The Employment Guarantee Scheme as a Social Safety Net -Poverty Dynamics and Poverty Alleviation

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Abstract

This paper investigates the dynamic aspects of poverty and anti-poverty interventions, particularly focusing on *promotional effects*, *i.e.*, the effects of helping the poor escape poverty and *protective effects, i.e.*, the effects of preventing the non-poor from slipping into poverty. We test the effectiveness of the Employment Guarantee Scheme (EGS) in rural India as a social safety net drawing upon the ICRISAT survey data. We have carried out the econometric analysis, namely Cox Proportional Hazard Model to estimate the probability of entering or exiting poverty by various covariates drawing upon annual household panel data during the period 1979 to 1984. The following three conclusions have been derived by our estimation results. Firstly, the results suggest that the EGS has significant promotional and protective roles irrespective of the choice of income poverty lines. This is an important finding in the sense that 1) the EGS was effective in reducing poverty in the long run since poverty reduction is achieved through positive promotional and protective roles and, 2) the EGS served as insurance for an annual income shortfall. Secondly, we have identified other important factors which prevent households from entering poverty and help them escape poverty, such as decrease in illness of household members, land and access to formal and informal borrowings. Thirdly, we have found that the static determinants of poverty identified by the probit model and 'the cause' of poverty estimated by the Cox Model are not much different, implying that static analysis has some implication in identifying the causes of long-term poverty.

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Key Words: South Asia, India, Chronic Poverty, Employment Guarantee Scheme, Safety Net

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1. Introduction

The purpose of this paper is to investigate how short-term shocks and resulting income shortfalls affect household poverty transition over time, and the extent to which participation of household members in the rural public work schemes (i.e., the Employment Guarantee Scheme) serves as a social safety net for the shocks. In order to address this issue, we have to take into account the dynamic aspect of poverty, because most of the existing evaluations of the targeted interventions, including rural public work programmes, are *static* in the sense that they use income or consumption data at a specific time. Few studies have focused on the dynamic aspects of poverty-alleviation policies, namely the impacts of anti-poverty policies on the long-term change in household welfare or poverty status over the years. In particular, in the context of developing countries, the distinction between 'chronic' and 'transient' poverty is often crucial for the analysis of poverty, because there exists a group of the poor who are left aside from the growth process and thus cannot escape from poverty. Also, static analysis often conceals the effects of anti-poverty intervention on sharp income shortfalls within a year. For households who do not have appropriate measures for smoothing consumption, it is important to supplement their income when faced with temporary income shortfalls.

The literature on 'poverty dynamics' has recently attracted the attention of both academics and policy-makers, because of the increasing recognition that use of static welfare indicators does not

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necessarily identify the chronic poor (Baulch and Hoddinott, 2000). Using the panel data in developing countries, some recent studies have seriously dealt with the dynamic aspects of poverty (*e.g.*, Bane and Ellwood, 1986, Baulch and McCulloch, 1999, 2000, 2002, Dercon and Krishnan, 2000, Jalan and Ravallion, 1998, 2000, McCulloch and Baulch, 2000, Muller, 1997, Ravallion, 1988, Ravallion van de Walle, and Gautam,1995). However, few studies have empirically examined the dynamic aspects of anti-poverty policies, that is, how the policy affects poverty status of households over time. Using the actual data on household income from the EGS, this study will try to understand how and to what extent the anti-poverty policy (rural public work scheme in particular) helps the poor escape poverty or prevents the non-poor slip into poverty.

Gaiha and Deolalikar (1993) investigate the chronic poverty, using the ICRISAT panel data in the period from 1975-76 to 1983-84. They show that persistent poverty was prevalent in the semi-arid villages in rural India. As in Table 1, a majority of the households had been below the poverty line for more than the five years in nine. Furthermore, they show that the non-negligible share (21.8 percent) of the total households continued to be below poverty line during the entire period drawing upon the annual data.

(Table 1 to be inserted around here)

A few studies have investigated the dynamic aspects of anti-poverty or safe-net policies drawing upon the statistical approach in which joint welfare distributions of two different periods are compared. To examine the effectiveness of the social safety net in Hungary during the late 1980s, Ravallion, van de Walle, and Gautam (1995) have proposed two concepts on policy roles on poverty alleviation, namely, 1) *promotional effects*, the effects of helping the poor escape from poverty and, 2) *protective effects,* the effects of preventing the non-poor from slipping into poverty. Based on a number of policy simulations, they conclude that cash benefits protected many from poverty, but prompted few out of poverty and that the impact on poverty was largely due to higher outlays, not improved targeting. Following Ravallion *et.al.*'s approach, Gaiha and Imai (2002) focus on *promotional effects* and *protective effects* of the EGS using the ICRISAT data in 1979/80 and 1984/85. Based on the simulations involving a wide range of poverty thresholds and different assumptions about the distribution of EGS earnings, Gaiha and Imai show that neither *promotional* nor *protective* effects are statistically significant and argue, as in Ravallion *et. al.* (1995), that larger outlay is necessary to strengthen these effects.

The methodology used by Ravallion *et al.* (1995) is useful for measuring the magnitude of promotive and protective effects expected from anti-poverty interventions. However, participation in the EGS is, for example, only one of the various factors that affect the transition of poverty status of households across different years. This methodology does not aim at identifying the relative importance of the anti-poverty interventions among other factors. Also, this is not very effective for the purpose of investigating dynamic aspects of poverty interventions over several years. Drawing upon the econometric approach, we will thus try to take a different approach to identify the *promotive* and *protective* effects to overcome these limitations.

In the present study, we will carry out the econometric estimation based on Cox's (1972) proportional hazard model, whereby the probability of a household entering (or exiting) poverty is estimated. We will extend the empirical methodology taken by Baulch and McCulloch (2002), who use the IFPRI (International Food Policy Research Institute) data in rural Pakistan. The present analysis draws upon the annual panel data on income which we have constructed from the ICRISAT survey. Since factors other than the availability of the EGS may also have promotional or protective effects, drawing upon the Proportional Hazard Model, we will estimate the probability of entering poverty or of exiting poverty by a number of variables, including household structures or transitory shocks. The relative importance of the EGS in comparison with other factors will be made clear by this approach.

This study will then compare the estimation results of the Cox Proportional Hazard Model that focuses on dynamic poverty transition with those of the random-effects probit model that estimates the relationship between static poverty status and its covariates. We will draw upon the annual income data for these estimations. Although a majority of the poverty studies to date have been mainly based on static models (such as logit or probit models) using annual income data, it is not entirely clear whether this static approach will make clear the actual *cause* of poverty (Baulch and McCulloch, 2002).

The rest of this paper is organised as follows. In the next section, the salient features of the Employment Guarantee Scheme and the data are briefly explained. The econometric analysis and estimation strategy on dynamic aspects of poverty and poverty alleviation policies will be discussed in detail in the Section 3. The section 4 reports the estimation results. The last section offers some concluding remarks.

2. Salient Features of the Employment Guarantee Scheme and the Data[2]

The Employment Guarantee Scheme in Maharashtra[3] was first experimentally initiated by Mr. V.C. Page in 1965. It was subsequently expanded as part of an integrated rural development project, culminating in the EGS Act (No.XX of 1978) and its implementation in Maharashtra in 1979. From a modest beginning, the EGS expanded rapidly into the most important poverty-alleviation programme in Maharashtra (Gaiha, 2000).

The EGS has the following features. Firstly, the scheme guarantees that every adult who wants a job in rural areas will be given one, provided that he or she is willing to do unskilled manual work on a piece-rate basis. In this sense, the decision as to whether to participate is left to the participants. Secondly, until 1988, the wage rate was usually below the agricultural wage rate.

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[2] This section draws mainly upon Gaiha (2000).

[3] Of the ten ICRISAT villages, Shirapur and Kanzara are located in Maharashtra.

Thirdly, as the guarantee holds at district level, a person may be required to travel a long distance for a few days of temporary work.

The scheme must satisfy two criteria: being labour-intensive and creating productive assets (Dev, 1995). As the EGS is aimed at minimising the recurrence of droughts by prioritising moisture or water conservation, it may indirectly reduce the possible risk for farming households. Work under the EGS should be so organised that it does not interfere with normal agricultural activities (Gaiha, 2000). However, it is not yet clear to what extent the EGS has been an effective measure for reducing the anticipated and unanticipated shocks faced by households.

The present study draws upon the ICRISAT panel data during the period of the crop year 1979-80 to 1984-85 in Shirapur and Kanzara in the state of Maharashtra. Shirapur and Kanzara are the only two villages out of ten where the EGS took place and the ICRISAT survey was carried out.[4] The data set covers production, expenditure, time allocation, prices, wages, and socio-economic characteristics in the semi-arid region in South India. Given the agro-climatic conditions and purposive selection of the villages, the VLS data are not representative of all of rural south India or, for that matter, even of its semi-arid region. Nevertheless, the longitudinal nature and richness in terms of variables included are what make the ICRISAT VLS data unique. The present analysis is based on data for 80 households in 2 villages. Our analysis draws upon annual panel data during the sample period.

3. Estimation Strategies

3.1. Change in Poverty Incidence

Before we discuss the details of econometric estimations, it is useful to give a brief descriptive statistic of the data, particularly focusing on the change in incidence of poverty over time. In this study, we will mainly use four poverty lines, all of which are based on Rs. 180 per capita per annum (at 1960-61 prices)[5]: namely (a) 0.5*Annual Poverty Line = Rs. 90, (b) 0.75*Annual Poverty Line = Rs.120, (c) Annual Poverty Line = Rs.180, and 1.25*Annual Poverty Line = Rs.225. Four different lines will be used, because estimation results of Cox Proportional Hazard Models or Static Poverty Regressions are likely to be sensitive to the choice of poverty threshold.

Corresponding to Table 1, Table 2 shows that poverty incidence is generally quite high in the survey area. In Case (c) where the standard income poverty line is applied, about 60 percent of the total households are under the poverty threshold. However, poverty incidence decreased over the years. It was reduced to 43 percent in 1984.

(Table 2 to be inserted around here)

Cases (a)-(d) equally show that poverty declined over the years irrespective of the poverty line applied. However, the proportion of poor households in the total sample considerably differs according to the poverty line that is applied. In 1979, for example, 23 percent of households are 'severely' poor (Case (a)), whereas 75 percent are 'mildly' poor (Case (c)). This table suggests that a substantial share of households may have experienced the shift from the group of 'poverty' to that of 'non-poverty' as the general level of poverty decreases. However, this table does not refer to the mobility between the poor group and the non-poor group. The Cox Proportional Hazard Model on poverty transition will focus on the transition process as well as the *cause* of the long-term decline of poverty incidence. The EGS participation rates are ranged from 11 percent to 17 percent over the survey period, as shown in the last row of Table 2.

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[4] See Walker and Ryan (1990) for the discussion on key features of the ICRISAT data set and survey villages.

[5] This poverty cut-off point has been widely used in the Indian poverty literature. For some applications, see Srinivasan and Bardhan (1988).

In order to investigate the dynamic aspects of poverty and poverty-alleviation policies, the next sub-section section tries to identify the factors that influence entries into and exits from poverty, drawing upon econometric estimations based on annual household income data constructed by the ICRISAT data set.

3.2. Model and Estimation Strategy

(1) Basic Model

One of the relevant empirical strategies for our purpose is to apply Cox's (1972) Proportional Hazards Model to the estimation of the probability of slipping into or escaping from poverty. Baulch and McCulloch's (2002) study based on household data in rural Pakistan is the first application of proportional hazard model to the analysis of dynamic aspects of poverty in developing countries. Drawing upon the ICRISAT data in India, this section will extend Baulch and McCulloch's work. Firstly, we allow the key explanatory variables, such as household endowments or characteristics, to change over time. This is important, because the change of household structure, such as increase in dependency burden, is likely to cause a household to slip into poverty. Secondly, related to the first point, transitory shocks, which include 1) village-level shocks (*e.g.*, rainfall shocks or increase of village-level unemployment rate) and, 2) idiosyncratic shocks (*e.g.*, illness shocks), have been added to explanatory variables. Thirdly, we have included the days of participation in the EGS in one of the arguments. This corresponds to the statistical analysis we presented in the last section. However, drawing upon the econometric approach in this section, we can identify the relative importance of EGS participation compared with other factors, in terms of enabling households to escape from poverty.

In Cox (1972)'s proportional hazards model, the probability of failure at the current period, time *t*, depends upon the unknown baseline hazard and the factors which affect the failure, given a spell lasting up to time *t* during which failure has not occurred. We will apply this model to the analysis of poverty dynamics, drawing upon Baulch and McCulloch (2002). In particular, we will focus on the probabilities of entering (or exiting) poverty given a spell of the state of being non-poor (or being poor) lasting up to the current period. The Cox proportional hazards model assumes that the hazard function $h(t)_{vi}$ of a household i may have the following functional form:

$$h(t)_{vi} = h_0(t)\exp(B_{vit}b_1 + I_{vit}b_2 + R_{vt}b_3) \qquad \textbf{(1)}$$

where

$h(t)_{vi}$ = the hazard function at time t, namely, the probability of household i in village v entering (or exiting) poverty given that the spell of the state of being non-poor (or being poor) has lasted until time t.

$h_0(t)$ = the unknown baseline hazard

b_i = a vector of coefficients

B_{vit} = a vector which is assumed to affect $\Pr_{it}$ *i.e.*, household characteristics of household i in village v at time t.

I_{vit} = a vector of idiosyncratic shocks of household i in village v at time t.

R_{vt} = a vector of the aggregate shocks of village v at time t.

The advantage of the Cox model is that we do not have to derive the unknown baseline hazard directly. So we can estimate the relationship between the probability of entering (or exiting) poverty ($\Pr_{vit}$) and B_{vit}, I_{vit} and R_{vt}. Obviously, some households do not exit poverty at the end of the period and thus we have included the censored spell, that is, the poverty spell at the end of the panel in the calculation of the likelihood function.

To estimate the equation (1), we will apply the following partial log-likelihood function

$$\ln L = \sum_{j=1}^{D}\left\{\sum_{k\in D_j}(B_k b_1 + T_k b_2 + I_k b_3) - d_j \ln[\sum_{k\in R_j}\exp(B_{vi}b_1 + I_{vi}b_2 + R_v b_3)]\right\} \qquad (2)$$

where j indexes the ordered failure times $t_{(j)}$ (j = 1, ---, D), D_j is the set of d_j observations that fail at $t_{(j)}$, $d_{(j)}$ is the number of failures at $t_{(j)}$, and R_j is the set of observations k that are at risk at time $t_{(j)}$ (*i.e.*, all k such that $t_{0i} < t_{(j)}$? t_i) (Kalbfleisch and Prentice, 1980).

We have included a variable on the availability of the EGS (namely the EGS participation days) as one of the arguments which determine the probability of entering or exiting poverty. By doing so, we can econometrically evaluate the significance of the promotional or protective effects of the scheme.

(2) Discussion

In applying the Cox Proportional Hazard Model to the probability of entering or exiting poverty based on household data, it is crucial to take into account the following specific issues. Firstly, household data are typically heterogeneous, we need to adjust heteroscedasticity. In estimating the Cox Proportional Hazard Model, we will use the Lin-Wei robust estimator which calculates the variance-covariance matrix proposed by Lin and Wei (1989). This robust estimator is similar to the so-called "sandwich" variance estimator or the Huber-White robust estimator which have been extensively used in the literature. Heteroscedasticity is adjusted by the robust variance estimator.

Secondly, the Cox Proportional Hazard Model assumes that hazard function is continuous and thus tied failures, that is, failures which occur in succession, do not conceptually arise, whereas poverty data we are dealing with are typically discrete. There are possibly two ways of considering tied failures in calculating the likelihood function. Firstly, it is assumed that as time is discrete the likelihood is changed to reflect discreteness and calculate the conditional probability that the observed failure arises in the risk pool given the observed number of failures, taking account of the order of each event. Secondly, even though we allow tied failure to occur, it would be possible to maintain the analytical framework of the partial log-likelihood function. We can let the likelihood reflect the marginal probability that the tied failure events occurred before the non-failure events in the risk pool and ignore the order of events. To approximate this, the largest risk pool will be used for each of the tied failure events. Since there are not so many ties in the data set, we will use the latter strategy for simplicity.

Thirdly, while the original form of the Cox Proportional Hazard Model deals with the case where there is a single failure time (*e.g.*, death) on each study subject, there may be more than one failure time on each study subject in our case since many households enter or escape poverty more than once during the survey period. We assume that, once failure occurs, the hazard function restarted since last failure and that each failure is not affected by the record of previous failure events. To estimate the model with multiple failures, we will first estimate the Cox Proportional Hazard Model with single failure data as if numerous subjects with single failure event existed. Then, we will adjust the standard errors by taking account of clustering at the household level, which is suitable for multiple failure data. Since it is reasonably assumed that the past record of entering or exiting poverty is reflected in a number of covariates in the Cox regression, our approach is considered to be one of the standard methods to analyse the multiple failure events.

(3) Estimation Strategy

First Step

The empirical strategy follows the two-step procedure. In the first step, 1) formal borrowings, 2) informal borrowings, and 3) the EGS participation are regressed by the random-effects Tobit model. We will then predict these variables for all households in the sample. In the second, the Cox Proportional Hazard Model is estimated by the formal and informal borrowings and the EGS participation days which have been predicted at the first step, together with other covariates. As the predicted values of these three variables are created for all sample households by the Tobit model, we will be able to take into consideration the endogeneity problem associated with borrowings or participation in the EGS, arising from the possibility that borrowings or participation is affected by the probability of entering or exiting poverty.

(a) Wage Estimation

Before we estimate the workers' participation equation, we will first estimate agricultural and EGS wage rates which are key factors to the worker's decision to join the wage-labour market. In this paper, we will particularly focus on the effects of individual or household endowments on the agricultural wage and EGS wage rates. With regard to the agricultural-wage function, we assume the following relationship.

$$W_{AGRitv} = W_{AGRitv}(H_{itv}, S_{itv}, A_{itv}, B_{itv}, V_{itv}, I_{itv}, R_{iv}, a_{iv}) \quad \textbf{(3)}$$

where H is a vector on health, namely height and illness.[6] i, t, and v denote individual, crop year (t=1, 1979, ---, t=6, 1984) and village respectively. Illness denotes total number of monthly dummy variables (summed over the entire crop year) as to whether a particular member of the household is ill for at least one day. S denotes an index of schooling (number of years). A refers to socio-demographic characteristics (viz. age, gender, caste, whether married or not), whereas B denotes family background (*e.g.*, the schooling or occupation of the household head[7], the debt of the household). V represents measure of wealth (land owned or net worth). I denotes village infrastructure. R refers to risk faced by households (rainfall). a denotes unobserved factors (*viz.* ability).

The EGS wage function is specified as follows.

$$W_{EGSitv} = W_{EGSitv}(H_{itv}, S_{itv}, A_{itv}, B_{itv}, V_{itv}, I_{itv}, R_{iv}, g_{iv}) \quad (4)$$[8]

In the estimation of each equation, we will assume linear functional forms. We will use the Random-effects Tobit model to estimate the linear functions.

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[6] Considering the possibility that weight or BMI index is likely to be affected by wage rates or income in the short run, we choose height as proxy for health.

[7] Ideally, parental education and occupation should be used but, as the problem of missing variables is serious, we will use the education and occupation of the household head instead.

[8] Note that the EGS wage rates are not fixed administratively, but determined on the piece-rate wage system.

(b) The EGS participation

With regard to the EGS and agricultural wage rates, we will use the values which have been estimated by the Tobit model for individual wage rates. The wage rates at the household level are derived by averaging the predicted values of the individual wage rates. The merit of this procedure again lies in taking into account of the endogeneity problem, because the possibility exists that the EGS participation in tern affects the EGS and agricultural wage rates.

Participation equation is specified as

$$P_{EGSvit} = P_{EGSvit}(\hat{W}_{EGSvit}, \hat{W}_{AGRvit}, B_{vit}, I_{vit}, R_{vt}, S_{v}, E_{vit}, a_{vi}) \quad (5)$$

i denotes household and *t* denotes crop year. *v* denotes the village (1 if households are in Shirapur and 0 in Kanzara). P_{EGSvit} is the availability of the EGS, namely the total numbers of days of participation by members of the household *i* during the crop year. $\hat{W}_{EGSvit}$ and $\hat{W}_{AGRvit}$ are the EGS and agricultural wage rates at the household level predicted by the individual wage functions. B_{vit} refers to the vector of household characteristics such as caste, characteristics of household head, sex/ age/ education combined variables. I_{vit} is an idiosyncratic shock at household level. We use illness and unemployment days of household members to proxy I_{vit}. R_{vt} is the variable which expresses the aggregate shocks. Village-level unemployment days and rainfall shocks are used for the aggregate shocks. S_v is a village dummy variable which proxies the village-level infrastructure. E_{vit} denotes the past EGS participation days which expresses the aversion for manual labour. a_{vi} is the individual unobservable effects. Random-effects Tobit model which takes account of the nature of panel data is employed for estimating the above equation.

(c)Formal and Informal Borrowings

Formal and informal borrowings are estimated similarly estimated as follows.

$$D_{formalvit} = D_{formalvit}(B_{vit}, I_{vit}, R_{vt}, S_v, a_{vi})$$

$$D_{informalvit} = D_{informalvit}(B_{vit}, I_{vit}, R_{vt}, S_v, a_{vi})$$

In this case, I_{vit} denotes unemployment days of household members to proxy I_{vit} and R_{vt} is village-level unemployment days. The choice of other variables is same as in the case of the EGS participation equation.

Second Step (Proportional Hazards Model)

$$h(t)_{vi} = h_0(t)\exp(\hat{P}_{EGS} b_0 + \hat{D}_{formalvit} b_1 + \hat{D}_{informalvit} b_2 + B_{vit} b_3 + I_{vit} b_4 + R_{vt} b_5 + S_v b_6)$$

where $h(t)_{vi}$ is the probability of household *i* entering (or exiting) poverty and $h_0(t)$ is the unknown baseline hazard which does not have to be estimated. P_{EGSvit} is the EGS participation days that are predicted by the first-stage equation. $D_{formalvit}$ and $D_{informalvit}$ are the net formal and informal borrowings estimated at the first step. B_{vit} is household background, such as caste, education, or area of owned land. I_{vit} is the vector of illness of male adults, female adults, or children. R_{vt} refers to either village-level unemployment rate and rainfall shocks.

4. Estimation Results

The first column in Case (a) of Table 3 shows the result of the estimation of wage function for the entire sample. Illness negatively affects agricultural wage rates. The results show that individual or household endowments are important in determining agricultural wage rates. The variables labelled as A, the socio-demographic characteristic factors significantly affect agricultural wage rates. Both age and caste (the dummy variable as to whether one belongs to the high caste or not) are significantly and positively associated with the agricultural wage. Wage rates of female workers are significantly lower than those of male workers. Contrary to one of the predictions made by the literature on the efficiency wage theory (Bliss and Stern, 1978), landed labourers tend to receive higher wages. It is likely that this reflects the fact that landholding strengthens the bargaining power of labourers with employers or that landholding may have an indirect correlation with some sort of skills which the workers possess. Furthermore, if rabi rainfall and lagged kharif rainfall increase, the agricultural wage decreases. This implies that the aggregate risk (which is parameterised by rainfall) negatively affects the welfare of labourers.[9] The second column in Case (a) of Table 3 shows the EGS wage function. Contrary to the case of agricultural wage functions, the EGS wage rates of younger workers tend to be higher than those of older workers. Gender difference in EGS wage rates seems to exist. The individuals belonging to the household where the household head is agricultural labourer tend to enjoy higher EGS wages. Case (b) reports agricultural and EGS wage functions for the landless. It is observed in both cases that, while illness has a negative impact on agricultural wage rates, education has a positive effect. Wage rates of female workers are lower than those of male workers as in Case (a).

(Table 3 to be inserted around here)

Table 4 shows the estimation results based on random-effects Tobit estimation of formal borrowings, informal borrowings, and the EGS participation days. The first and the second columns report the results on formal and informal borrowings. Village-level unemployment shock increases the net amount of formal borrowings, whilst unemployment days of household

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[9] A higher monsoon, which may result in a higher rainfall in kharif, is likely to increase agricultural wages. However, our result indicates that this story is not applicable to our sample, *i.e.*, Shirapur and Kanzara from

members significantly decrease it, implying that formal borrowings do not serve as an insurance for unemployment shocks. Rather do they imply the credit constraints whereby households with unemployed members are excluded from the formal credit. The results in the fourth panel report that if households are from low caste they tend to rely on informal borrowings to a greater extent. Also, a household whose household head is agricultural labourer does not have enough access to the informal credit market. As expected, owned land area is positively and significantly associated with formal borrowings presumably because land may be used as collateral. On the contrary, the amount of informal borrowings is not significantly affected by owned land area. Households in Shirapur tend to be more dependent on the informal borrowings.

(Table 4 to be inserted around here)

The third column reports the estimation results on participation in the EGS. Households with members whose agricultural wage rates are high tend to participate in the EGS for longer periods. This may be related to the piece-wage rate system of the EGS whereby workers with the low agricultural wage rates did not or could not participate in the EGS. Unemployment days of household members significantly increase the days of participation in the EGS, which suggests that the EGS serves as unemployment insurance. A household whose household head is agricultural labourer is positively and significantly associated with the EGS participation days. It is suggested that a female-headed household is more likely to be dependent on the EGS than is a male-headed household. The sixth panel on sex/ age/ education combined variables implies that the large number of young children significantly decreases the EGS participation days.

Table 5 presents the estimation results based on the Cox Proportional Hazard Model for the probability of *entering* poverty, while those for the probability of *exiting* poverty is shown in Table

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1979 to 1984. It should be also noted that unexpectedly large rabi (or post rainy season) rainfall might negatively affect some kinds of standing crops (see Walker and Ryan, 1990).

6.[10] The former is related to 'preventive' roles of the EGS, because the negative and significant coefficients of explanatory variables in Table 5 imply that these factors reduce the probability of slipping into poverty. On the other hand, the latter concerns 'promotional' effects as the positive and significant factors in Table 6 help the poor exit poverty.

(Tables 5 and 6 to be inserted around here)

Tables 5 and 6 report that the EGS has both *promotional* and *protective* effects for a range of poverty thresholds. It has been shown by Table 5 that the EGS has significant protective effects, that is, prevents households from slipping into poverty in Case (b) (where 0.75 of annual poverty threshold is used), Case (c) (where annual poverty threshold is used) and Case (d) (where 1.25 of annual poverty threshold is used). However, the EGS is not effective in preventing households from entering severe poverty based on the lowest poverty line (*i.e.*, 0.5 of annual poverty line) in Case (a). In order to prevent households from slipping into the severe poverty, increase of owned land area and decrease of illness of male adults[11] potentially have larger protective effects. In Cases (b), (c), and (d) where the EGS has a protective role, it will be useful for policy makers to note what other factors potentially play protective roles. The factors which may prevent the non-poor from slipping into poverty in Cases (b), (c), and (d) include 1) high level of formal borrowings (Cases (b) and (c)), 2) high level of informal borrowings (Case (d)), 3) large area of owned land, 4) the job of household head being not agricultural labourer (Cases (c) and (d)), 5) smaller number of children under the age of 5, 6) large number of male adults, 7) being in the

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[10] As the results are likely to be sensitive to the choice of poverty thresholds, four different cases are shown in Tables 5 and 6.

[11] The reason why illness of female adults has *negative* and significant coefficients in Cases (a) and (d) is not obvious. This might be related to the fact that, in the peak season when household income is high, only female members tend to be sick due to the heavy burden of work together with their relatively low level of nutritional status.

village, Shirapur and, 8) the lower level of annual rainfall. These results imply that, while the EGS has significant preventive effects, other policy interventions or structural factors which lead to the easier access to formal and informal borrowings, larger land areas, or decrease in dependency burden will be also potentially important in preventing the households from slipping into poverty, though the EGS was undoubtedly one of the most effective policy interventions to protect households from slipping into poverty.

On the contrary, Table 6 indicates that the EGS has significant promotional effects, that is, helps poor households escape poverty in Case (b) (where 0.75 of annual poverty threshold is used) and Case (c) (where annual poverty threshold is used). Promotional effects of the EGS are not observed in Case (a) or Case (d). This implies that the EGS was effective in helping the poor household, whose income is moderately below the annual poverty line, escape poverty. This is an important finding because one of the objectives of the EGS is to alleviate poverty through the guarantee of employment for the poor.

While the EGS has 'promotional' effects, it is noteworthy that other factors are also important in helping the poor households escape poverty. For example, 1) larger land area (Case (d)), 2) illness of female households (all the cases) and illness of male adults (Case (c)), 3) decrease in unemployment days of household members (Case (d)), 4) the job of household head being not agricultural labourer (Cases (b), (c), and (d)), 5) smaller number of young children under the age of five (Cases (a), (c), and (d)), 6) large number of illiterate male adults, and 7) being in Shirapur.

Table 7 shows the results on Random Effects Probit Model to estimate the probability of *being* in poverty. It may be useful to compare the results in Table 5 based on the estimation of the probability of *entering* poverty and those in Table 7 based on the estimation of the probability of *being* in poverty in order to make comparison of the *dynamic cause* of poverty and the *static state* of poverty.

(Table 7 to be inserted around here)

The first panel of Table 7 shows that households whose members participate in the EGS for a longer period are more likely to be poor (Cases (b), (c), and (d)), which is consistent with the results in Table 5. In general, the results in Table 7 show a pattern quite similar to those in Table 5. This is in sharp contrast with Baulch and McCulloch's (2002) paper which argues that the factors which are associated with the state of poverty identified by the logit regression are different from the factors which determine the cause of poverty identified by the Cox Proportional Hazard Model.

However, a few differences between the static and dynamic regression results are worth noting. Firstly, village-level unemployment rates are positive and significant in the static model (Cases (a), (b), and (c)), while they are not in the dynamic model. This implies that higher unemployment rates are associated with static state of poverty, rather than the dynamic transition of poverty. Secondly, the dummy variable as to whether household head is female affects the probability of *being* in poverty, whereas it does not have any effect on the probability of entering poverty.

In this paper, we have so far focused only on the absolute poverty lines in both static and dynamic poverty regressions. The interesting question is whether or not the results will be changed when the *relative* poverty line is applied. The Cox Proportional Hazard Models for entering and exiting poverty and the Random-effects Probit Model for being in poverty have been thus applied for the case where the relative poverty line is applied (that is, the case where the poverty line is set at the level of 20 percent of total household income each year). The t-values of coefficients associated with the predicted days of participation in the EGS have become less significant in the case where the relative poverty line is applied than in the cases where the absolute poverty lines are used: i) coefficient: -0.014, t-value: -0.46, for the case where the probability of entering poverty is estimated by the Cox model, ii) coefficient: 0.007, t-value: 1.46 (significant at 15 percent level) for the case where the probability of exiting poverty is estimated by the Cox Model, and iii) coefficient: -0.06, t-value:-2.02 (significant at 5 percent level) for the case where the probability of being in poverty is estimated by the probit model. The EGS does not have any significant protective effect for the relative poverty line, since the relative poverty line increases considerably over time (see Table 2). However, the EGS has some promotional effects for the relative poverty line. The coefficients on other variables show results that are generally similar to Tables 5, 6, and 7. In sum, though the use of relative poverty line makes promotional and protective effects of the EGS less significant, the overall pattern of the results, including the signs of the predicted values of the EGS participation days, are not considerably changed.

5. Concluding Observations

In the present study, we have investigated the dynamic aspects of poverty and anti-poverty interventions, particularly focusing on *promotional effects*, *i.e.*, the effects of helping the poor escape poverty and *protective effects, i.e.,* the effects of preventing the non-poor from slipping into poverty. Our analysis draws upon the case study of the Employment Guarantee Scheme (EGS) in rural India using the ICRISAT panel data. We have carried out the econometric analysis, namely Cox's (1979) Proportional Hazard Model to estimate the probability of entering or exiting poverty by various covariates, including the days of participation in the EGS drawing upon annual household income data during the period 1979 to 1984.

The present study contributes to the literature on poverty dynamics in the following two ways. Firstly, despite the increasing empirical evidences of poverty dynamics, few studies have tried to identify the factors which affect the movements into and out of poverty. However, the understanding of the cause of poverty transition has great value in the design of safety net policies and other interventions to protect the vulnerable (Baulch and Hoddinott, 2000). The present study, which follows the empirical methodologies taken by Baulch and McCulloch (2002), sheds light on this issue. Furthermore, the importance of our study lies in the fact that we incorporate the change in covariates. Secondly, the present study *econometrically* confirmed promotional and protective effects of anti-poverty interventions, using the actual data on the availability of the EGS for households. This is an important extension of Ravallion, van de Walle, and Gautam (1995) and Gaiha and Imai (2002) which rely on the statistical comparison of the income or consumption distributions over two different periods, because our approach based on the Cox Promotional Hazard Model can take into consideration the poverty transition over several years by controlling other covariates.

Our discussion and results in this study can be summarised as follows. Firstly, the Cox Proportional Hazard Model on the probability of entering poverty and exiting poverty shows that the EGS has significant promotional and protective roles. This is an important finding in the sense that 1) the EGS was not only effective in reducing poverty in the long run as poverty reduction is achieved through positive promotional and protective roles and, 2) the EGS served as an insurance for an annual income shortfall.

Secondly, whereas the EGS has promotional and protective effects, there are other important factors which prevent households from entering poverty and help them escape poverty. These include larger land area, access to formal and informal borrowings, the job of household head being not agricultural labourer, and lower dependency burden together with larger number of male adults. However, since most of them are structural factors which cannot be changed in the short run, the role of the EGS in poverty alleviation should not be underestimated.

Thirdly, we have found that factors closely associated with 'the state' of poverty identified by the probit model and those which are related to 'the cause' of poverty estimated by the Cox Promotional Hazard Model are not so different. This is in sharp contrast with Baulch and McCulloch (2002) who claim that static logit regression on poverty does not shed light on the cause of poverty. While the distinction between static and dynamic analysis is important, our results suggest that the traditional analysis on poverty regression based on probit or logit model has some implications on cause of poverty in a dynamic context.

Our results based on the econometric approach drawing upon the annual household income data suggest that the EGS has both promotional and protective roles. While the past literature emphasises that the targeting performance of the EGS was not satisfactory and non-poor individuals or households participated in the scheme (Gaiha, 1996, a, b), the analysis in this paper shows that the EGS was effective in reducing poverty in the long run and in serving as an insurance for income shortfalls. It is thus important for policymakers to pay attention to not only static performance of anti-poverty programmes but also the long run effects through the improvement in promotional and protective roles.

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Table 1 Persistent poverty estimates for semi-arid rural southern India, (ICRISAT villages), 1975-76 to 1983-84

Number of years Spent in poverty	**0 Never**	**1 Some time in Poverty**	**2**	**3**	**4**	**5---**	**---9 Always poor**
Percentage of poor households	**12.4**	**87.8**	**80.2**	**73.1**	**68.4**	**61.3**	**21.8**

Source: Gaiha and Deolalikar (1993).

Table 2 Change in Incidence of Income Poverty /Percentage of EGS participating households 1979/80-1984/85, Kanzara and Shirapur

	1979	1980	1981	1982	1983	1984
Case (a)						
0.5*Annual Poverty Line (Rs.90)	0.23	0.26	0.26	0.13	0.15	0.18
Case (b)						
0.75*Annual Poverty Line (Rs.135)	0.43	0.49	0.36	0.25	0.26	0.26
Case (c)						
Annual Poverty Line (Rs.180)	0.6	0.66	0.51	0.38	0.44	0.43
Case (d)						
1.25*Annual Poverty Line (Rs.225)	0.75	0.78	0.69	0.52	0.55	0.5
EGS participation rates	0.11	0.17	0.16	0.17	0.11	0.15
No. of Households	80	80	80	80	80	80

Table 3 Tobit Estimation Result of the Agricultural Wage and the EGS Wage , based on the ICRISAT data from 1979 to 1985

	Case (a) Whole Sample		Case (b) Landless	
Explanatory Variables	**Dependent Variable**: Real Daily Agricultural Wage	**Dependent Variable**: Real EGS Wage	**Dependent Variable**: Real Daily Agricultural Wage	**Dependent Variable**: Real EGS Wage
	Parameter Estimates t-ratio	**Parameter Estimates t-ratio**	**Parameter Estimates t-ratio**	**Parameter Estimates t-ratio**
Constant	0.28 (0.11)	3.64 (-0.34)	5.55 (0.95)	8.07 (1.68)
H_ height	0.01 (0.77)	-0.01 (-1.24)	-0.04 (-0.90)	-0.06 (-1.72) †
H_ illness (Whether ill or not)	-0.20 (-1.67) †	-0.02 (-0.34)	-0.63 (-2.02)**	-0.55 (-2.03)*
S (schooling years: years)	-0.10 (-1.61)	-0.08 (-2.24)*	0.75 (3.18)**	-0.49 (2.48)*
A_ age (age: years)	0.03 (2.22)*	-0.02 (-2.68)**	0.04 (1.08)	-0.0003 (-0.01)
A_ female [1] (whether female)	-1.90 (-5.18)**	-1.67 (-7.83)*	-1.67 (-2.35)*	-1.97 (-3.22)**
A_ high caste [1] (whether from high caste)	0.51 (0.75)	0.38 (0.84)	0.72 (-0.25)	3.01 (2.61)**
A_ medium high caste [1] (whether from medium high caste)	1.68 (2.44)*	0.38 (0.84)	2.80 (1.78)	2.97 (2.17)*
A_ medium low caste [1] (whether from medium low caste)	2.14 (2.84)**	0.59 (1.37)	2.48 (1.35)	4.35 (2.89)**
B _ agri labourer [1] (whether household Head is agricultural labourer)	0.73 (1.20)	1.23 (2.76)**	-0.25 (-0.20)	1.12 (1.18)
B_ debt (household's debt: Rs.)	-0.00007 (-1.72) †	-0.00005 (0.23)	0.0004 (1.67) †	-0.0004 (-2.31)*
V_ land (land owned: acre) (or V_ net worth (Rs.) for the landless)	0.03 (1.54)	0.009 (0.88	-0.05 (-0.25)	-0.00006 (-0.68)
I_ Shirapur (whether from Shirapur)[1]	0.34 (0.49)	0.90 (1.89 †	1.87 (1.09)	2.63 (1.87) †
R_ kharif rainfall(= (R_k- mean of R_k): R_k =Rainfall in kharif)	-0.03 (-0.28)	-0.02 (-0.34)	0.00009(0.70)	-0.02 (-0.11)
R_ rabi rainfall (= (R_r- mean of R_r): R_r =Rainfall in rabi)	-0.20 (-3.17)**	0.02 (0.17)	-0.05 (-0.25)	-0.10 (-0.90)
Lagged R_ kharif rainfall	-0.15 (-2.65)**	-0.07 (-2.01)	-0.17 (-1.33)	-0.11 (-0.98)
Lagged R_ rabi rainfall	0.02 (0.23)	0.05 (1.37)	-0.02 (-0.12)	-0.0002 (-0.002)
Number of Observations	1061	1061	166	166
Joint Significance	Chi2 (16)= 95.21**	Chi2 (16)= 42.97**	Chi2 (16)= 42.97**	Chi2 (16)= 66.22**

Note:[1] Dummy variable. [2] Numbers in parentheses are *t* ratios. **= significant at 1% level. *= significant at 5% level.

+= significant at 10% level.[4] Illness denotes total number of monthly dummy variables as to whether a worker ill for at least one day during the year.

Table 4 Random Effects Tobit Estimation of 1) Formal Borrowing, 2) Informal Borrowing, and 3) EGS participation days of Household: Case of Annual Data (1st Step)

Dependent Variables	**Formal Borrowing**		**Informal Borrowing**		**EGS Participation Days**	
Explanatory Variable	Parameter Estimate	*t*-ratio			Parameter Estimate	*t*-ratio
Predicted EGS Wage Rate	-------	(-----)	-------	(-----)	-2.18	(-0.93)
Predicted Agricultural Wage Rate	-------	(-----)	-------	(-----)	2.73	(2.41)*
Illness of Male Adults	-------	(-----)	-------	(-----)	-0.39	(-1.15)
Illness of Female Adults	-------	(-----)	-------	(-----)	-0.24	(-0.44)
Illness of Children	-------	(------)	-------	(------)	-1.61	(-1.46)
Village-level Unemployment Rate	1319.09	(1.58)	912.71	(1.15)	-8.07	(-1.28)
Unemployment Days of Household Members	-35.62	(-1.99)*	-11.78	(-0.70)	0.23	(1.81) †
Whether high caste 1)	484.42	(1.11)	-1041.01	(-2.63)**	4.94	(1.50)
Whether medium-high caste 1)	165.12	(0.36)	-612.39	(-1.50)	-0.23	(-0.06)
Whether medium-low caste 1)	-117.13	(-0.21)	-1180.22	(-2.27)*	7.20	(1.42)
Whether household head is agricultural labourer1)	-320.28	(-0.81)	-728.12	(-2.07)*	10.65	(2.61)**
Whether household head is female1)	11.13	(0.02)	-192.57	(-0.38)	7.84	(2.07)*
Age of household head	18.56	(1.00)	-0.99	(-0.06)	-0.09	(-0.69)
Sex/ age/ education variables:						
Number of people aged 0-5	509.18	(3.22)**	-171.95	(-1.18)	-2.31	(-2.19)*
Number of males aged 6-11	20.17	(0.09)	-83.55	(-0.42)	-1.86	(-1.32)
Number of females aged 6-11	240.01	(1.12)	-141.32	(-0.71)	-0.52	(-0.38)
Number of males aged 12-17	-106.54	(-0.48)	-131.47	(-0.64)	1.35	(0.93)
Number of females aged 12-17	540.05)	(2.59)**	-230.38	(-1.18)	1.15	(0.86)
Number of males aged 18-64						
Illiterate	-29.54	(-0.11)	211.28	(0.84)	-2.33	(-1.29)
Primary school or less	-426.48)	(-1.33)	42.11	(0.15)	-1.26	(-0.60)

Secondary school	209.65 (0.70)	-177.26 (-0.66)	-1.69 (-0.88)
Post secondary school	-332.65 (-1.14)	-136.95 (-0.50)	-1.48 (-0.49)
Number of females aged 18-64			
Illiterate	-256.74 (-1.04)	53.02 (0.25)	1.51 (0.99)
Primary school or less	51.31 (0.15)	950.97 (2.92)**	2.89 (1.26)
Secondary school	616.62 (1.96)*	301.52 (1.05)	-1.18 (-0.58)
Post secondary school	1621.29 (3.37)**	-136.95 (-0.50)	-1.48 (-0.49)
Number of males aged 65 or more	-924.88 (-1.72) †	185.84 (0.45)	2.34 (0.68)
Number of females aged 65 or more	166.07 (0.36)	-129.88 (-0.26)	0.62 (0.19)
Land Area (acre)	35.44 (2.98)**	3.64 (0.32)	------ (-----)
Net worth (Asset minus Liability: Rs.)	-------- (------)	------ (------)	-0.00009(-1.12)
Shirapur (Whether from Shirapur)[1)]	-235.53 (-0.58)	891.27 (2.41)*	6.97 (1.99)*
(R- mean of R) :R = ***annual rainfall***	------- (------)	-------- (------)	2.48 (4.44)**
$(R\text{- mean of R})^2$	--------(------)	-------- (------)	-0.21 (-4.31)**
E_ egs (past days of EGS participation)	--------(------)	-------- (------)	0.03 (1.15)
Constant	-119.41 (-0.13)	892.85 (1.11)	3.59 (0.54)
Number of Observations	476	476	476
Significance Test	Wald Chi square(25) =96.77**	Wald Chi square(25) =35.95	Wald Chi square (25) = 94.43**

Note: [1)] Square takes negative value when the deviation is negative. [2)] Number in parentheses is *t* ratio. **= significant at 1% level. *= significant at 5% level. †= significant at 10% level. [3)] Dummy Variable.

Table 5 Maximum Likelihood Cox Proportional Hazard Model of the Probability of *Entering* Poverty (based on *Annual Income* Data) – Estimation for Protective Effects

	Case(a) 0.5*Annual Poverty Threshold (90Rs.)[2)]		**Case(b) 0.75*Annual Poverty Threshold (135Rs.)**		**Case(c) Annual Poverty Threshold (180Rs.)**		**Case(d) 1.25*Annual Poverty Threshold (225Rs.)**	
Explanatory Variable	Parameter Estimate[3)]	*t*-ratio	Parameter Estimate	*t*-ratio	Parameter Estimate	*t*-ratio	Parameter Estimate	*t*-ratio
The Estimated Days of Participation in the EGS	**-0.015**	**(-0.54)**	**-0.03**	**(-1.70) †**	**-0.02**	**(-2.23)***	**-0.02**	**(-1.93) †**
Predicted Formal Borrowings (Rs.)	**-0.00003**	**(-0.12)**	**-0.0002**	**(-1.58)**	**-0.0001**	**(-1.69) †**	**-0.01**	**(-0.62)**
Predicted Informal Borrowings (Rs.)	**-0.0001**	**(-0.29)**	**-0.0002**	**(-0.91)**	**-0.00004**	**(-0.25)**	**-0.07**	**(-2.00)**
Land Area (acre)	**-0.06**	**(-1.78) †**	**-0.05**	**(-2.46)***	**-0.02**	**(-1.44)**	**0.01**	**(0.57)**
Illness of Male Adults	**0.08**	**(1.94) †**	**0.007**	**(0.22)**	**-0.02**	**(-1.09)**	**-0.01**	**(-0.62)**
Illness of Female Adults	**-0.19**	**(-2.06)***	**-0.07**	**(-0.85)**	**-0.02**	**(-0.61)**	**-0.07**	**(-2.00)***
Illness of Children	**0.04**	**(0.60)**	**0.05**	**(0.94)**	**0.01**	**(0.29)**	**0.01**	**(0.57)**
Village-level Unemployment Rate	0.38	(0.49)	0.50	(1.01)	0.33	(0.90)	0.09	(0.33)
Unemployment Days of Household Members	-0.01	(-0.67)	-0.002	(-0.22)	-0.0004	(-0.05)	0.004	(0.75)
Whether high caste [1)]	-0.01	(-0.67)	-0.07	(-0.30)	0.17	(0.81)	0.24	(1.80) †
Whether medium-high caste [1)]	-0.18)	(-0.52)	-0.18	(-0.94)	0.07	(0.046)	0.18	(1.75) †
Whether medium-low caste [1)]	-0.85	(-1.59)	0.08	(0.35)	----	(-----)	-----	(----)
Whether household head is agricultural labourer[1)]	0.08	(0.24)	0.08	(0.35)	0.35	(1.82) †	0.35	(2.85)**
Whether household head is female[1)]	-0.35	(-0.81)	0.16	(0.50)	-0.05	(-0.26)	-0.09	(-0.71)
Age of household head	0.003	(0.18)	0.007	(0.75)	0.007	(1.05)	0.003	(0.70)
Schooling Years of household head	0.08	(0.24)	-0.02	(-0.70)	0.02	(0.65)	0.03	(1.47)
Sex/ age/ education variables:								
Number of people aged 0-5	0.33	(1.66) †	0.29	(2.80)**	0.17	(2.22)*	0.09	(1.45)
Number of males aged 6-11	0.15	(0.87)	0.03	(0.22)	0.03	(0.55)	-0.002	(-0.05)
Number of females aged 6-11	0.06	(0.41)	0.14	(1.42)	0.03	(0.42)	0.009	(0.22)

Number of males aged 12-17	0.09 (0.54)	0.03 (0.26)	0.07 (0.82)	0.03 (0.60)
Number of females aged 12-17	0.04 (0.16)	0.18 (1.36)	0.16 (1.64)	0.13 (1.96)*
Number of males aged 18-64				
Illiterate	-0.89 (-3.77)**	-0.19 (-1.14)	-0.23 (-2.00)*	-0.16 (-2.20)*
Primary school or less	-0.35 (-1.35)	-0.26 (-1.77) †	-0.25 (-2.24)*	-0.20 (2.38)*
Secondary school	-0.19 (-0.97)	0.18 (1.36)	-0.26 (-2.41)*	-0.11 (-1.45)
Post secondary school	-0.07 (-0.27)	-0.19 (-1.14)	-0.04 (-0.31)	-0.10 (-1.53)
Number of females aged 18-64				
Illiterate	-0.13 (-0.65)	-0.26 (-1.77) †	0.04 (0.47)	0.08 (1.18)
Primary school or less	0.10 (0.22)	0.20 (0.74)	0.11 (0.54)	-0.03 (-0.19)
Secondary school	0.08 (0.35)	0.03 (0.16)	-0.04 (-0.31)	-0.07 (-0.66)
Post secondary school	---- (------)	------ (----)	----- (----)	----- (-------)
Number of males aged 65 or more	-0.38 (-0.72)	-0.13 (-0.39)	-0.11 (-0.58)	0.01 (0.07)
Number of females aged 65 or more	0.44 (1.28)	0.28 (1.57)	0.16 (1.11)	0.03 (0.27)
Shirapur (Whether from Shirapur) 1)	1.06 (2.26)*	0.70 (2.71)**	0.44 (1.93) †	0.31 (1.81) †
(R- mean of R) :R = ***annual rainfall***	0.03 (1.54)	0.02 (1.76) †	0.02 (2.37)*	0.03 (2.37)*
Number of Total Observations	398	398	398	398
Number of Subjects	135	193	253	301
Number of Failures	79	144	216	269
Time at Risk	398	398	398	398
Log Likelihood	-348.37	-710.51	-1127.54	-1468.83
Wald Chi Square	152.74**	136.83**	193.87**	205.44**
Test of Proportional Hazard Assumption				
Null Hypothesis: Assumption is Violated.	Chi^2(31)= 16.48	Chi^2(31)=13.80	Chi^2(31)=8.96	Chi^2(31)=9.48
Grambsch and Therneau (1994)	Prob> Chi^2=0.809	Prob> Chi^2=0.997	Prob> Chi^2=1.00	Prob> Chi^2=0.999

Note: 1) Dummy variable. 2) The poverty cut-off point is Rs. 180 per capita annually at 1960-61 prices, which has been widely used in poverty studies in India. 3) Coefficients are standard coefficients rather than exponentiated coefficients.

4) Number in parentheses is *t* ratio. **= significant at 1% level. *= significant at 5% level. †= significant at 10% level.

Table 6 Maximum Likelihood Cox Proportional Hazard Model of the Probability of *Exiting* Poverty (based on *Annual Income* Data) Estimation for Promotional Effects

	Case(a) 0.5*Annual Poverty Threshold (90Rs.)[2]		Case(b) 0.75*Annual Poverty Threshold (135Rs.)		Case(c) Annual Poverty Threshold (180Rs.)		Case(d) 1.25*Annual Poverty Threshold (225Rs.)	
Explanatory Variable	Parameter Estimate[3]	*t*-ratio	Parameter Estimate	*t*-ratio	Parameter Estimate	*t*-ratio	Parameter Estimate	*t*-ratio
The Estimated Days of Participation in the EGS	**0.004**	**(1.11)**	**0.01**	**(2.20)***	**0.03**	**(3.41)****	**0.01**	**(0.68)**
Predicted Formal Borrowings (Rs.)	**0.00004**	**(0.58)**	**0.00009**	**(1.05)**	**0.00009**	**(0.87)**	**0.00005**	**(0.41)**
Predicted Informal Borrowings (Rs.)	**-0.00007**	**(-0.77)**	**-0.0002**	**(-1.12)**	**-0.00006**	**(-0.31)**	**-0.0004**	**(-1.19)**
Land Area (acre)	**0.003**	**(1.30)**	**0.005**	**(1.37)**	**0.005**	**(0.89)**	**0.01**	**(1.56)**
Illness of Male Adults	**-0.004**	**(1.11)**	**0.007**	**(0.48)**	**0.04**	**(1.87) †**	**0.03**	**(1.05)**
Illness of Female Adults	**0.02**	**(2.64)****	**0.03**	**(1.79) †**	**0.05**	**(2.62)****	**0.09**	**(2.78)***
Illness of Children	**-0.02**	**(-0.49)**	**-0.05**	**(-0.60)**	**-0.04**	**(-0.30)**	**-0.16**	**(-0.65)**
Village-level Unemployment Rate	0.04	(0.13)	0.12	(0.36)	-0.21	(-0.40)	-0.90	(-1.22)
Unemployment Days of Household Members	0.002	(0.48)	-0.006	(-0.87)	-0.01	(-1.29)	-0.03	(-1.58)
Whether high caste [1]	0.03	(0.27)	0.02	(0.10)	-0.02	(-0.10)	-0.47	(-1.53)
Whether medium-high caste [1]	0.08	(1.29)	0.03	(0.30)	-0.11	(-0.78)	-0.47	(-2.32)*
Whether medium-low caste [1]	-----	(-----)	-----	(------)	-----	(-----)	-----	(------)
Whether household head is agricultural labourer[1]	-0.07	(-0.91)	-0.24	(-1.82) †	-0.69	(-3.73)**	-0.92	(-3.75)**
Whether household head is female[1]	-0.06	(-0.59)	-0.21	(-1.32)	-0.26	(-1.21)	0.03	(0.13)
Age of household head	-0.003	(-0.74)	-0.005	(-0.75)	-0.006	(-0.79)	-0.003	(-0.34)
Schooling Years of Household Head	-0.02	(-0.49)	-0.03	(-1.34)	-0.04	(-1.25)	-0.06	(-1.26)
Sex/ age/ education variables:								
Number of people aged 0-5	-0.11	(-2.20)*	0.09	(1.45)	-0.20	(-1.90) †	-0.35	(-2.50)*
Number of males aged 6-11	-0.02	(-0.39)	-0.002	(-0.05)	-0.05	(-0.57)	-0.10	(-0.69)
Number of females aged 6-11	-0.05	(-1.09)	0.009	(0.22)	-0.09	(-0.87)	-0.15	(-1.23)
Number of males aged 12-17	0.03	(0.77)	0.03	(0.60	-0.05	(-0.47)	-0.004	(-0.03)
Number of females aged 12-17	-0.06	(-0.97)	0.13	(1.96)*	-0.07	(-0.67)	-0.19	(-1.41)

Number of males aged 18-64				
Illiterate	0.10 (2.67)*	-0.16 (-2.20)*	0.29 (3.28)**	0.42 (2.61)**
Primary school or less	0.08 (1.18)	-0.20 (-2.38)*	0.20 (1.49)	0.32 (1.50)
Secondary school	0.03 (0.67)	-0.11 (-1.45)	0.25 (2.13)*	0.17 (0.75)
Post secondary school	0.07 (1.15)	-0.10 (-1.53)	0.24 (2.00)*	0.26 (1.63)
Number of females aged 18-64				
Illiterate	0.07 (1.71) †	0.08 (1.18)	0.04 (0.39)	-0.06 (-0.44)
Primary school or less	0.08 (0.89)	-0.03 (-0.19)	0.08 (0.36)	0.53 (1.64)
Secondary school	0.04 (0.76)	-0.07 (-0.66)	0.17 (1.39)	0.10 (0.57)
Post secondary school	---- (-----)	------ (-----)	**----- (-----)**	----- (-----)
Number of males aged 65 or more	0.12 (1.22)	0.01 (0.07)	0.12 (0.52)	0.02 (0.07)
Number of females aged 65 or more	0.06 (0.52)	0.03 (0.27)	0.05 (0.21)	0.25 (0.75)
Shirapur (Whether from Shirapur)[1)]	-0.20 (-1.69) †	0.31 (1.81)	-0.67 (-2.77)**	-0.68 (-1.90) †
(R- mean of R) :R = ***annual rainfall***	-0.005 (-1.02)	0.03 (2.37)	-0.005 (-0.48)	-0.02 (-1.00)
Number of Total Observations	398	398	398	398
Number of Subjects	331	301	213	165
Number of Failures	319	269	182	129
Time at Risk	398	398	398	398
Log Likelihood	-1766.4	-1468.83	-886.41	-573.42
Wald Chi Square	154.7**	205.44**	155.98**	156.00**
Test of Proportional Hazard Assumption				
Null Hypothesis: Assumption is Violated.	$Chi^2(31)$= 5.72	$Chi^2(31)$=13.80	$Chi^2(31)$=8.96	$Chi^2(31)$=9.48
Grambsch and Therneau (1994)	Prob> Chi^2=1.00	Prob> Chi^2= 0.997	Prob> Chi^2=1.00	Prob> Chi^2=0.999

Note: [1)] Dummy variable. [2)] The poverty cut-off point is Rs. 180 per capita annually at 1960-61 prices, which has been widely used in poverty studies in India. [3)] Coefficients are standard coefficients rather than exponentiated coefficients. [4)] Number in parentheses is *t* ratio. **= significant at 1% level. *= significant at 5% level. †= significant at 10% level.

Table 7 Random Effects Probit Model of *being* Poverty (based on *Annual Income* Data)

	Case(a) 0.5*Annual Poverty Threshold (90Rs.)[2]		Case(b) 0.75*Annual Poverty Threshold (135Rs.)		Case(c) Annual Poverty Threshold (180Rs.)		Case(d) 1.25*Annual Poverty Threshold (225Rs.)	
Explanatory Variable	Parameter Estimate[3]	*t*-ratio	Parameter Estimate	*t*-ratio	Parameter Estimate	*t*-ratio	Parameter Estimate	*t*-ratio
The Estimated Days of Participation in the EGS	**-0.04**	**(-1.32)**	**-0.08**	**(-2.83)****	**-0.08**	**(-3.16)****	**-0.05**	**(-2.08)***
Predicted Formal Borrowings (Rs.)	**-0.0002**	**(-0.78)**	**-0.0008**	**(-2.48)***	**-0.00006**	**(-2.00)***	**-0.0003**	**(-0.88)**
Predicted Informal Borrowings (Rs.)	**-0.0003**	**(-0.06)**	**-0.0002**	**(-0.36)**	**0.0001**	**(0.21)**	**0.0004**	**(0.83)**
Land Area (acre)	**-0.04**	**(-1.65) †**	**-0.02**	**(-0.83)**	**-0.002**	**(-0.12)**	**-0.01**	**(-0.72)**
Illness of Male Adults	**0.05**	**(1.09)**	**-0.005**	**(-0.12)**	**-0.06**	**(-1.45)**	**-0.05**	**(-1.33)**
Illness of Female Adults	**-0.26**	**(-1.53)**	**-0.13**	**(-1.58)**	**-0.07**	**(-1.08)**	**-0.15**	**(-2.22)***
Illness of Children	**0.06**	**(0.46)**	**0.08**	**(0.47)**	**0.04**	**(0.19)**	**0.32**	**(1.14)**
Village-level Unemployment Rate	1.41	(1.51)	2.17	(2.14)*	1.51	(1.65) †	1.30	(1.28)
Unemployment Days of Household Members	-0.54	(-1.09)	-0.03	(-1.59)	-0.02	(-1.06)	-0.01	(-0.56)
Whether high caste [1]	-0.54	(-1.09)	-0.47	(-0.74)	-0.01	(-0.02)	0.24	(0.38)
Whether medium-high caste [1]	-1.00	(-2.48)*	-0.56	(-1.16)	0.06	(0.14)	0.73	(1.41)
Whether medium-low caste [1]	-------	(------)	------	(-----)	----	(------)	-----	(-----)
Whether household head is agricultural labourer[1]	0.21	(0.49)	0.61	(1.10)	1.68	(3.06)**	1.93	(3.13)**
Whether household head is female[1]	0.10	(0.18)	1.33	(1.79) †	0.97	(1.50)	0.62	(0.82)
Age of household head	0.02	(1.08)	0.03	(1.20)	0.02	(1.03)	0.006	(0.24)
Schooling Years of Household head	0.05	(0.75)	0.09	(0.89)	0.11	(1.30)	0.15	(1.59)
Sex/ age/ education variables:								
Number of people aged 0-5	0.50	(2.20)*	1.08	(3.65)**	0.69	(2.70)**	0.60	(2.02)
Number of males aged 6-11	0.07	(0.41)	0.05	(0.25)	0.02	(0.12)	-0.17	(-0.78)
Number of females aged 6-11	0.06	(0.36)	0.53	(2.35)*	0.30	(1.51)	0.22	(0.93)
Number of males aged 12-17	-0.07	(-0.36)	0.002	(0.008)	0.04	(0.22)	-0.15	(-0.65)
Number of females aged 12-17	0.08	(0.34)	0.47	(1.67)	0.42	(1.69) †	0.56	(1.90) †

Number of males aged 18-64				
Illiterate	-0.62 (-2.08)*	-0.31 (-1.04)	-0.55 (-2.17)*	-0.53 (-2.13)*
Primary school or less	0.50 (-1.75) †	-0.71 (-2.00)*	-0.86 (-2.49)*	-1.07 (-2.43)*
Secondary school	-0.28 (-1.01)	-0.45 (-1.27)	-0.42 (-1.52)	-0.07 (-0.19)
Post secondary school	-0.32 (-1.32)	-0.58 (-1.68) †	-0.76 (-2.40)	-0.84 (-2.30)*
Number of females aged 18-64				
Illiterate	-0.33 (-1.35)	-0.94 (-3.10)**	-0.09 (-0.38)	0.12 (0.49)
Primary school or less	0.18 (0.34)	0.05 (0.08)	-0.17 (-0.32)	-0.65 (-1.11)
Secondary school	0.09 (0.32)	-0.09 (-0.24)	0.11 (0.33)	0.07 (0.18)
Post secondary school	----- (-----)	---- (----)	**---- (----)**	----- (------)
Number of males aged 65 or more	-0.67 (-1.31)	-0.94 (-1.59)	-0.25 (-0.49)	0.17 (0.28)
Number of females aged 65 or more	0.30 (0.72)	0.25 (0.50)	0.47 (0.98)	0.23 (0.42)
Shirapur (Whether from Shirapur)[1]	1.44 (2.44)*	1.86 (2.58)**	1.52 (2.39)*	1.57 (2.14)*
(R- mean of R) :R = ***annual rainfall***	0.04 (1.26)	0.06 (2.03)*	0.07 (2.56)*	0.07 (2.55)*
Constant	-1.05 (-1.18)	-0.32 (-0.28)	-0.41 (-0.41)	-0.10 (-0.09)
Number of Total Observations	426	426	426	426
Log Likelihood	-151.70	-179.31	-208.77	-186.62
Wald Chi Square	46.57*	51.58*	48.50*	46.22*

Note: [1] Dummy variable.

[2] The poverty cut-off point is Rs. 180 per capita annually at 1960-61 prices, which has been widely used in poverty studies in India.

[3] Coefficients are standard coefficients rather than exponentiated coefficients.

[4] Number in parentheses is *t* ratio. **= significant at 1% level. *= significant at 5% level. †= significant at 10% level.