the expansion and viability of MFIs, and on availability of small enterprise finance, and some governance issues. While there are good reasons for establishing regional MFIs, the regional nature limits their ability to reduce credit and liquidity risks by diversifying away idiosyncratic risks in connection with their loan portfolio and sources of finance. There is unduly high dependence on interest income; MFIs need to diversify to non-lending services. Although MFIs were hoped to fill the financing gap to micro and small borrowers, the regulatory limits on loan size and term to maturity and MFI's preference for small, short-term loans tend to pre-empt this. The system of governance in place in most MFIs is weak; individual commitment and dedication aside, neither shareholders nor board members nor management seem to have appropriate incentives. The composition (qualification mix, business experience, etc.) of MFI boards also needs to be reconsidered.*

## 1. INTRODUCTION

Poverty alleviation efforts involve enabling measures that increase the capacity of the active poor to engage in gainful activities (farming, petty trade, micro and small enterprises, etc.) so as to enhance their earnings and/or reduce variability of earnings (i.e. smoothing). Given their locational flexibility, low requirements of capital, training and technology, and labour intensive nature, micro and small enterprises (MSEs) are increasingly recognised as *effective instruments* not only of *poverty alleviation*, *broad-based development* and *job creation* (hence more equitable income distribution) but

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\* The opinions expressed here are those of the author and do not necessarily reflect the views of the Ethiopian Development Research Institute (EDRI). I am grateful for comments by anonymous referees. Any remaining errors are mine.

<sup>+</sup> Assistant Professor, Department of Economics, Addis Ababa University, and Ethiopian Development Research Institute (EDRI). The final version of this article was submitted in August 2000.

also of rapid economic growth and structural transformation. Some also view them as 'incubators of indigenous entrepreneurship'<sup>1</sup>

Equally recognised is that the poor are hindered from being engaged in such activities by, *inter alia*, finance constraints, from the formal financial sector in particular. So are micro and small business operators<sup>2</sup>. The main reasons cited in the literature are high transactions cost of small loans, information problems (hence *adverse selection* and *moral hazard* effects), lack of appropriate collateral, and the informal nature of their businesses. The problem is more pronounced in rural areas due to limited presence of formal lending institutions and the problem of covariant risk. The absence of formal financial institutions in rural Ethiopia also means that a substantial section of the population lacks access to alternative financial assets and financial services in general, and that mobilisation of rural savings is, at best, weak. Hence, the need for financial institutions that specialise in the provision of small loans (micro finance<sup>3</sup>) and mobilise small savings.

Cognisant of these, governments, NGOs as well as bilateral and multilateral donors have given high emphasis to Micro Finance Institutions (MFIs). (The Economist (November 1999) remarked: "Micro-finance is one of the trendiest areas of international development"<sup>4</sup>). Ethiopia is no exception. This is evidenced by the introduction of micro finance programs (e.g. at the Development Bank of Ethiopia (DBE)) and the proliferation of both NGO-based and government-supported MFIs in recent years<sup>5</sup>.

It was found necessary that micro finance services be business-like (rather than aid) and bring these activities "within Ethiopia's monetary and financial polices", hence the enactment of the Licensing and Supervision of Micro Financing Institutions Proclamation No. 40/1996 which requires MFIs to be established as share companies. The proclamation enhanced the status of MFIs as it allowed them to, among other things, legally accept deposits from the general public, draw and accept drafts, and manage funds for micro financing business (Article 3 (2a, b, i)). However, their engagement in such functions also makes it necessary that their activities be brought under the purview of the financial regulatory framework<sup>6</sup>. The emergence of a number of MFIs since then is encouraging. However, the width and depth of poverty in the country requires provision of financial services to the poor on *sustainable* basis. For an institution in a deposit taking-lending business such as MFIs to do this, it has to be financially viable as it cannot count on cheap subsidised funds.

The limited previous studies on MFIs focused on assessment of their impact, and/or loan recovery rates and their implication on sustainability. This paper looks at the viability issue by examining aspects of their current organisational structure, the legislation and National Bank of Ethiopia (NBE) directives that govern them and their governance. It is based on data obtained from MFIs, extensive discussion held with



their managers and examination of relevant documents. The rest of the paper is organised as follows. Section 2 gives brief history of MFIs. Section 3 examines the implication of the structure of MFIs on their portfolio structure and the potential risks therein. Section 4 deals with some regulatory restrictions in place and their implications on the expansion and viability of MFIs, and on availability of small enterprise finance. The issue of MFI governance is discussed in section 5. Section 6 concludes with a summary.

## 2. BRIEF MFI HISTORY

Microfinance evolved in the 1980s as a development approach that intends to benefit the (active) poor largely as response to the failure of targeted subsidised cheap credit programmes. In such programmes, benefits mainly went to those with connections and influence rather than the target beneficiaries; large loan losses accumulated, and frequent re-capitalisation were required to continue operating, suggesting the need for a new approach. The new approach considers microfinance as an integral part of the financial system, emphasises *sustainable institutions* operating on market principles to serve the poor (as opposed to *subsidised loans* to target populations), and recognises the importance of both credit and savings services (Ledgerwood 1999). On the other hand, a pilot project led by professor Yunus in the late 1970s had demonstrated that the poor can be bankable and that high loan recovery rate can be achieved under non-collateral lending, leading to the establishment of the Grameen Bank (in 1983). Grameen Bank became a highly publicised success story.

Governments, donors, NGOs, etc. found both the new approach to finance and MFIs appealing. This led to efforts to establish Grameen-Bank-type institutions, resulting in the proliferation of MFIs. Generally, MFIs focus on the active poor, give emphasis to women, provide group-based lending, and use compulsory savings, joint liability and social sanctions.

MFIs in Ethiopia are rather new. The early formal microfinance activity is the DBE Pilot Credit Scheme, initiated in 1990 under the Market Towns Development Project<sup>7</sup>, implemented in 1994. While many NGOs had credit schemes for years, NGO programmes that emphasises both *credit and savings* began in early 1990s. For example, the REST Credit Scheme of Tigray (RCST) (now Dedebeit Credit and Savings Institution, DECSI) was launched in 1993, Sidama Saving and Credit scheme (now Sidama Microfinance Institution) was established in 1994, Oromia Credit and Saving Scheme (now Oromia Credit and Saving S. C.) started in 1996. Currently, there are more than 18 MFIs, registered and operating in accordance with Proclamation No. 40/1996.

### 3. INSTITUTIONAL/ORGANISATIONAL ARRANGEMENT, PORTFOLIO STRUCTURE AND RISK

Financial viability (also called financial self-sufficiency) refers to the ability to cover both *direct* costs (i.e. financing costs, loan loss provisions, operating expenses) and *indirect* costs (i.e. adjusted cost of capital) with operating revenue (i.e. revenue from credit and savings operations and investment)<sup>8</sup>. Financial viability is essential for MFIs to expand outreach and provide services on sustainable basis. An important determinant of financial viability is *risk* as it affects both the cost and the revenue side. The major types of risks deposit taking-lending institutions such as MFIs face are credit risk, liquidity risk, reputational risk, operational risk, market risk, interest rate risk, and legal risk. In this paper, we look at aspects of portfolio structure, institutional arrangement and governance of MFIs that have implications on the first four types of risks and their likely consequences.

#### *Portfolio structure and risk:*

Some of the existing MFIs are region based<sup>9</sup> both in terms of their lending activities and sources of funds (while others depend on donor funds<sup>10</sup>); of the 18 registered MFIs that are currently operational, 7 are regional. There is also an almost complete dependence on the lending business, hence interest income is the only source of income.

For a deposit taking-lending institution such as MFIs financial viability is crucial for at least two reasons: (a) Outreach expansion and provision of services on sustained basis is possible only if they are viable. (b) Failure of such an institution has significant negative externalities (more on this latter).

Although regional MFIs are established for a good reason, this, in my view, has two negative consequences with implications on their financial viability. First, it segments the rural credit market in ways not based on *risk capacity* and *transaction cost* considerations. Second, it effectively limits the scope for diversification of their loan portfolios as well as sources of loanable funds, exposing them to risks that are *idiosyncratic* to their respective area/region<sup>11</sup>, hence are diversifiable. If, for instance, some natural disaster such as severe drought occurs in an area/region, (a) their loan portfolio could be wiped out due to widespread default (i.e. credit risk), and (b) source of loanable funds (i.e. savings to be mobilised in the area/region) could dry up. Such a squeeze from both directions impairs liquidity<sup>12</sup>, which in turn affects ability to obtain sufficient funds - through deposit taking or converting assets promptly - at reasonable cost, hence profitability. The risk is real, particularly for MFIs with large operations in rural areas and in drought-prone regions. Neither group/centre guarantee nor social sanction nor physical collateral will be of much help since such events simultaneously affect many groups and erode the value of asset collateral.



Failure involves costs, other than the loss of owners' capital and jobs, each of which has serious consequences. These include disruption of credit services; loss of deposits; erosion of public confidence, and loss of information 'capital' of the MFI.

Disruption of credit services of failing MFIs affects the activities of their clients since getting alternative lenders to switch to may not be easy (or, at least, will be costly<sup>13</sup>). The problem will be more pronounced if the failed MFI was the only one in the area/region (which is the case in many regions), hence an argument for having more than one MFI operate in a given area. Given the agro-climatic diversity of Ethiopia, this risk is diversifiable. Moreover, intangible assets such as the information capital the failed institution possessed about its clients, borrowers in particular, are lost as they are not easily transferable.

Bad reputation is particularly damaging for a deposit taking-lending institution since it erodes *confidence* of depositors, creditors and the general market place. The major sources of reputational risk are operational failures and failure to comply with relevant laws and regulations. Failure of a deposit-taking MFI affects depositors which, while probably negligible at the aggregate, may be huge locally as well as for individual depositors. Its depositors, likely to be mostly low-income individuals and micro-enterprises, lose hard-earned savings; savings which may constitute a significant proportion of their wealth. (That the potential losers are poor and less informed about the risks involved argue for introducing some protection against such losses such as deposit insurance, which can be justified on both economic and moral grounds). It also imposes negative externality effect on other MFIs, and deposit-taking institutions in general, by eroding confidence among the affected groups and the public at large.

These argue for (a) giving due emphasis to the issue of MFI financial viability early on through, *inter alia*, diversification; (b) proper regulation and supervision of MFIs; (c) putting good MFI governance in place; and (d) having some insurance mechanism to partially compensate *small* depositors in the event of failure.

Diversification of both sources of funds and loan portfolios is one important consideration. There are several (not necessarily mutually exclusive) potential alternatives: allowing MFIs operate cross-regionally; linking MFIs; and linking MFIs with banks.

Allowing MFIs to mobilise savings from and undertake lending activities in both rural and urban areas without restriction. This has the additional advantages of eliminating the monopoly and market segmentation problems, as well as inducing efficiency improvement in MFIs by introducing competition between them. One major limitation of this is that it will be costly for individual MFIs to establish a large network of branches covering various regions (hence not feasible even in the medium term). Moreover, it may be argued that, being the "first mover" in the rural areas of their



respective regions, MFIs have little or no prior information about the profitability of their "catchment areas"; they need to explore, hence incur exploration costs. Exposing them to competition too early (i.e. before they recoup these costs through abnormal profits) may make sustainability difficult, unless subsidies in the form of technical assistance and other institutional development support are provided. In the absence of support, granting them temporary exclusive rights (i.e. an opportunity to enjoy abnormal profits) as 'compensation' for the exploration costs may be socially beneficial (Hellman et al. 1996). But, one also needs to ensure that they have incentives to improve their efficiency. The length of the exclusive right can be used as an instrument to achieve this; it can be fixed in such a way that it induces efficient entry.

The other alternative is to link the MFIs so that funds flow from surplus to deficit MFIs and/or introduce an inter-MFI fund market<sup>18</sup> where those with surplus funds can lend to those facing shortage. Most of the MFIs are facing shortage of loanable funds despite the fact that they extend only short-term (with maximum maturity of 1-year) small loans, while some apparently have excess funds. There are at least three main reasons to link MFIs: to improve their liquidity, share information, and improve resource allocation efficiency and increase investment both at regional and national levels.

Not restricting the lending and savings mobilisation activities of the regional MFIs to their respective regions and creating links are important not only from the point of view of risk-spreading but also diversification of sources of funds and flow of funds. Such a flow allows (a) investment to be undertaken in areas/regions, which otherwise would have been postponed due to lack of sufficient funds within, and (b) better utilisation of resources which otherwise would have either remained idle or been invested in low quality local projects. Of course, in the event that a certain MFI is in trouble, due to *idiosyncratic* risk or otherwise, existing depositors will rush to withdraw their money while savers will be reluctant to hold deposits with it, especially if there are alternative deposit taking institutions. (To some extent other financial institutions may also suffer through contagion effects and erosion of confidence.)

The other reason for networking MFIs (and creating a link with banks) is to facilitate information exchange<sup>19</sup>. Unlike other transactions, credit transaction involves a promise by the borrower to pay in the future, hence there is *uncertainty* as to whether it will be delivered; it depends on borrower's ability and unwillingness to pay. Ability to pay is influenced by, among other things, the borrower's level of indebtedness (i.e. accumulated debt). Information on whether a loan applicant has unpaid past loans from other lenders is thus useful. More so when one considers the fact that, according to the 1960 Commercial Code of Ethiopia, repayment claims on new loans are "junior" relative to prior commitments. While secured creditors have *preferred* rights over unsecured ones, between secured creditors<sup>20</sup> rights "rank in accordance with the date

on which such rights have been registered" while mortgages registered on the same day rank concurrently (Negarit Gazeta, 1960, art. 192). Although MFIs do not normally secure their loans against borrowers' assets, they will still be affected because the availability of assets to be realised affects a borrower's general ability to pay. The old loan may have been secured against the borrower's assets: In fact, that MFIs do not secure their loans against assets and have it registered means that their claims will be *junior* even compared to *new* loans which are secured as the law gives preferred right to secured creditors.

One potential problem with this alternative, however, is that areas with relatively low profitable investment opportunities due to, say, poor infrastructure, may face credit starvation as the MFIs will now consider lending opportunities at a national level. This downside should thus be weighted against the benefits.

A third alternative is to link MFIs with formal banks. However, in this case one needs to ensure that MFIs do not simply become mechanisms for siphoning out rural savings for use in urban areas or for channelling bank funds to rural borrowers. One option is to require MFIs undertake active savings mobilisation and to plough back part of the funds so mobilised to rural areas/localities. The latter, to some extent, conflicts with the objective of allocating funds to their most efficient uses at a national level. On the other hand, not allowing MFIs to make their excess funds available for use by others will be costly both to them and to society since it results in *under-utilisation* or inefficient utilisation of funds and may encourage MFIs to lend to less creditworthy borrowers. So, one needs to strike a balance.

It should also be noted that the benefits of reduced asset portfolio and liquidity risks resulting from diversification of loan portfolios and source of funds across regions come at a price in that the *advantage* of being local (i.e. more information, and relatively easy *monitoring* and state *verification*) is lost.

Another area of concern is the concentration of MFIs on the lending business, having interest as their only income source. They need to diversify their income sources by widening the range of their services<sup>17</sup> to include, among others, transfers, safe-keeping, rural insurance, etc. Regarding agricultural (or rural) insurance, the insurance premium involved may be too high for most rural agents given the high natural risk and covariance of risks in rain-fed agriculture making expansion of coverage difficult. Small membership in turn limits the risk-spreading (sharing) benefits of insurance. Besides, it may be risky for regional MFIs to get into the agricultural (or rural) insurance business, in the drought-prone areas/regions in particular, due to limited scope for diversification. The occurrence of an insured-against-event on a large scale will squeeze their liquidity (rising non-performing loans and drying-up of deposits, and a rise in payout of insurance claims and decline in issue of new insurance policies resulting from reduced ability to pay premiums on the



part of those affected). There are also the issues of adverse selection, unless coverage is fully *comprehensive* (i.e. covers all rather than specific risks—e.g. all crops—and buying insurance is *compulsory*), and moral hazard.

The effect on depositors of failure of an MFI and that bail out is unlikely indicate the need for introducing some insurance mechanism. Partly because failure of an MFI is unlikely to have *systemic* effect and partly due to the moral hazard problems depositor-compensation and bail out create among depositors and MFIs respectively, bail out may be unlikely. In addition to the implications on government expenditure, it is difficult to justify the use of tax-payers' money in cases of failures unlikely to have *systemic* effects.

### *Institutional/organisational arrangements*

Many of the MFIs require Group/Centre<sup>18</sup> formation and prior savings with them, by potential borrowers (up to 2.5% of the amount to be borrowed), which is supposed to continue, even after borrowing, in parallel with the loan repayment, as a *precondition* for membership and access to credit. They disburse loans to group members either simultaneously or in turns. They also require regular *weekly* repayments of loans during group meetings.

### *Group/centre formation requirement*

The rationale behind the group (and centre) formation requirement is their *screening* role *ex-ante* and *monitoring, enforcement* and *guarantor* roles *ex-post*. Applicants with unsettled repayment obligations or perceived as dishonest or lacking the ability to make good use of funds, hence less likely to repay, will be screened out in the process of self-selection-based group/centre formation. The assumptions are first, since group members know each other well, they are likely to know if an applicant has prior commitments or is dishonest or lacks the ability to put borrowed funds into good use. Second, given that group members are jointly and severally liable for the repayment in the event of default and that the entire *group* will be excluded from future loans if it fails to repay, would-be members have an incentive to reveal the information. It provides a monitoring and enforcement mechanism as group/centre members put pressure on borrowing members to repay, and have incentives (in the form of repayment obligations of unpaid loans and loss of future access to the credit facility) to do so. In the event that a member defaults, the group/centre pays the loan on behalf of a defaulting member<sup>19</sup>. Termination (actual or treat) of credit in areas of high default (if made *public* and *credible*) may provide an enforcement mechanism by creating incentives for the local community in general to put pressure on borrowers to repay (assuming that continuation of the service is in the interest of the community).



However, the screening out of indebted potential borrowers may not work if most or all members of a group have prior commitments as they may agree not to reveal it, say, on reciprocity considerations (not an impossible outcome). More importantly, although making credit access *conditional* on settling previous loan obligations creates incentive to repay, automatic exclusion of those indebted may not be consistent with the poverty alleviation objective of MFIs - it may well be that they are indebted precisely because they are poor. Forming centres which requires several groups agreeing, among other things, to share risk (i.e. undertake to repay a loan by a defaulting group member(s)) is likely to create access problem. There is some evidence that the 'poorest of the poor' find it difficult to form a group (hence tend to get excluded) because others do not want them in their group. Theoretically, the poor can form a group among themselves (NB: MFIs do not accept a group composed of close relatives). Still, they may face a problem since others are reluctant to have such a group as a member (several groups are supposed to form a Centre). Moreover, given that failure to repay results in loss of future access to credit, these groups are the more likely victims due to their low ability to repay<sup>20</sup>. This defeats the noble (and, in view of the participatory approach to development, economically sensible) objective of reaching the poor, with implications on their capacity to participate in the development effort. Besides, excluding an entire group from future loans (irrespective of their record as individual borrowers) for the default of one member does not seem fully consistent with the long-term interest of MFIs. It erodes their potential borrower base by making more and more of individually good borrowers ineligible for credit (Von Pischke et al. 1996).

MFIs are expected to use a social sanction mechanism to enforce repayment (i.e. social collateral). The question then is, in the event that a borrower has two loans, a bank loan, which is secured (hence accorded priority by the law), and a loan from an MFI (backed by social collateral) but lacks resources to repay both, which loan would the lender give priority to. In other words, which of the two enforcement mechanisms (social sanction or legal) is likely to prevail? Even banks cannot always count on the priority of claims accorded to secured loans either as all their loans are not likely to be secured. It should, thus, be in the best interest of both MFIs and banks to exchange information regarding borrowers on timely basis (hence to create a mechanism to handle this). A lender cannot afford to make lending decisions under the assumption that it is the first lender.

### ***Prior saving requirement***

The main reason given for the prior saving requirement is that it helps to "inculcate the habit of saving and impose financial discipline" among their target populations. While the intention is good, it is not clear whether this is the best way to go about it. To some extent, it may also conflict with their stated objective of providing credit services to the poor, as it excludes those unable to meet this requirement (e.g. the poorest

section of society). Besides, some MFIs (e.g. SFPI) do not allow withdrawal from the compulsory savings until the group (or centre) has fully repaid its loans since they use the amount saved as partial collateral. Its collateral function thus provides another (unstated) rationale for requiring savings prior to borrowing (a fact not fully consistent with the common claim that MFIs provide non-collateral based loans). Moreover, such savings are essentially 'blocked accounts', hence involve significant loss of liquidity to the deposit holders – yet they are regarded as savings (rather than time) deposits for the purpose of interest rates. Besides, such prior saving requirements are most likely to exclude the 'bottom poor' who are most likely to fail to meet the requirement. Emphasis should be given to provision of savings services on terms that promote *voluntary* savings (e.g. open-access, individual accounts). DECSI and ACSI<sup>21</sup> are the exceptions in this respect; as of March 2000, they had mobilised *voluntary* savings of Br 76 million and 41.2 million from 202,000 and 151,942 deposit holders respectively. These amount to 52% and 61% of their respective outstanding loans (Wolday 2000).

#### ***Uniform repayment and timeliness of disbursement***

While the regular weekly repayment requirement may have advantages, its rigid application under all circumstances may be inappropriate since ability to pay may not be uniform overtime. For example, for borrowers earning a large proportion of their income from agriculture, repayment capacity typically varies across seasons, suggesting the need for flexibility.

There may be security arguments for extending loans to members of a group *in turns* in that making repayment performance of those borrowing first and maintenance of group discipline conditions for access by the remaining group members ensures good behaviour. The practice, however, negatively affects economic activity in at least two ways. First, that one has to wait until group members have repaid in full involves missed opportunity (i.e. one cannot exploit profitable opportunities as and when they arise). Second, lack of continual access to credit for working capital by a member affects existing activities. It should be noted that timeliness of loan disbursement is important.

## **4. REGULATORY ISSUES**

Currently, MFIs in Ethiopia are subjected to restrictions on the size and term of their loans to Birr 5,000 and 1 year respectively (Directive No. MFI/05/96). A single borrower limit is a standard regulatory measure to guard against imprudent behaviour by lending financial institutions in general to ensure some degree of diversification in their loan portfolio. It is meant to limit excessive risk taking through excessive exposure to limited number of borrowers (asset portfolio concentration). Micro finance schemes also use small loan size (together with frequent regular *compulsory*



meetings for savings and repayment<sup>22</sup>) as means to induce the better-off to exclude themselves (i.e. encourage *self-selection* by non-target individuals), who, otherwise, may compete for funds with the poor, especially if the interest rate is low. According to one survey, the average loan size ranged between Br 223 and 2650 (see, Wolday 2000).

There are at least three reasons to raise this limit. First, there exists a financing gap for micro and small enterprises as banks find them unattractive. Second, prudent lending requires maintaining good client base by retaining borrowers with good track record. Third, providing larger loans to good borrowers has singalling advantage.

The National Micro and Small Enterprises Development Strategy (which uses a capital-based definition of size<sup>23</sup> rather than employment size and use of automation (Ministry of Trade and Industry 1997) envisages MFIs to be the source of finance. However, under such loan size limits, MFIs are unlikely to fully cater for the financial requirements of Micro and Small Enterprises as the loan requirements of many small enterprises are likely to exceed this limit. Some of the MFIs are of the opinion that, given their poverty alleviation objective, the Br 5000 limit is reasonable as those requiring a larger amount are not 'poor', hence outside their target population<sup>24</sup>. They are reluctant to expand to Small Enterprise (SE) financing the reason being that, in trying to address the credit needs of SEs, they risk losing their focus on poverty reduction.

This view, however, fails to look at the issue from a *dynamic* perspective. The Br 5,000 limit is restrictive and rigid (constrains economic activity) for at least two reasons. First, since project costs generally increase over time, the number of business activities the 'poor' can potentially engage in with such low capital declines. Second, as the formerly 'poor' clients of MFIs grow, partly thanks to the credit services, their credit needs in terms of size and terms of loan changes (i.e. require loans of larger magnitude and longer maturity) but *still remain too small for banks to lend to*. In other words, a financing gap will be created with implications on growth; those requiring more than Br 5,000 will be regarded by the MFIs as 'graduates', but are not yet attractive to banks. If the objective of MFIs is not only poverty alleviation but also promotion of small enterprises development, then it is necessary that MFIs see their clients through until they grow to a size where they become of business interest to banks. One solution, some suggest, is to introduce a credit guarantee scheme to enable borrowers "graduating" from MFI loans get access to bank loans. However, care should be exercised since credit guarantee schemes are notoriously famous for breeding moral hazard among lenders, especially if coverage is full and free (moral hazard will be lower if the guarantee is only partial by ensuring that the lender shares the loss). Besides, the reluctance of banks to serve small borrowers emanates not only from their riskiness but also from the high transaction costs of



extending small loans (and mobilising small deposits). Credit guarantee schemes may reduce the first problem but not necessarily the second.

It makes good business and economic sense for MFIs to provide larger loans to clients that proved themselves reliable borrowers (i.e. with good repayment record). It allows MFIs to retain a client base of good quality. Maintaining good client base is consistent with their poverty alleviation effort since it contributes to their viability, thereby allowing them to provide credit services on sustainable basis. Not doing this leads to adverse selection in the sense that those who are good as borrowers and successful in their business 'graduate' from MFIs while others remain behind.

Removing the limit (or raising it to a level beyond which banks can take over) has an incentive element in that it *credibly signals* that good repayment performance is rewarded through access to larger future loans. This may reduce the probability of default.

The 1-year term limit (imposed by Article 4 of Directive No. MFI/05/96) on MFI loans ensures the absence of medium- and long-term credit market in the areas and for the borrowers supposed to be served by MFIs. For example, among the common purposes of borrowing by farmers are purchase of ox and cattle (for breeding). In this case, the 1-year term limit becomes too restrictive since, given the amount involved, it may be difficult to pay back fully in a year. In fact, according to information from some MFIs, borrowers are being forced to resell the ox bought with the loan (sometimes at prices lower than the amount borrowed<sup>25</sup>) in order to repay, which defeats the purpose (poverty alleviation) as there is no asset building. Worse, they may have to take other loans (from other sources) in order to repay previous loans (i.e. engage in *Ponzi finance*).

The absence of medium- and long-term micro-enterprise credit facilities and the Br 5000 limit together may also have other undesirable economic effects. (a) Borrowers in a given area are restricted to consider only business opportunities that are *small and have short gestation periods*<sup>26</sup>, resulting in engagement in similar activities which in turn leads to quick saturation of the market (with implications on their viability and repayment ability). Opportunities are already limited even without such restrictions. (b) Profitable opportunities with larger capital requirements and/or longer maturity remain unexploited.

While extending the 1-year limit may seem to be the obvious solution, it has other implications. First, there will be a jump in the loanable funds needs of the MFIs. Extending loans of longer maturity would mean that funds will be tied-up for a long time, thereby, aggravating their fund problems. More so when one considers the areas yet to receive credit services and the need for continued access to credit by those already covered<sup>27</sup>. This, however, is not an argument for not extending the term

of loans but rather for raising their lending capacity through aggressive savings mobilisation and other means.

Second, it increases credit risk. In fact, a number of MFIs, not surprisingly, find the 1-year limit acceptable. This is quite consistent with the preference for short maturity, which is typical of lenders, due to safety considerations; i.e. the shorter the term to maturity the less the risk. Third, it changes the maturity structure of their loan portfolio probably creating a *mismatch* between liabilities and assets. Of course, a mismatch *per se* will not be a problem so long as MFIs attract increasing deposits<sup>28</sup>.

It is desirable to relax the restrictive loan size (Br 5,000) and term to maturity (1-year) limits on MFI loans at least to clients with *proven repayment records* whose financing needs (both for investment and working capital) has increased due to growth of their businesses. It should also be recognised that with experience in lending, monitoring, collection of loans, etc. MFI's ability to handle larger and longer maturing loans increases. If this cannot be done, an alternative mechanism of closing the financing gap identified above should be sought. Promoting some of the MFIs to special/rural banks whose objective is not only poverty alleviation but also promotion of small enterprise development may be one option.

The legislation governing MFIs has no provisions regarding prudential liquidity requirements and access to last resort lending facility of the NBE. It is not clear whether not subjecting them to liquidity requirements from the start is deliberate (i.e. due to consideration of the costs involved). As deposit taking-lending institutions, MFIs need to keep liquid assets enough to meet normal withdrawal requirements of depositors. Like any deposit taking-lending institution, they are likely, from time to time, to face temporary short-term liquidity constraints, hence need to be provided access to the last resort credit facility of the central bank. Although the NBE has recently introduced a discount/rediscount window facility, that MFIs do not, currently, buy T-bills and government bonds means that they cannot access the facility unless some other arrangements are made.

## 5. GOVERNANCE

Governance, according to the World Bank (1994), refers to "the manner in which power is exercised in the management of a country's economic and social resources". Breakdown in corporate governance<sup>29</sup> is an important element of operational risk. Such breakdown can cause losses to the institution through fraud or *failure to perform* in a timely manner or cause its interest to be compromised by its dealers, or its staff conducting business in an unethical or risky manner. Issues like whether MFIs have appropriate governance structure including an effective independent board, whether board members and management have the appropriate mix of professional



qualification and relevant experience, and face appropriate incentives are thus important. It is often argued that those in the boards and management of MFIs have commitment. However, commitment, while undoubtedly important, cannot be a substitute for qualification or experience.

The 'individual' shareholders (mostly by virtue of being employees of the respective 'mother' NGOs<sup>30</sup>) are *nominal* shareholders. The legislative requirement that MFIs should be registered private share companies<sup>31</sup> (Proc. No. 40/1996) and the prohibition of unlicensed MFIs (Public Notice No. 2/1998) restricts NGOs from directly engaging themselves in microfinance activities. Our discussion with some of the NGO-based MFIs revealed that they had to establish MFIs using nominal shareholders while they provided the required capital. That the shareholders do not really *own* the shares, hence have *no personal stakes*, raises the issue of whether they have sufficient incentives to *monitor* both the board and management. The absence of remuneration to board members in some MFIs complicates the governance problem. To the extent that serving in a board is free contribution, even if shareholders have effective monitoring, there is not much that could be done to poorly performing board members other than changing them, which does not solve the basic *incentive* problem. While non-profit organisations such as charities may have non-remunerated boards, MFIs are businesses, not charities. It may also be difficult to hold them legally responsible for damage caused by their failure to properly discharge their duties. The Commercial Code of Ethiopia states that directors "shall be jointly and severally liable to the company for damage caused by failure to carry out their duties" (Art. 364(2)) and "when they fail to take all steps within their power to prevent or to mitigate acts prejudicial to the company which are within their knowledge" (Art. 364(4)). However, it is not clear whether the provisions apply to non-remunerated boards. One may hope that the desire on the part of board members and managers to protect their *reputation* (or commitment to establish one) to provide the incentive to perform. This may, however, work only if the market for managers and directors is competitive, *reputation* is important and information flows well, which is not the case in Ethiopia.

Although we have no detailed information on the composition of board members, there is some evidence that many are from parent NGOs or have NGO background. This raises the question whether a board dominated by people of *NGO mentality* is the appropriate body to set strategies and guidelines for the MFIs which are private share companies supposed to be run like businesses with focus on the poor. Although MFIs have *hybrid objectives* in that they combine *social mission* with *profitability* (and it is not clear to what extent the two are consistent), being profitable (hence sustainable) appears to be a necessary condition for the fulfilment of their social mission, hence the need to run them like businesses.



Some MFIs are fully or largely 'owned' by individual *nominal* shareholders, some of which are *insiders* to the MFIs. The Commercial Code of 1960 requires a share company to be formed by *public memorandum* which shall contain, among other things, "the manner of distributing profits" (Article 313). Accordingly, many MFIs have included, in their memorandum or articles of association, articles which prohibit distribution of dividends or "... irrevocably and unconditionally waiver[d] any claim to the shares and proceeds thereof or their right to transfer same to third parties' (discussion with MFIs). However, there is nothing that prevents them from removing these restrictions by exercising their right to amend the articles in accordance with the Commercial Code<sup>32</sup>, although it can be argued that the amounts involved are not large enough to create strong incentives to tempt many into such actions.

Table 1. Ownership Structure of MFIs (% of Equity)

MFI	% of Equity Owned			
	Regional gov't	Assoc/NGOs	Individuals	Total
ACSI S. C.	25	75	0	100
DECSI S. C.	25	75	0	100
Dromia Credit & Savings S. C.	25	75	0	100
Omo Microfinance Inst. S. C.	80	19.5	0.5	100
Specialised Financial & Promotional Inst. S. C.	0	80	20	100
Gasha Microfinancing Inst. S. C.	0	61.9	38.1	100
Wisdom Microfinancing Inst. S. C.	0	0	100	100
Sidama Microfinancing Inst. S. C.	0	79	30	100
Asser Microfinancing S. C.	0	97	3	100
Africa Village Financial Services S. C.	0	0	100	100
Buussa Gofa Micro-finance S. C.	0	19.6	80.4	100
Mekki Micro-finance Inst. S. C.	0	0	100	100
PEACE Micro-finance Institution	0	16	84	100
Addis Credit & Savings Institution	96.7	3.3	0	100
Mekki Micro-Financing Institution	0	91	9	100
Eshet Micro-finance Institution	0	20	80	100
Shashemene Idris Yelimat Agar Micro-finance	0	0	100	100
Bemishangul-Gumuz Micro-finance S. C.	20	50	20	100
WASSASA Micro-finance Institution S. C.	0	20	80	100

Source: Wolday (2000), and other unpublished documents.

## 6. CONCLUSION

MFIs are characterised by geographic concentration of their portfolio. For some, this is the result of limited financial capacity to diversify while, for the region-based MFIs the problem is more than that. That they are regional institutions puts an inherent limit on their ability to diversify geographically both their loan portfolio and source of funds, hence are exposed to idiosyncratic risks (risks which can be diversified away). There is also high concentration in terms of their source of income (almost exclusively

depending on interest income). These need to be resolved as they have negative implications on their financial viability, hence sustainability of their services.

Currently, MFIs exclusively focus on short-term loans. The expressed preference on the part of MFIs for short-term loans, and the implication of providing longer term loans on their loanable fund needs and risk means that removal of the 1-year term regulatory limit by itself may not bring material change in this respect. Currently, borrowers 'graduate' from the credit services of MFIs *prematurely* (i.e. before their businesses can attract bank financing) while sustainability (and, arguably, poverty alleviation) requires continued access to finance. It also makes good business and economic sense for MFIs to retain clients with proven record of good repayment by responding to their growing credit requirements until they become attractive to banks. Moreover, the National Micro and Small Enterprises Development Strategy envisages MFIs to serve the financial requirements of Small and Micro Enterprises. But, MFIs themselves are reluctant to move to small enterprise finance arguing that it diverts their focus on poverty alleviation. The strategy, thus, has to be revisited to address the financing gap. MFIs should recognise that retaining a good client base contributes to their financial viability, thereby allowing them to provide sustainable services.

The group/centre formation requirement to access MFI credit creates a built-in tendency to exclude 'the poorest' members of the society as they find it difficult to form a group/centre. There may also be *self-selection* by the poorest section, convinced that others are unlikely to accept them in their group/centre.

MFIs are supposed to be run like businesses. Yet, for most MFIs, the composition of the boards as well as management does not reflect this in terms of their background, qualification mix and business experience. Most have NGO background. Too much weight appears to have been given to commitment and dedication, which, while important, is no substitute for qualification or experience. In the case of MFIs 'owned' by *nominal* shareholders there is also the problem of lack of incentives to monitor the board and management.

## NOTES

<sup>1</sup> By providing opportunities for entrepreneurs to utilise their talents and skills in developing and running business. MSE are thought to be better suited to exploit niche markets, enhance economy-wide productivity, and bring about rapid technical change (see, IFC, 1998).

<sup>2</sup> See, Survey on Urban Informal Sector Activity Operators and Small Scale Manufacturing Industries (CSA May 1997), Ageba (1998).

<sup>3</sup> Microfinance refers to the process of lending small amounts of money, without collateral, to help poor people to become entrepreneurs.



<sup>4</sup> Modern technologies such as the Internet are being used to promote microfinance. According to the Economist (November 1999), the number of microfinance institutions (MFIs) worldwide has reached about 10,000.

<sup>5</sup> There are more than 18 MFIs that have registered and are operating in accordance with Proclamation No. 40/1996.

<sup>6</sup> Although many NGOs that had microfinance schemes complained that the proclamation contained aspects that are not consistent with their objectives as NGOs. For example, the legislation requires that an institution should register as a *private share company* and be wholly owned by Ethiopians. Some feel that the establishment of an MFI as an independent private share company that operates on profitability criteria together with the restriction on foreign ownership, makes it difficult for foreign NGOs to continue their credit services to their target population or to support the MFIs themselves.

<sup>7</sup> The Market Towns Development Project is an IDA-financed national level project aiming to develop infrastructure in 16 towns identified as market and service centres and to alleviate poverty through job creation and income enhancement.

<sup>8</sup> The adjusted cost of capital is the cost of *maintaining* the value of the equity relative to inflation (market rate of equity) and the cost of *accessing commercial rate liabilities* rather than concessional loans. (Ledgerwood 1999).

<sup>9</sup> Some of them have registered as national MFIs and are trying to expand by opening branches (e.g. the Specialised Financial and Promotional Institution S.C.).

<sup>10</sup> Most of the MFIs that have their origins in the credit activities of foreign NGOs are heavily dependent on funds donated from their "mother" NGOs rather than deposit mobilisation. This constrains expansion of their outreach since donors are reluctant to continue injecting money into them partly due to the private company status of MFIs. Experience shows that credit schemes that heavily depend on external funds (rather than savings mobilisation of domestic savings) are unlikely to succeed.

<sup>11</sup> An anonymous referee pointed out that this may not be a serious problem since the regions are very large, some of them bigger than some African countries. What matters, however, is not the *physical size* of a region *per se* but the opportunity for diversification (i.e. diversity of potential activities, geo-climatic condition, etc.). There is no necessary correlation between the two. Besides, the small countries cited are constrained by national, as opposed to regional, boundaries.

<sup>12</sup> Liquidity risk arises from inability to meet liability obligations or additional loan requests.

<sup>13</sup> Unlike in the goods market, in the credit market switching is difficult or costly both to the lender and the borrower because of the information-intensive nature of the market. In this market sellers (i.e. lenders) consider not only the price/interest rate the borrower is willing to pay but also his/her quality (i.e. the probability that s/he will repay).

<sup>14</sup> The inter-bank money market is also a potential source of loanable funds for MFIs for their short-term lending in particular. Still another source is foreign borrowing. While this may allow rapid expansion of outreach of lending services, it has several potential problems: it is unreliable, may create a disincentive on MFIs to mobilise domestic savings (more so if it is a grant or involves low interest cost), and involves foreign exchange risk.

<sup>15</sup> The MFIs themselves have emphasised experience sharing and other rationale on the basis of which the Association of Ethiopian Micro-finance Institutions (AEMFI) was established.

<sup>16</sup> All unsecured creditors are required by law to enter the universality of creditors to share the remaining proceeds after secured creditors *fully* recovered their claims.

<sup>17</sup> ACSI and DECSI have made a good start in this respect in that they are acting as agents for the Social Security Authority (SSA) in paying pension benefits to pensioners.

<sup>18</sup> A Centre is formed by a number of Groups.

<sup>19</sup> Although MFIs seem to draw much comfort from the presence of 'group guarantee', it should be noted that *group guarantee* does not help in the event that a risk affecting the group/centre as a whole occurs which is very likely, for example, in rural areas.

<sup>20</sup> A group composed of *homogenous* members has the advantage of reduced information problem (due to easier access to the information and interpreting its implications for persons who are similar), facilitating screening and peer monitoring. But, it also involves a disadvantage in that the similarity in preferences and



*covariance* in income flows (sources and levels) of members, hence the risk of delinquency/default by the group as a whole, tends to be high.

<sup>21</sup> DECSI = Dedebeit Credit and Savings Institution; ACSI = Amhara Credit and Savings Institution.

<sup>22</sup> Repayment is made in public in the presence of the Group members with consequent *loss of face* if repayment is not made – the assumption is that the *humiliation such disclosure of wrong doing brings will restrain default*. As Goodhart (1997) noted, rogues (scamp, cheat, outlaw) may not be humiliated by disclosure. However, in the case of group lending, it can be argued that *rogues must have been excluded* in the self-selection-based Group/Centre formation process.

<sup>23</sup> The strategy defines Micro Enterprises as those with paid-up capital of up to Birr 20,000, and Small Enterprises as those with paid-up capital of Birr 20,000 - 500,000.

<sup>24</sup> In fact, most of them do not (and do not want to) give loans in excess of Birr 2000 (source: author's discussion with MFI managers).

<sup>25</sup> In determining whether a borrower forced into such a situation actually incurs a loss, one should take into account not only the selling price relative to the purchase price of the ox (or asset in general) bought with the borrowed funds but also the *service it rendered* before the sale.

<sup>26</sup> The short-term nature of MFI finance creates a bias towards activities with short gestation period, typically trade, and against productive activities.

<sup>27</sup> An empirical study in Tigray (Fiona Meehan 1999) has found that while DECSI's credit had significant positive impact on income, "the positive impact ... was dependent on continued access to credit, on a regular basis, and where this was interrupted, the improvement in household income rapidly decreased" (pp. 13-14). This has implications on the loanable fund needs of DECSI.

<sup>28</sup> It should be noted that one of the key economic functions of financial intermediaries is maturity transformation. They accept deposits from a large number of savers on short- to medium-term maturity basis and provide loans on long-term basis, without becoming illiquid since, under normal circumstances, the probability that all depositors would want to withdraw their deposits at the same time is low.

<sup>29</sup> The other elements are breakdown in internal control, failure of information technology systems, events like fires or other disasters.

<sup>30</sup> Nominal shareholders who are employees of the respective mother NGOs 'own' up to 97.5% of the shares.

<sup>31</sup> A share company, according to The Commercial Code of 1960, is "a company whose capital is fixed in advance and divided into shares and whose liabilities are met only by the assets of the company" and where members are liable only to the extent of their share holding (Article 304). A share company could be formed either between founders or by public subscription. Almost all of the MFIs have been formed between founders which are regional governments and NGOs (or individuals) (see, Table 1).

<sup>32</sup> The Code (Articles 423, 425, and 462) stipulates that shareholders can amend their memorandum or articles of association in an *extraordinary* meeting with *two-thirds* majority attendance (excluding abstentions and blank ballots) and with, *at least, half* of the shareholders having voting rights represented ( $1/3^{\text{rd}}$  and  $1/4^{\text{th}}$  in case of a second and third extraordinary meetings).

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# LAND REFORM: REVISITING THE PUBLIC VERSUS PRIVATE OWNERSHIP CONTROVERSY

Haile Kebret\*

## ABSTRACT

*The objective of this paper is to examine the impact of land reform that was carried out in the mid-1970. In the context of the controversy between public and private ownership of land, this study evaluates the impact of the land reform on economic performance in general and agricultural output in particular. This evaluation is made using a medium-size macro-econometric model to trace the feedback effects of this policy on other sectors of the economy. But the study limits itself to the particular period in which the reform was implemented. The results of this study suggest (1) agricultural output would not have been higher if land distribution were not undertaken; but the margin of improvement due to land distribution is minimal; (2) the results of this study are consistent with most of the studies undertaken in that they all seem to suggest an improvement in agricultural performance, at least in the early years of the land reform.*

## 1. INTRODUCTION

One of the central policy challenges facing economies like Ethiopia is the issue of land ownership. This importance emanates from the fact that economic growth, employment and basic survival of the majority of the population depend (at least in the short- to medium-term) on the productive efficiency of the agricultural sector. Unfortunately, there seems to be no fact-based consensus regarding which type of land ownership enhances productive efficiency with a minimum sacrifice of equity.

To implement its "socialist" policies, the then new military government introduced many fundamental economic policy changes after overthrowing the imperial regime in 1974. Among the fundamental policy changes was the redistribution of rural land and nationalisation of manufacturing industries. These policy changes were a significant departure from the land ownership system and the prevalence of private manufacturing industries that had existed until that time. In essence, the land reform changed both land

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\* Visiting Professor, Department of Economics, Addis Ababa University. The final version of this article was submitted in June 2000.



ownership and the administration of its distribution. The objective of this study is, therefore, to shed some light on the available evidence regarding the relationship between type of land ownership and agricultural output. More specifically, it will examine the impact of the Ethiopian land reform on the performance of the agricultural sector. That is, it will attempt to answer the question: what would have the performance of the economy been if these policy changes were not undertaken?

To examine the above policy issue the approach that will be followed is what is usually referred to as counter-factual (or causal) analysis. This has been one of the widely used methods in macroeconomic policy exercise (see Challen and Hagger 1983, p. 194). One of the essential feature of this approach is to determine how different the performance of the economy would have been (from what is actually observed) if certain policy changes were or not made in some past period. Given that the control simulation values reasonably mimic the historical values of the target macro variables, then, the deviations of policy induced simulation values (from the control simulation values) represent the effect of the changes in policy.

In order to examine the effects of the structural shifts that were undertaken in the mid-1970s, therefore, the basic control simulation values will be compared with the shocked-run simulation results obtained using the coefficients of the behavioural equations for total output, agricultural output and manufacturing output prior to the change in policy. That is, while the control-run simulation values represent the actual behaviour of the economy the shocked-run simulation values that are based on the coefficients prior to the policy change represent the effects of the policy change. The difference between the two is the deviation attributed to the policy changes.

The remainder of the paper is organised as follows. The second section will briefly discuss the basic socio-economic indicators in Ethiopia relative to similar economies, and highlight the state of the agricultural sector both before and after the land reform. It will also briefly review the literature. The third section describes the model and estimation results. Policy issues are addressed in the fourth section using simulation exercises. After reviewing the policies undertaken in the mid-1970s as a background, this section will examine the impact of changes in land ownership on the performance of the agricultural sector.

## **2. THE AGRICULTURAL SECTOR**

### **2.1. Role, Structure and Constraints**

Due to its dominant share in GDP, the performance of the agriculture sector significantly influences the performance of other sectors of the economy. For instance, agriculture accounts for more than 80 per cent of employment and 90 per cent of exports. Ethiopia exports exclusively primary products such as coffee, hides and skins, oil seeds and oil

nuts. These exports are the main sources of foreign exchange, and hence capacity to import. Manufacturing output, which depends on imported intermediate inputs, is, therefore, indirectly influenced by the performance of the agricultural sector. Similarly, other macro aggregates, level of employment, rate of inflation, for instance, are also directly influenced by the performance of the agricultural sector.

The performance of the agricultural sector, and hence GDP, has been unsatisfactory, at least in meeting food requirements. And probably due to low agricultural productivity and the population explosion, food availability has been on the decline. For instance, in 1992, the food production index decreased to 86 per cent compared to 1979-1981. This index is lower than both the averages for Sub-Saharan Africa and all LDCs. Further, Ethiopian food imports increased to 15 per cent of total imports in 1992, compared to only 9 per cent in 1970. The respective 1992 figures for Sub-Saharan Africa and all LDCs were 11 per cent and 9 per cent. The relevant question is, which factor contributes more to food insecurity? And more specifically, does institutional arrangements (ownership types) in the rural area matter?

Clearly, the existing food insecurity does not seem to be due to land scarcity. Population density in Ethiopia is about twice that of the Sub-Saharan Africa average, but only about half of the average for all LDCs. Further, since arable land (as percentage of land area) in Ethiopia is twice that of the Sub-Saharan Africa average, a shortage of arable land cannot explain the poor agricultural performance in Ethiopia. The explanation probably lies in inappropriate agrarian policy, and low rates of resource utilisation, rather than land scarcity. According to some estimates,<sup>1</sup> about 65 per cent (or 78.9 million hectares) of Ethiopian territory is considered either fertile, or sufficiently fertile and therefore suitable for agriculture. And with an average population density of 41.2 persons per square kilometre, land scarcity is not a problem in Ethiopia, as is the case, say, in South and South-East Asian countries. In fact, the size of potential agricultural land that is actually utilised is very small. According to Galperin (1981, pp. 169-170), "[i]n the early 1970s, the area of cultivated land constituted about 10.5 million hectares or 9.3 per cent of the country's territory; ...and in the late 1970s, this area had decreased to approximately 8.7 million hectares, 3.2 million hectares constituting long fallows". Similarly, Griffin (1992, p. 52), on the basis of a relatively recent survey, concluded that, without even introducing any irrigation system or any other technological change, the stock of cultivated land in Ethiopia could be increased by an additional 18 to 22 per cent.

Another low resource utilisation example is the absence of developed irrigation systems in Ethiopia. Only 1.2 per cent of the total arable land is irrigated in Ethiopia, compared to 3.4 per cent in Sub-Saharan Africa and about 23.8 per cent in all LDCs. Being rain-fed, therefore, agricultural output in Ethiopia is vulnerable to rainfall fluctuations, as witnessed by the repeated occurrence of drought over the years. To focus on the issue at hand, in addition to low resource utilisation, backward farming techniques, and inappropriate agrarian policy, the land tenure system is also believed to have contributed



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to the poor performance of the agricultural sector. To highlight this point, a brief review of the land ownership structure before and after the 1975 major land reform is in order. Due to regional variations and intricate land ownership and land use relationships within a region, the Ethiopian land ownership system that had existed prior to the 1974 revolution defies any clear classification<sup>2</sup>. Ignoring the intricacies within each tenure system, Rahmato (1984, p. 23) identifies two major land ownership patterns: usufructuary tenures and private tenures. Usufructuary tenure system includes all the land under communal (kinship based), church and state ownership. And the private tenure refers to all the land owned by (originally taken away from peasants and then given to) powerful officials and loyal servants of the imperial government. The term "private" here is misleading because in essence what is termed private land is distributed by the state to individual owners.

No accurate data is available on the proportion of cropland under the respective tenure systems. And what is more, the extent of tenancy which was the main argument for abolishing the land tenure system that had existed prior to 1975 is not well documented at a national level. The sketchy evidence available, based on official survey carried out just before the 1975 land reform, is reported in Table 1. According to this survey, about 33 per cent of the cropland and 36 of total landholdings were in the hands of tenant cultivators. Rahmato (1984, p. 22) cites other estimates that put tenant holdings ranging from 42 per cent to well above 50 per cent of total rural landholdings. Whatever the share of tenant holdings was under the pre-1975 land tenure system, it was not conducive for improving agricultural output. Rahmato (1984, p. 25) noted, "[f]or all tenants, the major factor for their dependency, and the chief obstacle to improved production was the lack of security of tenure. Each share-cropper was never certain how long he would cultivate his holding, or when he would be told to give it up."

Table 1. Pre-1975 Distribution of Holdings by Tenure and Area of Control- %

(PRIVATE )Tenure type	% of Total Holding	% of Total Cropland Area
Communal	11	6
Owned and rented	15	24
Tenant Operated	36	33
Owner Operated	38	37

Source: Rahmato (1984, p. 23), Table 2.

The 1974 revolution fundamentally changed both the landholding system and the land/tenant relationship. After overthrowing the monarchy in 1974, the then military government nationalised rural land in 1975. The No. 31/1975 land reform provision, known as the "Public Ownership of Rural Land Proclamation", declared, among other things, that rural land is a property of the state (Article 3) and prohibited both private ownership of rural land and the transfer of its ownership in any form (sale, exchange, lease, etc.) and for any reason (Article 4). The declaration also prohibited hiring of

agricultural labour by private individuals (Article 5), thus ending not only tenancy but also whatever insignificant "wage" labour that might have existed.

The government also established Peasant Associations to administer land distribution among local farmers who were given access to use, but not to own, the land. Each Peasant Association was organised as part of the central government bureaucracy whose function extended to implementing government policies related to land over an area of 800 hectares and about 2400 families. According to Mulat (1990, p. 57): "[b]y the end of 1985 there were a total of 20,157 Peasant Associations with a membership of about 6 million households covering about two-thirds of the country's rural population". The nationalisation of rural land and the transfer of its administration to local Peasant Associations contrasted with the private ownership of land (mainly landlord/tenant relationships in the south and family ownership in the northern half of the country) that had existed prior to 1974. When the land reform was implemented, about 94 per cent of agricultural output was produced using primitive techniques while the mechanised sector produced the remaining 6 per cent. The few mechanised large agricultural estates producing cash crops were not distributed to individual farmers, but instead put under direct state control when land was nationalised.

In essence, the above measures gave each farmer access right (short of ownership) to a piece of land (up to a maximum of 10 hectares for each self-cultivating rural household). Hence, this freed many rural farmers from being a tenant of absentee landlords (who had been entitled to extract from one-third to one-half of tenant output), at least in the southern part of the country. But the reform also meant frequent redistribution of land among respective inhabitants as the size of the population increased. Consequently, lack of security in land holdings due to the periodic redistributions and the decrease in the size of allocated land as population increased led to over-utilisation of the cultivable land, with less concern for its appropriate development. That is, there was no incentive for farmers to pay attention to crop-rotation, planting or protecting available trees to safeguard against soil erosion, and other related efforts that affect the future productivity of the land. It is clear, therefore, despite their contrasting structures, both land tenure systems have failed to address the insecurity in landholding.

In addition to nationalisation of rural lands, the government also established the Agricultural Marketing Corporation (AMC) with a mandate to supervise the production and sale of agricultural output. Through this corporation, as Griffin (1992, p. 66) observed: "[t]he government has attempted to control the prices of major agricultural products, particularly food grains, through direct intervention. In addition, it has a monopoly of the distribution of fertiliser and thus is able to control its price directly."

As is clear from Table 2, the price differential between AMC farm-gate and selling prices is substantial. For instance, the AMC average selling price for Teff, Wheat, and Barley



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was higher by about 50, 64.4 and 66.6 per cent, respectively, than the AMC farm-gate prices.

Even if one attempts to justify government intervention on equity grounds and/or price stabilisation, therefore, such a huge gap between what farmers earned and what government charged for their produce represents a substantial "hidden" tax. This is particularly true compared to what farmers could earn selling in free market prices. The gaps between free market and farm-gate prices averaged 162 per cent, 155 per cent, and 256 per cent for Teff, wheat and barley, respectively.

It should be noted that, despite some arguments about the government's political motives in undertaking the land reform and its implementation, the nationalisation of rural lands was well received especially by the majority of peasants and intellectuals who had been demanding for such a change for a long time. As the government started to strengthen its control over the production and the marketing of agricultural output, however, even the peasants who were supposed to be the main beneficiaries of the reform, started to lose their enthusiasm. As Rahmato (1984, pp. 66-67) noted: "[t]he price system for agriculture has not been favourably received by a large number of peasants. Peasants felt particularly resentful of the unfavourable price structure, and for comparison they pointed to a long list of goods whose prices had gone up sharply within the last five years. ... [W]hether or not peasants were accurate in their view that prices of many manufactures and other items at the village market have risen sharply is not the main point: the main point is the growing conviction among peasants that they are not offered commensurate prices for their products."

Table 2. Wholesale Prices of Grain (Birr per Quintal), 1989

{PRIVATE }Grain Type	AMC Farm-gate price	AMC Selling Price	Free Market average price
<b>Teff</b>			
white	48.0	69.55	124.83
mixed	41.0	61.90	112.00
red	37.0	57.55	93.67
<b>Wheat</b>			
white	36.0	57.55	110.6
mixed	32.0	53.15	74.00
black	31.0	52.10	67.83
<b>Barley</b>			
white	30.0	49.90	115.00
mixed	28.0	47.70	63.50
<b>Maize</b>	22.0	44.45	52.00
<b>Chicken peas</b>	30.0	49.90	135.67
<b>Lentils</b>	45.0	66.30	186.50

Source: Abraham (1994), Table 3, p. 209.

The initial enthusiasm generated by the land reform seems, therefore, to have lost its momentum since it was accompanied by inefficiencies in the distribution of inputs and unfavourable pricing structures for both agricultural inputs and outputs.

Other possible factors that might have contributed to poor agricultural performance include: Outdated farming techniques, lack of imported agricultural inputs, ecological degradation of potential arable land, and high underemployment due to relative increase in population. Land cultivation techniques have not significantly changed for decades (maybe centuries) in Ethiopia.

Traditional farming methods which use rudimentary implements (a wooden plough, sickle, etc.) are still the dominant farming methods. Usage of fertiliser, soil conservation methods and other modern agricultural techniques are at their embryonic stage. For instance, according to Mengisteab (1990, p. 106), in 1983-1984 the proportion of farmers using fertilisers, improved seeds and pesticides were 14 per cent, 2 per cent and 0.5 per cent, respectively. Similarly, during the same period, the proportion of fertilised area and new seed area were 12.3 per cent and 1.3 per cent of the total cultivated area, respectively. The situation improved in recent years, but is still low even by African standards. In 1993, for instance, fertiliser consumption per hectare in Ethiopia averaged about 2.3 kilograms compared to 4.6 kilograms for all-Africa.

Table 3 CROP YIELD BY TYPE OF FARMING

{PRIVATE }Ownership & Crop Type	1973/74	1979/80	1981/82	1983/84	1984/85	1985/86
<b>PEASANT:</b>						
Teff	8.0	9.5	8.2	8.3	6.8	7.5
Barley	10.6	11.7	12.0	10.9	10.7	10.0
Wheat	10.1	11.1	10.1	10.5	10.3	9.8
Maize	43.8	17.3	18.2	18.7	11.4	11.4
Sorghum	19.0	16.2	14.7	13.3	6.1	11.0
Pulse	-	12.1	10.6	9.5	6.9	7.1
<b>CO-OPERATIVE:</b>						
Teff	N/A	7.2	5.0	7.2	5.4	5.8
Barley	N/A	8.3	9.1	1.9	7.7	7.8
Wheat	N/A	7.4	8.2	8.5	6.4	9.3
Maize	N/A	20.2	7.7	13.4	9.6	8.9
Sorghum	N/A	3.8	6.5	11.4	6.3	11.0
Pulse	N/A	5.6	4.6	6.1	3.4	5.2
<b>STATE:</b>						
Teff	N/A	5.8	5.6	4.2	2.8	5.6
Barley	N/A	13.5	18.7	12.1	12.8	16.4
Wheat	N/A	11.9	13.1	13.3	14.8	16.3
Maize	N/A	23.3	27.8	21.3	24.2	24.2
Sorghum	N/A	11.9	14.1	9.1	9.9	5.1
Pulse	N/A	4.6	3.4	3.5	3.6	3.0

Source: Abraham (1994), Table 4, P. 200; and Mengisteab (1990), Table 4.4, P. 78.

Mean yield of unfertilised hectare.

N/A = not applicable.



How much of the decline in per capita food consumption is due to an increase in population, shortage in rainfall or decline in output due to the above policies is hard to discern. Whatever the contribution of each of these factors, Table 3 indicates a declining trend of agricultural output especially beginning the early 1980s. Crop yield (measured as quintals per hectare), was about the same (except for maize) in 1973/74 and in 1979/80, in peasant farming. Beginning the early 1980s, however, yield for most crops declined for all ownership types. For instance, Teff (the staple cereal), probably the most labour intensive among the crop types, declined over the indicated period. And the decline was more significant in state-operated farms than the other two ownership types. Peasant farming consistently outperformed both the co-operative and state-operated farming in terms of the productivity of teff. Given the government's monopoly over the distribution of fertilisers and pesticides, the low productivity in state operated cultivated land suggests bureaucratic inefficiencies in managing the state farms. The overall decline in agricultural output beginning in the early 1980s also coincided with implementation of farm co-operatives.

In summary, it seems, the traditional farming techniques, combined with unfavourable land tenure system prior to 1975, inappropriate agrarian policies (pricing, farm input supply, etc.) since 1975, and sporadic drought occurrences have kept the performance of the agricultural sector below its potential.

## **2.2. Land Reform Policy Issues: An Overview**

The land reform that was carried out in 1974 was radical in the sense that it fundamentally changed both the ownership of rural land and the way it is administered. In short, private ownership of land and tenancy (rent payment to landlords and sharecropping) were abolished without any compensation to previous owners of the land. In essence, the proclamation ended a feudal order and the corresponding land tenure system that had existed for decades, and in some regions of Ethiopia for centuries.

The justifications given for undertaking the land reform were both political and economic. In declaring the land reform (Proclamation No. 31/1975), the government stated that, "[i]n countries like Ethiopia where the economy is agricultural, a person's right, honour, status and standard of living is determined by his relation to the land". It is, therefore, essential, the declaration continued, " ...to fundamentally [sic] alter the existing agrarian relations so that the Ethiopian peasant masses ...be liberated from age-old feudal oppression." Whatever the conviction of the government in liberating the peasants from the feudal land tenure system, its political motive is unmistakable. Prior to 1974, the vocal left-wing movement (which included sporadic peasant uprisings, constant student protests, the labour movement and the teachers union, among others) had been demanding a land reform, "land to the tiller", and other political changes for years. In fact, according to Mengisteab (1990, p.13), "[i]n the 1970s, most of the literature on Ethiopia's agriculture emphatically claimed a causal relationship between the land tenure

pattern that existed prior to 1975 and the stagnation of the country's food production". The initiative to reform the land tenure system was, therefore, in tune with the demands of the political movements in urban areas and the landless peasants in the rural areas. Consequently, the land reform declaration was well received by opposition groups and especially by the peasants in the southern part of the country, where tenancy was relatively widespread. By championing the very issue that was at the centre of the political opposition, therefore, the government managed to put its political opponents on the defensive. Despite their scepticism on the motives of the government and its commitment to implement it effectively, they had no choice but to support the declaration of land reform in principle (Mengisteab, 1990, p. 87).

Whether the government shared the conviction that land reform was necessary to improve the economic performance of the agricultural sector (as its declaration states), or it was drawn into it to pacify its political critics and potential peasant uprising (as its critics claim) is hard to determine.<sup>3</sup> Whatever other political objectives it might have had, the government's officially stated objectives for undertaking the land reform were, Mengisteab (1990, p. 93), "[t]o free the tenants from exploitation by the landowners, to provide land to the landless in order to generate employment, to eliminate poverty and extreme inequality and also to modify the country's position in the international division of labour". These objectives are not particularly unique to the land reform in Ethiopia. In fact most land reform initiatives include most or all of the above objectives, although the degree of reform necessary to achieve these goals may vary (from simply reforming tenant/landlord relationships to abolishing private ownership of land). As El-Ghonemy (1990, p. 95) correctly put it, "[p]ublicly declared aims (of land reform) are usually in stock phrases such as the abolition of feudalism, exploitation, injustice, absentee landlordism, under-utilisation of land, and of the arbitrary market power of landlords, water lords and money lenders". The main variations in land reform initiatives probably lie in the degree of their comprehensiveness, and the ideological tenet under which they are carried out. The Ethiopian land reform is among the most comprehensive and it was carried out, at least in later years, in the context of what the government claims was a socialist development path.

The debate whether land reform is an appropriate tool to achieve all or some of the proclaimed objectives, and, if so, under what conditions, has been an unsettled issue (Mengisteab 1990, P. 27). Those in favour of land reform argue that land reform is essential for economic efficiency (Berry and Cline 1979), employment generation, income redistribution, economic growth, and hence alleviation of poverty (Dorner 1971, 1992, and Griffin 1981, 1992). The efficiency argument in favour of land reform runs as follows (Berry and Cline 1979): Given that there are no increasing returns to scale in LDC agriculture, large size farms under-utilise land, while small landholdings under-utilise labour. Therefore, land reform which remedies such imbalances will increase efficiency in the agricultural sector. Given the weak industrial sector in LDCs, the agricultural sector accounts for a substantial share of employment. Because large farms



tend to be more capital-intensive than small farms, land distribution is likely to generate more employment. Similarly, land distribution in favour of the landless and tenant farmers will lead to more equitable distribution of rural land, and hence alleviate rural poverty.

Opponents of land reform concede that land reform might be a useful instrument to redistribute income in the short run, but it constrains economic growth. Therefore, they argue, the best way to achieve income distribution is by fostering economic growth in the long run. This conclusion is predicated on two assumptions: First, large-scale farming is more productive than small-scale farming, and tenants are not necessarily less productive than owner-farmers; second, economic growth ultimately reduces poverty and redistributes income. Given these assumptions, therefore, land reform is not the most efficient way of achieving both economic growth and equitable distribution of income, at least in the long run.

Whether land reform increases efficiency, generates employment, fosters economic growth, and alleviates poverty or not is, of course, an empirical question. The empirical evidence over the last thirty years seems, however, inconclusive.<sup>4</sup> The lack of consensus is partly due to (1) differences in measurement across studies, (2) variations in country specific characteristics, and (3) type of reform implemented. For instance, due to type of reform and the degree of commitment to follow through in the implementation process, the economic effects of land reforms in Latin America and some Asian countries are different. Dorner (1992, pp. 29-30) noted, "[e]xperience shows that basic reforms can improve the income share of the poor as well as the growth of the economy. The widely heralded capitalist development and land reforms in Japan, South Korea and Taiwan cannot be ignored as mere coincidences. In all cases, economic growth followed major agrarian reforms." Summarising the experience of Latin American countries (based on various studies), on the other hand Dorner (1992, p.56) states that, "[o]verview of Latin American land reforms over the past thirty years allows no clear and definitive judgement about these efforts. Compared to the East Asian reforms (Japan, Taiwan, South Korea), those of Latin America were of a different order". Dorner attributes some of the differences in the impacts of land reform to differences in the degree of commitment of respective governments in providing farm input and lack of political will to carry through the initiated land reforms.

Despite differences in country characteristics and political ideology under which land reforms are implemented, Mengisteab (1990, p. 34) suggests that there are common attributes of a successful land reform. After evaluating the experiences of Japan, Taiwan, China and Cuba, which are considered to have carried out a successful land reform, he concludes that all four cases had the following common characteristics which contributed to the successful implementation of land reform. These attributes include: (1) in all countries, land was distributed in a comprehensive way and landlessness was either reduced or eliminated; (2) agricultural extension services (fertilisers, improved seeds, pesticides and marketing services) were made available to peasants; (3) multiple

cropping and variety of seeds were made possible by significant advances in irrigation system; and (4) all four countries improved rural living conditions by providing health care, education and other related public infrastructures. In the case of Latin America, Mengisteab (1990, p.35), on the other hand, "[t]he reform sectors were largely neglected. The outcome has been that the expected result of land reform has not materialised."

In summary, the empirical evidence regarding the precise impact of land reform on the above-stated objectives in particular and the performance of the agricultural sector in general is inconclusive. In addition to variations in country-specific attributes and evaluation criteria across studies, the difficulty of arriving at a consensus, it seems, is further complicated by two factors: The complex objectives that accompany a land reform package, and the vulnerability of the agricultural sector to external shocks. That is, given that the objectives of land reform range from equitable distribution of income to growth of agricultural output, it is difficult to evaluate precisely the success of a given land reform in the absence of a ranking scheme to evaluate the various objectives, unless all follow a similar pattern. Further, even if one focuses on a single criterion, say agricultural output, to evaluate the impact of land reform, all natural factors and government policies do not remain the same and, therefore, the comparison could only be suggestive rather than precise. Consequently, conclusions may vary depending on how one views the relative importance of the unmeasurable natural factors or policy issues in influencing agricultural output. Even though these limitations<sup>\*</sup> are prevalent in most areas of economic enquiry, they are particularly important in agriculture where weather conditions play a significant role. In the policy experiments that follow, these caveats should be understood.

It has been almost twenty-five years since the land reform was implemented in Ethiopia. And few studies have been carried out to evaluate its impact on the performance of the agricultural sector. These studies will be discussed later in relation to the results of this study. Two points should however be highlighted from the outset. First, there is no consensus on the overall impact of the land reform. For instance, Griffin (1992, p. 3) states that, "[i]t is not possible to calculate the extent to which the reform improved the standard of living of the masses of the rural people, but it is evident that the improvement must have been considerable". Mengisteab (1990, p. 35), on the other hand, concludes that "[E]thiopia's land reform is another unsuccessful case... (and this is because) the distribution of land was not accompanied by favourable allocation of other resources to the peasantry". Second, these studies are descriptive analyses of how the economy performed during the period, with no reference to what the path of the economy might have been had it continued its pre-1974 trend. As will be clear from the design of policy experiment, the objective of this study is, as Griffin (1992, p. 4), suggested to "[c]onsider whether the land reform simulated production above what it otherwise would have been". In addition to the impact of the land reform, the other nationalisation measures undertaken in the mid-1970s will also be included in the



simulation exercise. It is hoped an integrated approach of the main policy initiatives will shed some light on the performance the economy might have had in the absence of these policies.

### **3. MODEL ESTIMATION AND RESULTS**

#### **3.1. Model Estimation**

In principle, the econometrics literature provides ample estimation methods ranging from single equation estimators (SIEs) to full information system estimators (FISEs). In practice, however, data and other constraints limit the choice of estimation techniques. The simultaneity of the relationships suggests that an estimator that would use all the information available in the system (say, three stage least squares) is appropriate. This leads, however, to what is usually referred to as "The Undersized Sample Problem" or the degrees of freedom problem, since there are only 27 observations available. The choice is, therefore, limited to either SIEs (OLS, for instance) or any of the limited information estimators (2SLS, instrumental variables, etc.).

Accordingly, an attempt was made to estimate the model using the Cochrane-Orcutt procedure (C-O), instrumental variables and some variations of 2SLS in order to test the stability of the parameters. The analysis will depend, however, mainly on the results obtained from the 2SLS estimates.

Before proceeding to examine the estimated results, it is worth-highlighting that the question of data stationarity (invariance with respect to time) and, therefore, model estimation has gained much attention in recent years. Accordingly, more sophisticated methods to test whether a given economic data series is stationary or not, and corresponding estimating procedures have also been and are being developed. No attempt is made in this paper to use some multivariate time series model (the Johansen procedure, for instance). This is mainly due to the limitation of the data to lend itself to any appreciable potential lag structure that might be required to establish the degree of integration (the number of times a data series has to be differenced to achieve stationarity).

#### **3.2. Estimation Results**

In addition to the relevant identities and definitions, the model contains twenty-two behavioural equations pertaining to four sectors. These sectors include: Output supply, labour demand, aggregate demand, and external sectors. The level of disaggregation adopted is, to some extent, influenced by data availability. Due to space limitations, only the estimation results of the equations relevant for this study (those that relate to the output sector) are reported below.

In reading the results, the following points are worth-noting: the reported R square is adjusted for degrees of freedom, numbers in parenthesis are t-statistics, and 'Ln' is the natural logarithm; D.W. and D.h. are Durbin-Watson 'd' and 'h' statistics, respectively, and D is the serial correlation coefficient.

$$\text{Ln (RY/RFCA)} = 6.0133 + 0.78508 \text{ Ln (STR/RFCA)} - 0.19196 \text{ D1} \quad [1]$$

(24.013) (15.15) (3.388)

$$\bar{R}^2 = 0.94 \quad \text{D.W.} = 0.5671 \quad \text{D} = 0.882 \quad \text{SSE} = 0.081775 \quad \bar{Y} = 1.7799$$

$$\text{Ln CUR} = 0.3105 + 0.26168 \text{ Ln (RMNT/RMO}_{t-1}) +$$

(0.147) (2.506)

$$0.11844 \text{ Ln (RMS/R Y)}_{t-1} + 0.47893 \text{ Ln CUR}_{t-1} - 0.754 \text{ D1} \quad [2]$$

(2.659) (3.076) (4.723)

$$\bar{R}^2 = 0.82 \quad \text{D.h.} = 0.49 \quad \text{SSE} = 0.085453 \quad \bar{Y} = 0.097215$$

$$\text{Ln RAO} = 6.0991 + 1.2593 \text{ Ln LAFI} + 0.0654 \text{ Ln RF}_{t-1} - 0.036162 \text{ T} \quad [3]$$

(8.163) (8.382) .678 (5.731)

$$\bar{R}^2 = 0.75 \quad \text{D.W.} = 1.6 \quad \text{D} = 0.130 \quad \text{SSE} = 0.20832 \quad \bar{Y} = 8.7907$$

$$\text{Ln RMO} = 1.8437 + 0.45529 \text{ Ln LM} + 0.2647 \text{ Ln RMNT} + 0.43753 \text{ Ln RFCA} \quad [4]$$

(2.185) (2.688) (2.173) (4.450)

$$\bar{R}^2 = 0.51 \quad \text{D.W.} = 0.85 \quad \text{D} = 0.705 \quad \text{SSE} = 0.20925 \quad \bar{Y} = 7.1508$$

where:

CUR	= capacity utilisation rate (RMO/CMO)
D1	= dummy variable (1975 - 1987 = 1)
LAFI	= agricultural labour force index (1980=100)
LM	= labour force in manufacturing-thousands of individuals
RAO	= real agricultural output - million birr
RF	= rainfall-millimetres
RFCA	= real capital stock, adjusted for capacity utilisation-million birr
RMNT	= real imports of intermediate inputs-million birr



RMO	= real manufacturing output-million birr
RMS	= real total money supply (currency + demand deposit)-million birr
RY	= real total output at factor cost-million birr
STR	= total employed labour force in millions of individuals
T	= time trend

The above model (in combination with other sectoral equations) is used for dynamic and deterministic simulation after adding the relevant identities and definitions. All equations are used in the simulation. The main data sources used to estimate the models include: various official publications of international agencies and published and unpublished government reports. Where choice is available, however, data from international agencies are used to maintain consistency in updating and facilitate comparisons over time. The specific primary data sources include: International Financial Statistics, Government Financial Statistics and Balance of Payments Yearbook published by the International Monetary Fund; Yearbook of National Income Statistics and World Tables published by the United Nations. Additional data from the National Bank of Ethiopia, the Ethiopian Statistical Office and other Ethiopian government agencies were also collected to supplement the international data sources.

## **4. POLICY ISSUES**

As stated in the introduction, the policy question that the model will be used to address is the impact of the land reform on the performance of the agricultural sector. That is, the policy analysis is concerned with what the performance of the agricultural sector would have been if government had not implemented land reform<sup>5</sup>.

Since the purpose of the study is to evaluate the effects of the main components of each policy as a package, an attempt will be made to incorporate the policy changes simultaneously instead of one at a time. For instance, to evaluate the effects of land reform and nationalisation of manufacturing industries, both policy changes will be incorporated at the same time. This will be clear when the policy design of each policy experiment is discussed later.

### **4.1. Re-Estimates Of Policy Variables**

To evaluate the effects of these policies, the basic model presented earlier is re-simulated with the following changes. The equations for the total output, agricultural output and manufacturing output are re-estimated for the pre-policy period (1961-1974). Due to the small sample size, the equations are estimated using a single equation estimator (Cochrane-Orcutt). As before, after dropping the dummy variable, the ratio of real output to the real fixed capital stock ( $RY/RFCA$ ) depends on the ratio of labour force employed to the real fixed capital stock:

$$\ln (RY/RFCA) = 7.0830 + 0.99116 \ln (STR/RFCA) \quad [5]$$

(7.7083) (5.8642)

$$\bar{R}^2 = 0.87 \quad D.W. = 1.723 \quad SSE = 0.01872 \quad \bar{Y} = 1.7255.$$

As can be seen from the t-statistics, the coefficients are significant and the explanatory power of the equation is acceptable. Compared to the 2SLS estimates reported earlier (equation 1) the autocorrelation problem is reduced and the coefficient of the labour-capital ratio is larger in this equation. Further, the coefficient of the labour-capital ratio in this equation is not different from one<sup>5</sup>, indicating constant returns to labour as a fixed factor, and zero marginal productivity. But the coefficient for the entire sample is less than one, indicating diminishing returns. The implied marginal products of labour-capital ratios<sup>6</sup> for the entire sample and the short sample also shed some insight on the performance of the economy. The respective marginal products, 0.27 and 0.32, indicate that it was higher for the pre-1974 period than it was for the entire sample period (1961-1987).

Agricultural output depends on the labour force (LAFI), lagged rainfall (RF<sub>-1</sub>) and a time trend (T):

$$\ln RAO = 3.5898 + 0.59177 \ln LAFI + 0.53308 \ln RF_{-1} + 0.011268 T \quad [6]$$

(2.324) (1.792) (1.5264) (2.0675)

$$\bar{R}^2 = 0.69 \quad D.W. = 1.59 \quad SSE = 0.04198 \quad \bar{Y} = 8.935.$$

The statistical significance of the above coefficients is inferior to the 2SLS estimates reported earlier (equation 3). But the problem of serial correlation is significantly improved in this equation compared to the 2SLS estimate. And in terms of coefficient size, a unit increase in labour input had a greater impact on agricultural output over the entire sample period than pre-1974, as can be seen from the respective coefficients.

Manufacturing output depends on the labour force employed (LM), intermediate inputs (RMNT) and the existing real fixed capital stock (RFCA):

$$\ln RMO = -2.5599 + 1.0762 \ln LM + 0.1191 \ln RMNT + 0.26735 \ln RFCA \quad [7]$$

(3.4368) (12.295) (2.890) (1.8377)

$$\bar{R}^2 = 0.95 \quad D.W. = 1.93 \quad SSE = 0.008748 \quad \bar{Y} = 7.205.$$

The statistical significance of the coefficients is much better in the smaller sample than with the 2SLS estimates (equation 4). The adjusted R square and the Durbin-Watson statistics are significantly improved compared to the previous estimates. The marginal



products of labour and capital in the smaller sample are 2.14 and 1.25, respectively. The respective marginal products for the entire sample are 1.35 and 0.68. The above cited study, Wubneh (1990, p. 321), also reports a decline in the marginal productivity of labour between 1975 to 1984 compared to 1960 to 1974. According to his estimates, the marginal product of labour between 1960 to 1974 averaged 1.95, while the respective figure for 1975 to 1984 averaged 1.44. Despite the differences in model specification and sample size, the values obtained in this study and that of Wubneh seem to be of the same order of magnitude.

#### **4.2. Policy Simulation, 1973-1987**

The basic model is re-simulated by substituting the respective coefficients of the smaller sample (1961-1974) for the entire sample. The difference between these simulation results and the basic simulation (control-run) results predicts what would have been the performance of the economy if there had not been any change in policy in the mid-1970s.<sup>7</sup>

As summarised in Table 4, the shocked values of all the endogenous variables are different from the control-run values, suggesting that the above discussed policy changes had a measurable impact on the macroeconomic aggregates concerned.

Agricultural output (RAO) would have been lower, on average, if agricultural reform had not been undertaken. As discussed above, the essence of the reform was to distribute land equally to those who use it (taking it away from absentee landlords). This measure, therefore, must have initially created positive incentives for farmers to increase their production. But agricultural output started to decline beginning in the early 1980s, which corresponds to the formation of farm co-operatives, which enabled the government to control the sale and the price of agricultural produce (see Table 3). Such policies probably created disincentives and bureaucratic obstacles in the production and distribution processes, such that efficiency was compromised causing output to decline, as the results beginning in the 1980s indicate. On the whole, agricultural output would have been about one per cent lower, on average per annum, if the government had not implemented the land reform and related policies.

Manufacturing output (RMO), on the other hand, would have been higher if the government had continued with the pre-1974 policies. Both the level and the rate of manufacturing output would have increased over the simulation period. This might be explained by the unfavourable economic policies taken and the political environment that was created after 1974. That is, in addition to the possible uncertainties created by the nationalisation of manufacturing enterprises, the shortage of foreign exchange and the mismanagement of the public enterprises, and political instability probably contributed to the decline in manufacturing output. Consequently, manufacturing output would have increased by about 7 per cent if the changes in policy had not taken place.

Table 4. The Impact changes in the Ownership of Land and Manufacturing Enterprises on Total and Sectoral Outputs - Deviations from control-run (%)

Year	Capacity Utilisation	Output		
		Agricultural	Manufacturing	Total
1973	-0.67	-12.85	-7.43	-22.29
1974	-0.19	-6.10	-10.30	-15.62
1975	7.66	-2.12	-10.54	-1.60
1976	10.04	-1.03	-0.57	3.10
1977	11.82	-7.30	-6.05	8.56
1978	13.11	-6.34	26.21	14.44
1979	14.06	-11.22	18.19	20.46
1980	14.93	-14.27	17.28	25.74
1981	15.58	-16.43	9.73	27.14
1982	16.38	-16.75	0.01	29.51
1983	16.88	-25.71	7.38	33.71
1984	17.23	26.65	8.50	36.85
1985	17.74	21.05	16.91	35.61
1986	18.47	29.08	10.80	41.92
1987	18.74	25.24	17.67	46.41
Average	12.78	-1.21	6.52	18.93

It is worth-noting that even though the agricultural sector showed at least a small net positive effect while most of the other macro aggregates showed a decline on average following the 1974 reform, the net effect of the policy on agricultural output over the sample period is too small to suggest a clear effect. What is probably more important is how the pattern of positive impact of the reform in the first seven years reversed itself and consistently declined until the end of the sample period. To put the results in context, a brief review of similar studies is in order. As stated earlier, there is no consensus regarding the overall effect of the land reform on the performance of the agricultural sector. But since many authors use different criteria to evaluate the success of the land reform initiative, here the focus will be only on one criterion: Did agricultural output increase following land reform compared to its pre-1975 level?

In answering this question on the basis of his survey, Griffin (1992, p. 4) concludes that "[i]t is unlikely that the growth performance would have been any better had the reforms not occurred." He notes that output per capita was not growing fast enough to improve the living standard of the rural peasants significantly, but he argues that the situation would not have been any better without land reform. Similarly, Ghose (1985), examined the performance of the agricultural sector between 1975 to 1983. Ghose (1985, p. 133) notes that, even allowing for the increase in crop area, "[t]he growth of agricultural output as well as of food output was quite impressive during the first four-year period 1977/78-1982/83". Further, although cautious on the conclusiveness of the data, Rahmato (1984, p. 73) on the basis of regional surveys reaches a similar conclusion when he states that, "[i]f the figures for 1980 are not a result of changes in data collection, and instead



indicate a trend, small-holder agriculture may be showing a promising sign of improvement."

Mengisteab (1992, pp. 115-118) is, however, sceptical that the land reform resulted in any significant improvement of agricultural output. After examining agricultural output between 1961 and 1988, he argues that the variation in agricultural output does not show a consistent pattern that is directly attributable to the redistribution of land. He attributes the stagnation of the agricultural output, however, not to the land reform but to lack of commitment of the government to provide "appropriate agrarian policies". It has to be noted that all these studies are a descriptive analysis of the agricultural sector over time, and do not address the issue of what would have been its performance in the absence of land reform. Hence, direct comparability is not possible.

To recapitulate: (1) the results of this study suggest agricultural output would not have been higher if land distribution were not undertaken; but the margin of improvement due to land distribution is minimal; (2) most of the studies undertaken suggest an improvement in agricultural performance, at least in the early years of the land reform; the qualitative conclusions of most of these studies are, therefore, consistent with this study; (3) since the studies are not directly comparable, and the data are subject to variations (due to weather and other exogenous factors), the results should be viewed as suggestive orders of magnitude.

## NOTES

<sup>1</sup>For a detailed discussion of the size of arable land, and rate of utilization by region and at the national level, see Galperin (1981, Chapter 10); and Griffin (1992, Chapter 2).

<sup>2</sup>For a detailed discussion of the land tenure system that had existed in Ethiopia prior to the land reform of 1975, see Mengisteab (1990) and Rahmato (1984).

<sup>3</sup>This scepticism is due to the vague political philosophy of the government just prior to the land reform proclamation, and its lack of commitment in allocating investment funds to the agricultural sector while taxes on agricultural produce were constantly increasing.

<sup>4</sup>For a detailed discussion of the arguments both in favour and against land reform and the corresponding evidence, see Mengisteab (1990, pp. 21-38), and Dorner (1992, pp. 14-57).

<sup>5</sup>Even though this is clear from visual inspection, it could also be verified formally using the following t-statistics:

$$t_{N-k} = (\hat{\beta} - \beta_0) / s_{\hat{\beta}}$$

where  $N-k$  is the number of degrees of freedom,  $\hat{\beta}$  and  $\beta_0$  are the estimated and the actual (hypothesised) coefficients, respectively, and  $s_{\hat{\beta}}$  is the standard deviation of  $\hat{\beta}$ . Using this test, the hypothesis that the coefficient of the labour capital ratio is not different from one cannot be rejected at the 5 per cent level of significance.

<sup>6</sup>The marginal product of labour is calculated as the estimated coefficient of labour times the actual average product of labour.

<sup>7</sup>For a discussion of why shocked runs (policy experiments) ought to be compared with the control run (model based solution values) and not with the actual historical values of each endogenous variables, see Challen and Hagger (1983, p. 153).

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# FARMERS' WILLINGNESS TO PAY FOR TENURE SECURITY

Tekie Alemu\*

## ABSTRACT

*An important aspect of property rights in agrarian societies is the entitlements in land. While there are numerous theoretic formulations showing the impact of secured tenure, there has not been sufficient success in the empirical sphere. This paper tries to obtain ex-ante valuation for improved tenure system of farmers in Ethiopia. The paper also tries to identify factors that trigger the choice for a positive WTP (Willingness to Pay) and those that affect the amount that farmers would pay for such a change. The results in this paper seem to reinforce the compelling reasons, discussed in the tenure literature, required for having a secured institutional setup for the farmers in Ethiopia. On the basis of this, consequent policy prescription is for the system to move towards a more secured system by banning all efforts of redistribution and allowing the farmers to decide on allocating the resource as they wish to their siblings.*

## 1. INTRODUCTION

Coase (1937) introduced transaction costs into economic analysis and his theoretical work (Coase, 1960) demonstrated that their absence is an important precondition for Pareto efficiency. Consequently, where transaction costs are positive, "the assignment of property rights represents an additional constraint in the economic agent's budget constraint" (Smyth, 1998). These results, coupled with quests for the effects of the absence or 'improper' assignment of entitlements, have resulted in a proliferation of literature on property rights and articulates the role of initial entitlement of property rights.

Entitlements in land is a particularly relevant aspect of property rights in agrarian societies, since both the proportion of the population and the economy is dependent on this resource. It is simple and intuitive to conclude that insecure tenure leads to inefficient resource allocation theoretically, by introducing elements of market failures,

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\* Assistant Professor, Department of Economics, Addis Ababa University. The final version of this paper was submitted in June 2000.



externalities, and uncertainty into the analysis. Quantifying and obtaining empirical results of the effects of tenure insecurity, however, has proved to be much more difficult.

Despite these difficulties, some empirical evidence has been drawn from different studies. Lin (1992), for instance, studied the effects of transforming the Chinese collective farms into the so-called "household-responsibility" system. The new system was introduced over a span of 5 years starting in 1979. An important feature of the system was that the responsibility given to the household was increased over time, so that it was introduced gradually. His findings show that for the period between 1978 and 1984, i.e., as the provinces in his analysis raised the proportion of household-responsibility system, crop production grew by 42 per cent. Decomposing this growth into various factors, he established that close to 50 per cent of the growth is due to the various reforms undertaken during this period. More important, institutional changes with respect to the household-responsibility system alone accounted for the lion's share of the crop production growth (47 per cent). This is a very strong evidence of the impact of institutional changes.

Another important corroborative research, with respect to the returns from the introduction or improvement of tenure security is that reported by Feder et. al. (1988) for Thailand. The Thai agricultural system has two distinct types of tenure: one which is titled and secure, and another that is not. The latter condition is described as squatters, i.e., illegal occupation of state-owned land. Squatters can be evicted, hence the insecurity. The analysis shows that titled farmers are more productive than squatters, to the tune of 12 to 20 per cent, in three of the provinces it studied. However, it is doubtful if one could properly speak of squatting as tenure. Often this is a temporary situation, which is observed in transit to other forms of employment and is largely a response to poverty. Thus, production may not be conducted under comparable condition to titled land. Hence, the reported figures have to be qualified.

Nonetheless, the institutional scenarios on which these ex-post studies are based are unusual for the following two reasons. First, it is seldom the case that changes in land tenure occur smoothly. As Bell (1990) points out correctly, and as evidenced during the communist revolutions in both Eastern Europe and the Third World, "... a substantial redistribution of individual property rights [in land] is most likely to occur in the wake of a social upheaval." Such abrupt changes are seldom complemented or followed by supporting institutions and policies. This may lead to frustrated land reforms such as that enacted in Ethiopia in 1975 (Dessalegn 1984). Second, it is uncommon to find communities with different forms of tenure arrangements side by side. This makes empirical comparisons between, say, properly assigned and unassigned property rights difficult.

The previous considerations and problems lead the author to look for alternative ways of valuing tenure security. This paper, therefore, bases its analysis on farmers' ex-ante valuation of introducing a relatively more secured institutional structure in landholding.

Ethiopia's institutional arrangements for gaining access to land, forms of land ownership, as well as the ways and means of handling disputes arising from the system of land tenure have been controversial. Still, in the past three decades or so, the system has undergone tremendous changes in the form of ownership permitted, some of which were radical.

The main cause of the controversies, however, need not necessarily be attributed to the absence of well-defined property rights regimes and the accompanying loss of efficiency. It may have actually been largely triggered by the fact that any change in the prevailing rights structures, often leads to fundamental reallocation of resources (i.e., land) among different interest groups. It is unfortunate, yet not surprising, that it is those segments of society with an expressive voice who get attention and thereby ensure that their interests are enhanced or at least made sure that they remain intact. The less powerful segments of society, in our context the poor farmers, lack both the opportunity and platform for making their demands heard or having them placed at the forefront, thus may not fair that well.

It is ironic, therefore, that although farmers form the segment of the population most affected by actual or potential changes in the land tenure system, it is seldom that their interests or wishes have been taken into account by researchers, policy-makers and authorities determining agricultural issues. For instance, a cursory examination of the debates, controversies and the literature on tenure system in Ethiopia reveals that, almost invariably, all types of arguments are forwarded as if they were 'good' for the farmer. It is seldom, if ever, that farmers are actually asked how they feel about these issues, controversies, and the policy options, all of which are entertained and created by outsiders who are usually out of touch with the farmers' realities. This can easily be illustrated by the most common normative statements made regarding land privatisation in Ethiopia. Most of these statements either begin or end by asserting that 'farmers must have the right to sell their land.' This is rarely presented as, 'We must have the right to buy the farmers out'. Irrespective of the argument or option forwarded, the policy option is presented as if it is nothing but positive to the farmers, while in reality they are probably seeking for their own benefits. The under text of this contains an 'elitist' view, i.e., we know better, we can identify your problems, your solutions, and even your controversies!

On the other hand, farmers are not completely powerless or apathetic. As economic agents, the ways by which farmers arrive at decisions affecting production or respond to potential or actual institutional changes are crucial. If the incentive mechanisms



give the wrong signals to them, they may take actions which individually may well be rational and efficient, but may not necessarily be so from either the society's point of view at a given point in time, or in an inter-temporal context, or both.

Tekie (1999) shows that tenure insecurity adversely affects investment in physical soil conservation in the crop producing highlands of Ethiopia. This implies that improvements in the landholding system with respect to security enhances investment, which could lead to improved production and productivity. This paper examines farmers' perceptions about the land tenure systems prevailing in Ethiopia and their interest for institutionalising more secured tenure arrangements. Moreover, the paper enquires whether farmers are prepared to ensure that such changes are instituted by paying for them. In addition to this, factors that trigger both the choice to pay and the amount that farmers are willing to pay for improved tenure security will be examined. The present study departs from previous research in that it attempts to give farmers a voice by taking their views on issues of tenure security.

## **2. BACKGROUND: THE CURRENT LAND- RIGHTS SYSTEM**

According to the Ethiopian Constitution enacted in 1994, 'the right to ownership of rural and urban land, as well as of all natural resources, is exclusively vested in the state and in the peoples of Ethiopia' (Article 40, 3). In this regard there have been no changes in the (property) rights claimed by the state from previous proclamations. It bestows peasants only with the 'right to obtain land without payment and the protection against eviction from their possession' (Article 40, 4). Thus, individuals *residing* in rural areas, leading their livelihood from farming, have user rights over the land they have been allotted with by the community. As far as sale, mortgage or exchange of tenure is concerned, the new rules are identical to previous institutional arrangements whereby, land so allotted to individuals in the rural communities 'shall not be subject to sale or to other means of exchange' (Article 40, 4).

There is an important departure of the current land policy from the previous regime's, regarding the final authority or power in administering land. The 1994 constitution is based on devolution of power to administer land and other natural resources to the Regional States, provided that these are consistent with the laws that are promulgated by the Federal Democratic Government of Ethiopia (FDRE) (Article 52, 2d).

As a follow-up of Article 52, 2d, of the Constitution, the FDRE issued Proclamation Number 89/1989 in 1997, which detailed the roles of its regional states in administering rural land. The proclamation provides the later with the responsibility of promulgating laws pertaining to the administration of land under their jurisdiction, with

the stipulation that those do not contradict the fundamental laws of the federal government (Article 5).

The first six points of Article 6 in the proclamation details the conditions under which the regional states can introduce reallocation of land in rural areas. Reallocation includes, not only a process of periodic adjustments of individual farmers' landholdings, but also the demarcation of areas that would be used communally for grazing, residence, local forests and other social services.

The periodic reallocation of individually cultivated land among members of a community is intended to ensure that all would-be farmers could get land. Reallocation should take into account the overall magnitude of the household head's responsibility, newly formed households, as well as family size. Thus, regional states should decide the rules by which land will be reallocated among members of the rural communities. The objectives of these provisions seem to provide means for obtaining access to land to young and newly formed farming households.

As long as the available stock of unutilised land in a village is low, limited or non-existent, for newly formed households, or in-migrants into the village, redistribution is bound to affect existing farming households negatively. Whenever households are subjected to a reduced amount of land, the proclamation allows them to take their share from lands that they used prior to the redistribution. That is, in the event that the actual holding of a household exceeds the maximum amount allowable to the household during any redistribution, the amount of land deemed 'excess' would be taken away from the household, and given to other members of the farming community with less or no land at all.

An important provision of the 1997 proclamation is that households that lose land in the process of redistribution would have to be compensated by individuals to whom this land is allotted. The compensation, however, is not for the whole value of the land, as land is by definition owned by the state. Consequently, the stipulated compensation is for the labour and investment expenditures made on the land by the pre-redistribution users (Article 6, 7-12).

This may be seen as an important departure towards enhancing farmer confidence to invest in land, particularly when one compares its provisions with the form of disappropriation that prevailed in the country during the Derg regime (1974-1991), where no compensation was allowed for such actions. However, the mechanisms for valuing these compensations as well as their enforcement has not been spelt out properly. These are important because, given the current tenure arrangements, they would send signals to current users that whatever investments are made now would be redeemed in the event of land redistribution. Thus, there is a need to clearly spell out and define valuation systems and enforcement mechanisms for compensation.



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The reactions to the provisions of the constitution regarding allocation, devolution of authority, land redistribution and compensation are not uniform. In order to examine these issues closely, we examine them of how three regional states (where the study sites are located) are interpreting and enforcing the provisions of the proclamation.

The Council of the Tigray National Regional State (CTNRS) enacted a law pertaining to the administration of land in 1997 (CTNRS 1997). It seems to have realised that in most parts of the region the size of landholding has reached the minimum level possible for performing any meaningful agricultural activity. It actually puts a minimum floor for the plot size beyond which it should not be subdivided. Consequently, even siblings inheriting land from their parents cannot subdivide a plot if it results in allotments of less than the limit (*ibid.* Article 16, No. 4).

It also asserts that the reallocation that have been undertaken in the region previously have been sufficiently fair. Coupled with this, there is the fact that fresh redistributions would definitely diminish the size of plots. Judging from these facts, it seems that the possibility of future redistribution in the region has been partly diminished.

On the other hand, the Council of the Amhara National Regional State (CANRS) decided to reallocate land within its jurisdiction. The main objective for enacting the redistribution implemented in 1997 was the belief that land was "grabbed by few bureaucrats and elects of agricultural cooperatives who have been proponents of the [previous] regime" (CANRS 1996). Accordingly, a substantial reallocation took place in 1997, the period when the data used in this study was collected.

The other extreme case is that of the Oromia National Regional State. To our knowledge nothing has been done regarding land reallocation since the overthrow of the Derg regime in 1991. The last redistribution reported in these sites occurred in the late 1980's. These allocations, according to the interviews in the villages, were made in the process of distributing land which was under collectives earlier.

We conclude this section by observing that there are two important positive departures from the tenure system that was envisaged and implemented by the previous (the Derg) regime. First is the principle that each region could implement its own land policy. This allows each region to assess its own needs, problems, and solutions that are appropriate for the given circumstances and act accordingly, within the framework of federal laws and regulations.<sup>7</sup> Second is the idea of introducing compensation on immovable investments made on land, pending on reduced land holding caused by redistribution. Needless, however, to say that refinements are needed in the valuation and enforcement spheres.

### 3. MODELLING WILLINGNESS TO PAY FOR INSTITUTIONAL CHANGE

We consider a model where the production function depends not only on the factors of production but also on the institutional arrangements in the economic system, the details of which are given in Appendix (1). Here we start with the indirect utility function given by:

$$V(p_f, p_p, w, y^* | I_j) \quad j = 0, 1 \quad [1]$$

Where,  $p_f$  and  $p_p$  are the prices of farm products and market purchased products, respectively,  $w$  represents the wage rate,  $y^*$  is the income of the household, while  $I_j$  is the institutional arrangement, with  $j=0$  implying the status quo and  $j=1$  some proposed change.

Institutional arrangements that ensure secured and private ownership are assumed in standard economic analysis, and as argued earlier, these would generate the 'right' incentive structures, which enable economic agents to make choices that lead to efficient outcomes. Such a representation might be a very close approximation of the institutional settings in a relatively advanced market economy with competitive markets for all factors and commodities. However, this need not hold in many societies where the institutional arrangements, including markets, differ substantially.

Suppose we envisage a change in the institutional set-up from the status quo,  $j = 0$ , with insecure tenure, to one which is relatively more secured,  $j = 1$ .<sup>2</sup> If, the improvement entails a change in the incentive structures such that this ensures a more efficient utilisation of resources, the income of the household is bound to change. This would certainly have an impact on the supply and demand equations of the household and if these changes are substantial, relative prices may also change, which in the final analysis would also generate changes in the indirect utility function. Denoting change by  $\Delta$ , we have

$$\Delta V = V(p_f^1, p_p^1, w^1, y^{*1} | I_1) - V(p_f^0, p_p^0, w^0, y^{*0} | I_0) \quad [2]$$

The compensating variation defines that amount of money which can be taken away from the individual household after the change in the institutional arrangement, such that the household maintains its pre-change level of satisfaction. This we may call the willingness to pay (WTP) for an improvement in the institutional arrangement. Thus, the WTP is the amount of money that has to be deducted from the household's current income such that the following identity holds:



$$V(p_f^1, p_p^1, w^1, y^{*1} - WTP | I_1) = V(p_f^0, p_p^0, w^0, y^{*0} | I_0) \quad [3]$$

Assuming separability of the function with respect to WTP, we can write the reduced form for equation [3] as:

$$WTP = g(X\beta) \quad [4]$$

Where  $X$  is a vector of characteristics affecting willingness to pay and  $\beta$  is a vector of parameters to be estimated.

#### **4. DATA COLLECTION, ELICITATION OF VALUATION FOR SECURITY AND DATA DESCRIPTION**

We collected data by administering a structured questionnaire on the willingness-to-pay (WTP) for instituting secured and private land tenure, given the current insecure land holding system, from farming households in five Peasant Associations (PA's) in Ethiopia.<sup>3</sup> Part of the questionnaire which was used for this paper is presented in Appendix (2). The data has been aggregated at the household level for the 526 randomly selected households from these villages, which are located in three regional states (Tigray, Amhara and Oromia).

The constitutional orders, institutional arrangements and normative behavioural codes of individuals in a community have been identified as the three pillars of institutions that define a property right and its smooth functioning for any society.

The constitutional order refers to the fundamental rules about how society is organised—the rules of making rules. ... [Institutional arrangements] include laws, regulations, associations, contracts, and ... property rights. ... [N]ormative behavioural codes, refers to the cultural values which legitimise the arrangements and constrain behaviour (Feder and Fenny 1991).

Land tenure arrangements as a form of property rights have to fulfil these institutional set-ups. As shown in Section 2, the constitutional order has been clearly defined in the case of Ethiopia. Similarly, the institutional set-up for running the land use and its administration has been handed over to the Regional States, which has resulted in different types of reactions based on the conditions in each.

The third important element that must be considered as indicated in the above citation is how individual farmers perceive the land ownership arrangement in Ethiopia, and

whether they are willing to pay for some proposed changes in these arrangements. This is also needed, as emphasised in the CVM literature, to ascertain and to give credibility for the quoted figure, since it has been argued that, "Subjects must understand, be familiar with, the commodity to be valued" (Cummings et al., 1986).

For this purpose, we asked in our sample the type of land ownership prevailing in the country. As indicated in Appendix (3A), only one per cent of the sample was unable to identify the type of ownership prevalent in the country. More than 80 per cent of them defined it as state property while the remaining put it as some form of communal property. The confusion between state and communal property comes from the definition of the type of ownership given by the state, as discussed earlier in Section 2.

We also asked whether they would consider paying money to the government and ensure their ownership indefinitely. Thus, they were told that if this were to happen, then the government or the community would not interfere with reallocation of land in the future. They would have a right to exchange (including through selling) their land whenever the need to do so arose, and the responsibility of provision of land to the next generation, i.e., their siblings, would fall on the household.

Around 23 per cent of the sampled households would be willing to pay for such an institutional change (see Appendix (3B)). Given the low level of income of these farmers, and seen from the perspective that land has mostly been either under customary tenure or under state ownership, this is a substantial proportion. The strength of the need to such a change, however, varied among the sampled sites—Geblen and Debre Birhan are on the weaker side. Tentatively, we would put income constraints for such a result in the case of Geblen, whereas for Debre Birhan the fresh memory of the effects of redistribution might have contributed to this. However, even in these sites, there are farmers who are willing to pay for moving away from state and/or communal ownership, which inherently leads to periodic redistributions, and towards one that is private and tenure is more stable.

As a follow-up question, we asked the farmers who refused to pay their reasons for doing so. As indicated in Appendix (3C), around 64 per cent of them said that they did not have financial capacity for doing this. About 28 per cent of the sampled respondents believed that land must be given free of charge to farmers. It is also worth-noting that around 16 per cent of those who refused to pay for the change in Debre Birhan expressed their concern of future nationalisation by the government as a reason for not paying for these rights.

Those households who identified financial problems as a reason for not willing to pay for the institutional change were asked whether they would borrow soft loans for this purpose. Appendix (3D) shows that around 53 per cent of those who presented



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financial reasons for not paying are willing to borrow in order to pay for the shift in the institutional set-up. As a result, a total of around 50% of our sampled households would be willing to pay for a secured (private) ownership of land.

Table 1 shows the average WTPs that have been elicited by the sample. In all sites, except for Koro Degaga, we got zero bid from more than 50 per cent. Thus, the medians are zero, even for Koro Degaga, which shows a positive median WTP, it is the minimum in the sample that has been picked.

Table 1. Descriptive Statistics of WTP in ETB† for Tenure Security per Hectare of Land

	mean	std. err.	95% conf. int.	median	min.	max	N
<b>The Total-Sample, Out-of-Pocket WTP per Hectare</b>							
All sites	284.45	83.34	(663.5, 991)	0	0	21333	524
Harresaw	473.52	94.46	(286.04, 661)	0	0	5455	98
Gebien	146.67	56.76	(34.02, 259.31)	0	0	4000	99
Debre Birhan area	297.66	91.72	(116.03, 479.29)	0	0	6295	119
Koro Degaga	105.80	21.88	(52.42, 149.18)	0	0	1133	109
Sirbina Godeti	415.91	130.48	(156.97, 674.86)	0	0	9697	99
<b>The Total sample: Borrowers and Out-of-Pocket WTP per Hectare</b>							
All sites	827.23	83.34	(663.5, 990.96)	0	0	21333	524
Harresaw	1970.51	324.46	(1326.5, 2614.52)	1033	0	21333	98
Gebien	488.43	149.05	(193.64, 785.22)	0	0	12000	99
Debre Birhan area	575.22	111.68	(354.07, 796.36)	0	0	6295	119
Koro Degaga	233.93	47.63	(139.53, 328.34)	49.56	0	4000	109
Sirbina Godeti	989.45	175.08	(642, 1336.9)	472.22	0	9697	99
<b>Sub-sample with Positive Out-of-Pocket WTP</b>							
All sites	1173.65	133	(910.43, 1436.87)	700	49.57	9697	127
Harresaw	1496.93	200.35	(1087.76, 1906.1)	1000.00	333.33	5455	31
Gebien	1452.00	369.80	(615.47, 2288.53)	1200.00	400	4000	10
Debre Birhan area	1771.06	416.55	(899.21, 2642.91)	707.1	89.36	6295	20
Koro Degaga	329.49	50.7	(226.46, 432.51)	200	49.57	1133	35
Sirbina Godeti	1328.24	370.44	(571.68, 2084.79)	782.6	162.64	9697	31
<b>Sub-sample: Borrowers with Positive WTP per Hectare</b>							
All sites	2122.5	259.53	(1609.15, 2635.85)	1334	40	21333	134
Harresaw	3411.75	654.69	(2090.54, 4732.97)	1666.67	666.67	21333	43
Gebien	2610.26	867.12	(720.96, 4500)	1600	400	12000	13
Debre Birhan area	1942.9	282.18	(1344.7, 2541.1)	1935.48	181.65	4500	17
Koro Degaga	655.11	195.32	(251.41, 1078.8)	400	40	4000	21
Sirbina Godeti	1419.49	290.22	(832.45, 2006.53)	775	193.55	9600	40
<b>Sub-sample: Borrowers and Out-of-Pocket with Positive WTP per Hectare</b>							
All sites	1660.8	150.75	(1363.95, 1957.65)	837	40	21333	261
Harresaw	2609.6	403.03	(1806.36, 3412.84)	1393.94	333.33	21333	74
Gebien	2106.67	520.69	(1026.82, 3186.51)	1200	400	12000	23
Debre Birhan area	1850.02	256.84	(1329.13, 2370.9)	1333.33	89.36	6295.08	37
Koro Degaga	456.34	82.68	(289.64, 621.04)	205.14	40	4000	56
Sirbina Godeti	1379.65	228.38	(924.21, 1835.09)	782.61	162.64	9697	71

†1 USD was around 7.00 ETB at the time of the survey. Source: Own survey.

The mean out-of-pocket WTP for tenure security of the 127 households is ETB 1173, while that for the 134 households, who were willing to borrow for making their payments, was ETB 2122, and the combined mean WTP for the 261 households is 1660. Comparisons of these means should be taken cautiously because the respondents were not facing the same question. Namely, the out-of-pocket payers were not asked what they would pay if borrowing was available.

Given this, however, with the exception of one site (Sirbina Godeti)<sup>4</sup>, we observe that the mean WTP of the borrowing sample is larger than the out-of-pocket WTP in all others. Consequently, the borrowing sample has a mean of 1.81 times that of out-of-pocket payers. This, coupled with the fact that the borrowing sub-sample is larger, has pulled the mean of positive WTP upwards relative to the out-of-pocket borrowers.

Focussing on the out-of-pocket payers, we also observe that the variation of mean WTPs among the different sites seems to follow the level of land scarcity in the village. If we exclude Debre Birhan, where there was redistribution at the moment of data collection and concentrate on the remaining four sites, the mean WTP's per hectare for Harresaw and Geben were ETB 1497 and 1452, respectively, while that for Koro Degaga was only ETB 330. Contrasting these figures with the mean landholding per household, which are given in Appendix (5) is indicative that these two variables are inversely related.

To conclude this section, it is important to note that the fear of being confiscated again is an important impediment to the WTP for security. Thus, one could speculate that, if this uncertainty were to be removed, it would have been possible to obtain a larger proportion of our sample with positive WTP. Moreover, there is the proposition that WTP derived from open-ended questions tend to result in lower bids than close-ended ones (Halvorsen and Saelensminde 1998). As a result, it is suspected that the average values presented would be underestimates of the true WTP.

## **5. STATISTICAL SPECIFICATION, DEFINITION OF VARIABLES AND ECONOMETRIC RESULTS**

### **5.1. Statistical Specification**

Cross-section data generated from household surveys often result in dependent variables that are censored, which have come to be known as limited dependent variables in the literature. The characteristic feature of these models is the fact that there is a limit value (lowest, or highest, or both) to the dependent variable, and quite a significant number of observations in the sample take this limit value. This feature is inherent in CVM surveys with zero as a limiting value. Thus, the methodologies developed for limited dependent variables is also relevant for CVM models.



Starting with Tobin's (1958) seminal paper, a number of statistical models have been developed in order to take care of these limiting values in the dependent variable. In this line Cragg (1971) elaborated on an interesting set of models by making various assumptions on the basic simultaneous equations, which were elaborated and refined further by Maddala (1983) and Amemiya (1985). In general, the models take the form:

$$\begin{aligned} z_i &= \gamma' w_i + \delta_i & (a) \\ y_i^* &= \beta' x_i + \varepsilon_i & (b) \\ z_i &= 1 \text{ if } y_i^* > 0 \text{ and } z_i = 0 \text{ if } y_i^* \leq 0 & (c) \end{aligned} \quad [5]$$

Where  $x_i$  and  $w_i$  are vectors of exogenous variables. The parameters to be estimated are given by the vectors  $\gamma$  and  $\beta$ . The censored dependent variable is  $y_i^*$ , which is observed only if it is greater than the limiting minimum value, and is zero otherwise. When the dependent variable is observed we also have  $z_i$  being equal to 1, otherwise it takes a value of zero. The error terms in the equations are given by  $\delta_i$  and  $\varepsilon_i$ , which are assumed to be normally distributed.

In the setting of our data, Equation [5(a)], taken separately, gives us a probit model, which could be used to identify the determinants of households' positive WTP for the institutional change. Consequently,  $z_i$  is 1 for households that said would pay for the institutional proposed institutional change and 0 otherwise.

If we assume that Equation [5(b)] holds with,  $y_i = 0$  if  $y_i^* \leq 0$ , and  $y_i = y_i^*$ , otherwise, then the original Tobin's model applies. On the other hand, if we assume that the error terms in Equations [5(a)] and [5(b)] are characterised by a bivariate normal distribution, with covariance  $\rho$ , then the sample selection model applies. If we, however, assume that the probability of  $y_i^*$  obtaining a positive value and the level that it attains is not correlated, then we have the truncated OLS model, if we continue to assume normality, otherwise we have an independent OLS model on the positive values only in the structural equation, Equation [5(b)].

## 5. 2. Definition of Variables

The explanatory variables used in estimation are the following:

1. The total area of land which is possessed by the household: This is an aggregate level of all the area of all plots that have been given to the household by the community. We use this in the probit equation with the hypothesis that households

that have larger land would be inclined to choose (or 'vote') for a change towards a more secured system—these tend to be losers given the existing tenure structure.

2. The total area of land that the household is willing to pay for: This is the amount of area for which the households were willing to pay for secured tenure. The variable is used in the second (structural) equation hypothesising that it would negatively be related with the willingness to pay per hectare, as it applies for any demand equation.
3. The average years since the holdings were under the disposal of the households: This variable considers whether the length of time that the households have had control over their holdings would have any bearing on the decision to pay for it. It has been used only on the probit equation.
4. The area of land foregone for soil conservation per hectare on the households' plots: Here we are interested to see whether investments made on soil conservation influence both the decision to choose a secured system and the level of payment. Intuitively, it should influence both positively.
5. The mean distance of plots to the households' homesteads: This is in order to investigate whether distance has any bearing on the determination of both the probability of paying and the level of payment made.
6. The number of adults aged 15 years and above in the households: Since the redistributions made so far are dependent on family size, households with more adults in them would expect increase holdings if they were to occur. Thus, we hypothesise that this variable would be inversely related to both actions.
7. The exposure of household head to literacy: Here we would like to see the impact of access to education on these actions.
8. Non-farm income of the household: We used this variable on the probit equation to see its impact on the decision to pay.
9. Value of owned domestic animals by the household: This is used as a proxy to household wealth, which is used in the probit equation.

### 5.3. Estimation Results

#### 5.3.1. Factors Affecting the Probability of Positive WTP

Parameter and their slope estimates of the independent probit model are presented in Table 2.<sup>5</sup> The sign of each parameter seems to be consistent with expectations. Interestingly, the number of adults in the household generates negative impact on the probability of the household's choice of the institutional set-up. At the margin, the mean probability of a positive WTP is reduced by 3% points with an increase in the number of adult household members. Given the institutional set-up in the country this is to be expected. As mentioned earlier, since the main rationale for redistribution of land has been equity and access to land for newly formed households, it follows that households that have more adults would benefit from such an action and would



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actually lose if the institutional set-up is changed into one of private ownership. Thus, it is not surprising at all if households with larger number of adults tend to be less enthusiastic about moving towards private ownership.

The coefficient for the amount of soil conservation investment made is positive and significant at 10 per cent level. Thus, the larger the investment made on soil conservation the larger the probability for the household to opt for a move towards private ownership of land. The marginal contribution of one additional square metre investment on the probability of positive WTP is about 6 percentage points. This is intuitive since a household with larger investments made would have to lose much more than one with less investment on insecure holdings under an unsecured tenure arrangement.

Table 2. Determinants of Willingness to Pay for Tenure Security<sup>†</sup>

Variable	Coefficient	Marginal Effects
Constant	-0.7624292713*** (0.27611436)	-0.2141077243*** (0.076472565)
Total household landholding (in hectares)	0.5597947290*** (0.059578081)	1572032712*** (0.017040320)
Average number of years farmers possessed the land	-0.007025052714 (0.0094768699)	-0.001972796831 (0.0026612695)
Area of land investment on soil conservation (in metres per hectare)	0.02207193545* (0.011708076)	0.06198308550* (0.032815883)
Mean distance of plots from homestead (in Km)	-0.3982899311*** (0.14940934)	-0.1118489989*** (0.041357228)
Age of household head	0.0003712995935 (0.0052308203)	0.0001042694897 (0.0014690936)
Number of adults in the household	-0.1202716709*** (0.047727193)	-0.03377505917*** (0.013344656)
Literacy of household head (0=illiterate, 1=literate)	0.3945866990* (0.20579887)	0.1108090460* (0.057724969)
Non-farm income of household (in '000 Birr)	0.2324773199** (0.10248150)	0.6528499338** (0.028835082)
Value of assets (in '000 Birr)	0.001227821359 (0.024891730)	0.0003448005564 (0.0069909237)
Number of observations	254	
Log likelihood function	-227.7597	
Chi-squared	124.855	

† Dependent variable  $z = 1$  if 'out-of-pocket' willingness to pay is greater than zero;  $z = 0$  otherwise.

†† Figures in parentheses are standard errors.

\*\*\*, \*\*, \* indicate significance levels of 1, 5 and 10 per cent, respectively.

A household that has made more investment on land, the more secured would it like the tenure system to be. Moreover, larger land possession induces larger probability on choosing more stable tenure system, after accounting for other factors, since in case of redistribution it results in reduced holding.

Distance from plot to its homestead, on the other hand, influences the probability of a household's payment for security negatively. In fact, at the margin, the probability of positive WTP decreases by more than 10 percentage points as the distance of farms increased by a kilometre. On the other hand, non-farm income affects this decision positively. However, wealth, defined as the total value of domestic animals owned by the household, and average tenure, defined as the mean number of years that the plots have been under cultivation by the household, do not have any statistically significant influence on the decision to pay for security.

### 5.3.2. Determinants of the Level of WTP

Table 3 reports the results of an independent regression model based on observations with positive WTP only, column 1 and 2 of results indicate the estimated coefficients and their total marginal effects, respectively. We also tried both the Tobit 1 and Tobit 2 models<sup>7</sup>, which are presented in Appendix (7). Tobit 1 failed the moment-based test for normality proposed by Pagan and Vella (1989) and Tobit 2 results show that the correlation coefficient,  $\rho$ , is not statistically different from zero, implying that independence of the two equations cannot be rejected. Thus, our analysis will be based on the results of the independent model.

As can be seen from these results, there are three important variables that explain the amount that an individual is willing to pay for security that are statistically significant. Only one of these variables, the amount of soil conservation made on the land, appear on both the probit and the independent OLS equations. Total household landholding does not appear in the structural model, since in its place we use the variable total area of land farmers wanted to pay for security.

Interestingly, these variables have the expected sign as well. Thus, the larger the quantity of land, the lower the price tag farmers attach on it. Since both the dependent and independent variables enter the structural equation in levels, the marginal effects are marginal willingness to pay as well. Consequently, around the mean value of the variables, an increase in the quantity of land available for changes in tenure arrangement reduces the WTP by Birr 117.5. It is difficult to compare this result with prices of land, for the simple reason that they do not exist. It would not be fair to compare these to the 'prices' of land in urban centres, because the scarcity levels and use of land in these two are different.<sup>8</sup> Comparing this to the average value of farm income seems to be more reasonable, which is around Birr 1500.



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At the same time, controlling for other factors, investments made on soil conservation on land occupied by the farmers increase their WTP for secured tenure arrangements. Thus, at the margin, a change in the soil conservation structure by a metre per hectare raises the WTP by ETB 12. This phenomenon goes with rational reasoning since a farmer would definitely be inclined to pay more for lands with larger investments structures built on them.

Table 3. Determinants of the Levels of WTP: the Independent Model †

Variable	Independent Model	
	coefficient	marginal <sup>9</sup>
Constant	11.1802*** (5.2998)	
Total household landholding (in hectares)		2.5672*** (0.3018)
Area of land investment on soil conservation (in metres per hectare)	0.0337* (0.0184)	0.1199* (0.0652)
Mean distance of plots from homestead (in Km)	-0.1044 (3.0647)	-0.6459 (14.0548)
Age of household head	-0.1595* (0.0864)	-0.7311 (0.3965)
Number of adults in the household	0.6992 (0.8389)	3.4559 (3.8478)
Literacy of household head (0=illiterate, 1=literate)	3.8445 (3.5144)	17.7958 (16.12)
Non farm income of household (in '000 Birr)	-0.0203 (1.2348)	0.0045 (5.6627)
Average number of years farmers possessed the land		-0.0322 (0.0434)
Value of assets (in '000 Birr)		0.0056 (0.1141)
Total area of land farmers wanted to pay for security (in hectares)	-2.8035*** (1.0558)	-1.1753*** (0.4522)
No. of observations	127	
Adjusted R <sup>2</sup>	0.15	
F[7, 112]	4.35	

†The dependent variable is willingness to pay per hectare of land ('00 of Birr).

†† Figures in parentheses are standard errors

\*\*\*, \*\*, \* are significance levels at 1, 5 and 10 per cent respectively.

At the same time, total land at the disposal of the household would not only influence the probability of seeking change in the institutional change, but also affects the level of WTP positively.

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## **6. CONCLUSIONS**

The sampled farming households are not only aware of the existing tenural arrangements in the country, but also are willing to pay for changes in the institution.<sup>10</sup> A large proportion of the sampled households (around 50 per cent) wanted to pay for a change in the existing tenure arrangements. Interestingly, around 50 per cent of those who were willing to pay, were willing to do so without our mentioning of credit facilities.

The data shows that controlling for the other variables in the model, area of land, investment in soil conservation, literacy of the household head, and non-farm income affect the probability of paying for the institutional change positively. On the other hand, mean distance of plots to the household's homestead and its number of adult members affect the probability of paying for this change negatively.

The level of payment that farmers are willing to make for the institutional change is negatively affected by total land for which the change is sought. The effect of investment on soil conservation, however, is positive.

The results in this section seem to reinforce the compelling reasons, discussed on the tenure literature, for having a secured institutional set-up for the farmers in Ethiopia. Since the country is basically dependent on agricultural production, improvising on the institutions that ameliorate productivity should be welcomed.

Consequently, the government is faced with only one imperative policy option: a movement away from the existing insecure tenure system towards a more stable and secured one. It should be clear however that the sole solution to this problem is not necessarily a full-fledged privatisation of land which is seen in current day developed economies.

On the contrary, the available option to move towards a secured system is a continuum of property rights structures. One feasible option, given the situation of the farmers in the country is, for instance, to stop any systematic redistribution of land that is sponsored by the government, be it at the federal level or the regional one, and make sure that each household would have complete say in the allocation of land among its siblings.



# NOTE

<sup>1</sup>There may even be compelling reasons to go a bit further and propose to let the decisions be made at lower levels, preferably at the community or village levels.

<sup>2</sup>In the contingent valuation literature, envisaged changes are made on environmental goods which do not have market prices [see for example, Johansson 1993].

<sup>3</sup>Recently, the PA's have been changed into Kebele Administrations (KA's) indicating the realization of their administrative role.

<sup>4</sup>Explaining this difference may be hazardous without sufficient proof but we note the fact that farmers in Sirbina Godeti have a long experience of the consequences of borrowing (namely repayment responsibilities) from the government. This is a site where farmers have a long history of getting loans from the government for purchasing fertilizers. The other sites have little experience, if any, in this respect, which may have pushed their WTP by borrowing from the government. It is even possible to speculate that they may be thinking 'there would be no repayment.'

<sup>5</sup>Tests for multiplicative heteroscedasticity over the main continuous variables with the specification,

$\text{var}(\varepsilon) = (\varepsilon^* w)^2$  indicated that the coefficients in,  $\gamma$ , were not statistically significant.

<sup>6</sup>Frequencies of Actual and Predicted Outcomes, Predicted Outcomes have Maximum Probability

Actual	Predicted		Total
	0	1	
0	380	17	397
1	84	43	127
Total	464	60	524

<sup>7</sup>We also tried a truncated regression model on the positive values; however, the model did not converge.

<sup>8</sup>Land is not sold in urban centers too. But one can sell his house. It is interesting to note that the price of houses in Addis Ababa is generally far above the price of the 'house'. Consider the cases of small service quarters being sold for quite exorbitant prices, which are demolished and new buildings erected on the land. In effect, the market is taking care of the value of land as well.

<sup>9</sup>An important adjustment is needed for obtaining the marginal values of the independent OLS model. Using the McDonald and Moffitt (1980) decomposition of the total effects of changes in the expected value of  $y_j^*$  with respect to any explanatory variable  $x_j$  is given by

$$\frac{\partial E[y]}{\partial x_j} = F(\cdot) \left( \frac{\partial E[y \bullet]}{\partial x_j} \right) + E[y \bullet] \left( \frac{\partial F(\cdot)}{\partial x_j} \right)$$

where  $E(y \bullet)$  is the expected value of the non-limit values of  $y^*$  and  $F(\cdot)$  is the cumulative normal

distribution. Thus, the total change in  $y^*$  is the sum of the change in the dependent variable for observations above the limit, weighted by the probability of being above the limit, and the change in probability of being above the limit weighted the expected value of being above the limit. [I am grateful to Fredrik Carlson for his suggestions and help in getting the statistical programme right.]

<sup>10</sup>We qualify this in terms of the sampled households only because this sample may not be taken as a representative sample of the country's varied cultures as well as the uses that land is put under by the communities. If at all it could be generalized, it should not pass the settled agricultural farmers. For instance, the conclusions arrived here are highly unlikely to hold for the areas where the population is dependent on cattle raising for their livelihood. Here communal landholding may well be the preferred type of tenure arrangement.

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## APPENDIX 1

Changes in the institutional arrangement are exogenously determined from the household's point of view. Though they may also be a consequence of historical development of a society, they are usually determined through the political process, and affect production by altering the incentive structures facing the individuals in their investment decisions, and choices they make in the production process. Thus, we write:

$$q = f(L^d, A|I_j) \quad [A1]$$

$$\forall j = 0, 1$$

where,  $q$  is an index of composite output produced by the household, which is either consumed by the household domestically ( $X_f$ ) or is sold for cash in the market ( $q_s$ ).

The farm's demand for labour is denoted by  $L^d$ , part of which may originate from market,  $L^d_p$ , and the other part being family labour,  $L^d_f$ . Land input, which is assumed fixed, is given by  $A$ ; and for the time being, let ' $I$ ' be the prevailing institutional arrangement, which is equal 0 for the *status quo* and 1 for an envisaged change. We have ignored other capital inputs in our analysis.

The household's utility is assumed to depend on the goods consumed and leisure, which we write as:

$$U(X_f, X_p, l) \quad [A2]$$

Where,  $X_p$  is an index of composite goods consumed by the household, which comprises of purchased goods from the market, and  $X_f$  is consumption from own production. At the same time, the total available labour in the household may be used as either input in its own farm, or it may be hired out, the remaining part of labour is leisure, given by  $l$ . In general the farming household faces three basic constraints:

1. A cash income constraint:

$$p_p X_p \leq p_f (q - X_f) - w(L^d - L^d_f - L^s_{nf}) \quad [A3]$$

Where  $L^s_{nf}$  is the household's labour supply on non-farm activities with

2. A labour supply constraint

$$T = L_f^d + L_{mf}^s + l \quad [A4]$$

3. The production possibility constraint given by Equation [A1].

Following the basic model formulated by Singh et al. (1984) we collapse all the constraints into:

$$p_p X_p + p_f X_f + wl = wT + \pi \quad [A5]$$

where  $\pi = p_f q(L^d, A|I_f) - wL^d$

With a concomitant Lagrange equation:

$$L = U(X_f, X_p, l) + \mu(y^* - p_p X_p - p_f X_f - wl) \quad [A6]$$

where

$y^*$  is the 'full income' of the household

$p_f$  is the price index of agricultural products in the market

$p_p$  is the price index of purchases made by the household, and

$\mu$  is the Lagrange multiplier.

The solution to the first order conditions of Equation [A6], with respect to  $X_p$ ,  $X_f$  and  $l$ , yield the equations of the demand for the farm product, the market purchased product and leisure, as a function of their respective prices, income and the institutional set up:

$$X_i = X_i(p_f, p_p, w, y^* | I_i), \quad \forall i = a, p \quad [A7]$$

By substituting the demand functions in Equation [A7] into the utility function we obtain the indirect utility function which is given in Equation [1] in the main text.



## APPENDIX 2. WILLINGNESS TO PAY FOR SECURITY

1. Who owns land in Ethiopia?

\_\_\_\_\_

2. Suppose the government was to sell the plots of land you are cultivating. Thus, you would have the right to sell it, the government will not redistribute land in your village, and you would take care of allocating land to your siblings. Would you be willing to pay for them?

Yes.....1 => q. 4

No.....2 \_\_\_\_\_ => q.3

3. Why not? **Code (r)** \_\_\_\_\_ If answer is 1=> q. 4, otherwise =>q. 5

4. Suppose the government was to lend you money that will be payed over a long period (say 10 years) with a soft interest rate (say 4 % per year) for such purposes. Would you borrow in order to buy the plots you currently cultivate?

Yes.....1

No.....2 \_\_\_\_\_ => q. 6

5. Give details on the amount you are willing to pay for each of the plots that you have identified earlier.

Plot No.	Willingness to pay (In Birr)	Plot No	Willingness to pay (In Birr)
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

# APPENDIX 3

Appendix 3A. Perceptions of peasants about form of land ownership in†							Appendix 3C. Reasons for not purchasing land rights†						
	Haressaw	Gebien	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites		Haressaw	Gebien	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites
State	91 (92.9)	80 (80.8)	113 (95.0)	72 (66.1)	80 (79.2)	435 (82.9)	Do not have money	63 (94.0)	50 (56.2)	57 (57.6)	34 (45.8)	47 (71.2)	251 (83.5)
Community P.A./ people	6 (6.1)	19 (19.2)	6 (5)	36 (33.0)	18 (17.8)	85 (16.2)	Land must be distributed freely	4 (6.0)	37 (41.6)	19 (19.2)	39 (52.7)	11 (16.7)	110 (27.8)
God	1 (1)			1 (0.9)		2 (0.4)	Afraid of being nationalized again		2 (2.2)	16 (16.2)	1 (1.4)	8 (12.1)	27 (6.8)
Don't know					1 (1.0)	1 (0.2)	It must belong to the State			2 (2.0)			2 (0.5)
No response					2 (2.0)	2 (0.4)	Old to buy			5 (5.1)			5 (1.3)
Total	98 (100)	99 (100)	119 (100)	109 (100)	101 (100)	526 (100)	Total	67 (100)	89 (100)	99 (100)	74 (100)	66 (100)	395 (100)
Appendix 3B. Would you pay for secured private ownership of land?†							Appendix 3D. If a financial problem, would you borrow for it?†						
	Haressaw	Gebien	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites		Haressaw	Gebien	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites
Yes	29 (29.6)	10 (10.1)	17 (14.3)	35 (32.1)	29 (28.7)	120 (22.8)	Yes	43 (68.3)	13 (26)	17 (29.8)	21 (61.8)	40 (85.1)	134 (53.4)
No	67 (68.4)	89 (89.9)	99 (83.2)	74 (67.9)	68 (67.3)	397 (75.5)	No	20 (31.7)	37 (74)	40 (70.2)	13 (38.2)	7 (14.9)	117 (46.6)
No response					2 (2)	2 (0.4)	Sub-total	63 (100)	50 (100)	57 (100)	34 (100)	47 (100.0)	251 (100)
Outliers	2 (2)		3 (2.5)		2 (2)	7 (1.3)	No response	35	49	62	75	53	274
Total	98 (100)	99 (100)	119 (100)	109 (100.0)	101 (100)	526 (100)	Grand total	96	99	119	109	101	526

† Figures in parentheses are percentages.



APPENDIX 4. Descriptive Statistics of the Variables Used in Regression

Variable	Non-protesting group						Group with positive WTP					
	Harresaw	Gebien	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites	Harresaw	Gebien	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites
Number of observations Total land	92	60	74	69	76	371	29	10	17	35	29	120
	Mean	0.47	0.33	2.66	3.58	1.94	0.4345	0.24	2.79	3.64	2.13	2.1
	Std. Dev.	0.19	0.19	1.07	1.49	1.03	0.1637	0.0622	1.12	1.5	1.46	1.75
	Minimum	0.15	0.13	0.38	0.75	0.38	0.15	0.13	0.38	1.13	0.88	0.13
	Maximum	0.9	1.5	6.53	8.25	7.35	0.85	0.38	4.93	8.25	7.35	8.25
Mean tenure	Mean	16.12	20.08	17.98	12.99	19.08	16.34	16.55	18.17	12.91	17.58	15.92
	Std. Dev.	8.5469	9.41	7.49	7.54	6.82	7.82	9.37	8.26	6.93	5.74	7.47
	Minimum	4	6	4.75	2.6	2	4	6.5	6	4.43	6.5	4
	Maximum	43	42	43	41.83	50	30	38	39	33	29.29	39
	Mean	20.51	19.86	8.41	1.81	0	32.97	22.75	4.41	3.57	0	11.53
Total area of land used for soil conservation	Std. Dev.	25.62	24.8	30.8	9.55	0	24.44	24.25	18.19	13.26	0	21.46
	Minimum	0	0	0	0	0	0	0	0	0	0	0
	Maximum	93	100	175	70	0	93	62.5	75	70	0	93
	Mean	273.98	222.51	353.26	742.18	603.62	547.94	141.9	538.96	664.76	528.56	476.62
	Std. Dev.	822.03	398.67	613.32	714.03	508.32	276.48	195.9	354.79	546.13	349	484.92
Age of Household head	Minimum	0.5	0	19.25	4.33	1.13	3	0	19.25	4.33	12.5	0
	Maximum	6515	2000	2312.5	4235	2625	2000	500	1213.43	2285.71	1400	2285.71
	Mean	47.36	55.18	53.51	45.9	48.33	45.69	46.8	55.53	45.6	50.28	48.26
	Std. Dev.	14.94	14.31	15.55	13.12	14.51	14.86	14.99	17.96	15.35	17.26	16.19
	Minimum	20	26	25	24	16	20	26	28	24	16	16
Maximum	87	92	87	83	83	92	69	83	83	83	83	83

## APPENDIX 4. Continued

Variable	Harresaw	Goblen	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites	Harresaw	Goblen	Debre Birhan	Koro Degaga	Sirbina Godeti	All sites
Number of adults in household												
Mean	2.58	2.88	3.23	3.2	3.76	3.12	2.14	2.6	3.18	3.11	3.9	3.03
Std. Dev.	1.5	1.15	1.37	1.41	1.86	1.54	1.46	0.97	1.29	1.6	2.08	1.71
Minimum	0	1	1	1	0	0	1	1	1	1	0	0
Maximum	6	6	6	7	10	10	6	4	5	7	10	10
Literacy												
Mean	0.032	0.033	0.1757	0.1739	0.1316	0.11	0.04	0.1	0.29	0.23	0.28	0.19
Std. Dev.	0.1786	0.181	0.3831	0.3818	0.3403	0.31	0.19	0.32	0.47	0.43	0.45	0.4
Minimum	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	1	1	1	1	1	1	1	1	1	1	1	1
Non-farm income												
Mean	444.42	32.6	609.23	173.34	265.5	323.62	519.9	11.4	957.44	166.47	468.41	429.82
Std. Dev.	814.62	158.86	750.25	191.49	1102.78	755.08	945.1	27.2	1097.88	220.58	1700.48	1068.06
Minimum	0	0	0	0	0	0	0	0	17.5	0	0	0
Maximum	5000	1200	4444	672	8640	8640	5000	84	4444	672	8640	8640
Value of assets												
Mean	1628.73	1151.08	5565.38	3685.62	2498.26	2897.56	1637.97	1232	6123.24	4591.8	2887.86	3403.14
Std. Dev.	1555.07	674.11	3698.64	4244.92	1958.95	3197.43	1505.14	587.48	3214.39	5550.13	2036.9	3797.16
Minimum	0	0	0	48	0	0	0	0	370	150	0	0
Maximum	6540	3050	22100	29350	7450	29350	5185	2150	10940	29350	7390	29350
Land to be paid for												
Mean	0.3092	0.091	0.6919	2.78	1.41	1.03	0.3741	0.22	1.7	3.45	1.57	1.73
Std. Dev.	0.2402	0.1258	0.9093	1.83	0.78	1.35	0.1737	0.0531	0.86	1.4133	0.67	1.52
Minimum	0	0	0	0	0	0	0.08	0.13	0.15	1.13	0.3	0.08
Maximum	0.9	0.5	3.15	8.25	3	8.25	0.85	0.25	3.15	8.25	3	8.25



## APPENDIX 5. Single Equation Tobit 1 and Tobit 2 Estimates of the Determinants of The Level of WTP ††

Variable	Tobit 2			Tobit 1	
	Probit	structural Equation			
	Coef.	Coef.	marg. ef.	Coefficient	marg. ef.
Constant	0.2802 (0.285)††	8.1614 (5.9455)		-11.6862** (5.7355)	-2.2406** (1.0729)
Total area of land farmers wanted to pay for security (in hectares)		4.7249** (2.1135)	1.5087** (0.7194)	7.9119*** (1.1809)	1.517*** (0.2181)
Area of land investment on soil conservation (in metres per hectare)	0.0056 (0.0224)	0.01899 (0.0389)	0.0034 (0.0157)	0.046** (0.0244)	0.0088* (0.0466)
Mean distance of plots from homestead (in Km)	-0.4394* (0.2592)	-6.3786 (4.0042)	0.0608 (1.7423)	-6.8376** (2.9683)	-1.311** (0.5591)
Age of household head	-0.0169** (0.0076)	-0.3879*** (0.0979)	-0.4295 (0.0404)	-0.1479 (0.0935)	-0.0284 (0.0179)
Number of adults in the household	-0.1283 (0.1085)	-2.0573** (0.9303)	-0.0443 (0.5973)	-1.9993** (0.9282)	-0.3833** (0.1765)
Literacy of household head(0=illiterate,1=literate)	0.2526 (0.2994)	5.1247 (4.1573)	0.4303 (1.8756)	9.637*** (3.9915)	1.8477** (0.7655)
Non farm income of household (in '000 Birr)	0.1301 (0.2179)	2.7424 (1.7988)	0.2547 (1.1741)	3.3769*** (1.6385)	0.6475** (0.3150)
Average number of years farmers possessed the land	-0.0004 (0.0107)		-0.0001 (0.0038)		
Value of assets (in '000 Birr)	0.0057 (0.0541)		0.002 (0.0193)		
Total land under household (in hectares)	0.3346*** (0.0871)		0.1196*** (0.0331)		
SIGMA(1)		11.1351*** (0.9652)		22.3412*** (1.5818)	
RHO(1,2)		.146 (1.356)			
No. of observations		524			524
Log-L		-700.3775			-704.2784

† Probit dependent variable  $z = 1$  if 'out-of-pocket' WTP is greater than zero;  $z = 0$  otherwise; dependent variable for structural equation in Tobit 2 and Tobit 1 is the censored out-of-pocket WTP.

†† Figures in parentheses are standard errors.

\*\*\*, \*\*, \* indicate significance levels of 1, 5 and 10 per cent respectively.