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Determinants of Rural Labor Market Participation in Tanzania

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Abstract: Participation in rural off-farm activities (outside a household's own farm) is one of the livelihood strategies among poor rural households in many developing countries. One component of off-farm activities accessible to the very poor is wage labor because it does not require any complementary physical capital. A household's ability to participate in the rural labor market depends on the characteristics of the household itself and the local labor markets conditions. This study examines the factors that determine the number of households supplying labor to a particular rural local labor market in rural areas of Tanzania and the share of labor income in total cash income. The study finds that education level, availability of land, and access to economic centers and credit are the most important factors in determining the number of households that participate in a particular rural local labor market and the share of labor income in total cash income.

MOTIVATION

Many studies show that participation in rural labor markets is an important strategy for poverty alleviation and food security in developing countries.¹ In Sub-Saharan Africa, rural households commonly depend on off-farm sources for 30-50 percent of their income.² Defined in terms of function, off-farm employment has two major components, namely wage employment and self-employment.³ The component of rural off-farm employment, in which the poor can participate because it does not require any complementary physical capital, is wage labor (i.e. to supply their labor for wage in the rural labor markets). A corresponding Kiswahili saying goes: "mtaji wa maskini ni nguvu zake mwenyewe," which translates "the asset of the poor is his/her labor power." The report on Tanzania's Household Budget Survey (HBS) of 2000/01 shows that the poverty

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rate of the households that participated in the rural labor markets were slightly lower than those which did not. However, the most recent national Labor Force Survey (LFS) in Tanzania shows that only 11 percent of the poor households participated (supplied labor) in the rural labor markets in 2000/01.⁴

Studies elsewhere have shown that the capacity of households or individuals to participate in rural off-farm activities varies significantly across countries and within countries. In their analysis of 100 farm household studies, Reardon et al. in 2001 find that this variation is partly due to high entry barriers to certain rural off-farm activities, which makes certain activities accessible only to higher income groups.⁵ The 'entry barrier' hypothesis is particularly important in the case of off-farm self-employment. For the poor rural wage labor supplier, however, the main problem is the availability of wage employment in areas close to his/her homestead. In other words, with high entry barriers in off-farm employment such as off-farm self-employment, very poor households have no other option but to participate in rural off-farm wage employment, which in turn is only possible if there is sufficient demand for their labor nearby.

Thus, concerning these very poor households an important policy question arises: what factors determine the total participation of individuals/households in the rural labor markets? Equally important is the question of factors that determine the share of labor income in total income. Few studies of rural labor markets in Africa focus on the non-farm sector, although wage employment can be provided by both farm and non-farm sector.⁶ Furthermore, these studies concentrate on the individual/household level. However, the proponents of the importance of "spatial targeting" for poverty reduction argue that most micro-policies first target particular areas/locations and then households located therein.⁷ This paper answers the question of what determines the number of households in a village that participate in the rural labor market and the share of income derived from these markets (in the households total cash income) using a modified farm household model, aggregated to the village level.

The rest of the paper is organized as follows: Section 2 presents the theoretical framework of the agricultural household model with transaction costs and liquidity constraints; Section 3 describes the econometric models and the estimation strategies. Section 4 discusses the results of the analysis; and Section 5 provides conclusions of the paper.

THEORETICAL FRAMEWORK

In finding the determinants of the number of households which participate in a certain rural local labor market and the share of labor income in total income, it is important to address the spatial dependence in the development of one rural market on the other. For example, the study by Bryceson in 2000 shows that development of other markets such as credit markets in the rural areas may have significant impacts on rural labor markets.⁸ This argument is theoretically based on the proposition that households participating in rural credit markets may offer jobs to other households, thus, increasing the number of households participating in the rural labor markets and the contribution of income derived from the rural labor markets. As most of the rural credit is directed to agricultural activities, for example season credit for purchasing fertilizers and pesticides, the link of credit availability and rural labor market is likely to work through the farm sector.⁹

However, due to transportation and other transaction costs, the spatial dependence effects dissipate as distance increases, i.e. the strength of the connection between the two markets is expected to diminish with distance.¹⁰ This argument is in line with most spatial econometric analysis and regional sciences in general that indicate spatial dependence is a declining function of distance. Thus, high transaction costs cause localization of rural labor markets because it becomes costly to sell labor to distant places.¹¹ As such, transaction costs is one of the factors that may result in disequilibrium in the rural markets as discussed in the recent study by Kanwar in 2004 for the case of rural India.

As in many studies of rural economies, the starting point of our theoretical framework is the Farm Household Model (FHM).¹² This model is preferred to, for example, the occupational choice models, because of its flexibility to analyze economic aspects for a range of different household types – from pure subsistence to commercial farm households. The FHM can readily be extended to accommodate incomplete markets and market imperfections such as differential accessibility to rural labor markets and other off-farm activities due to differences in transaction costs, rationing, and entry barriers.¹³

Some studies of rural labor markets assumed that the rationing and transaction costs apply to each household differently.¹⁴ When the emphasis is on spatial targeting, this assumption may not be realistic because households in one village are likely to be rationed in wage labor markets by their access to infrastructure, information costs, and credit availability. This is particularly important when modeling village labor markets because farmers in Tanzania's villages are not fully integrated into urban wage labor markets.¹⁵ Thus, the paper adopts the non-separable farm household model (with transaction costs, rationing in labor markets, and credit constraints) used in the 2000 work of Woldehanna and extended by Mduma in 2003.¹⁶ However, the paper moves further by considering market outcomes at the village level. Normally, we consider the importance of the rural labor markets in terms of the number of households which sold their labor in the rural labor markets and the share of labor income in total cash income.

We impose some regularity conditions, namely the quasi-concavity of the household preference, convex agricultural production frontier, and linearity in all constraints in the model. Woldehanna and Mduma show that, under these assumptions, the Kuhn-Tucker first order conditions for utility maximization are both necessary and sufficient for a household's utility maximization problem. They also show that the propensity to participate in the rural labor markets declines with the increase in marginal value of time, the extent of rationing in the rural labor markets, and the transaction costs of participating in the rural labor markets.¹⁷ Furthermore, from the assumptions of rationing, search, and other transaction costs, the model implies that access to information and markets will influence participation rate in the village. Also from the assumptions of household characteristics, labor endowment and stock of human capital in the villages are some of the factors that have bearing on the rural labor markets.

Although the focus of this study is mainly on the supply side of the rural labor market, the comparative statics behavior discussed above needs to be qualified by also looking at some aspects of the demand side in order to enable a village level analysis. This is particularly needed because the presence of 8.4% of unemployment rate in rural areas of Tanzania points to some of the demand side factors. On the demand side of the rural labor markets, the amount of labor that a household can buy increases with

relaxation of the cash constraint. In a 2003 study Mduma shows that relaxing the cash constraints increases the demand for labor by shifting the labor demand curve upwards. In other words, in the village labor markets, households that can access credit are likely to offer opportunities for wage employment to other households.¹⁸

With respect to agricultural land, we note that land is likely to be complimentary to wage labor. However, even though large landholdings may reduce the need for seeking for wage employment, households with large amount of land (relative to their labor endowment) are likely to demand labor from the rural labor markets. Thus, at the village level, the effect of the land availability on rural labor markets is also likely to manifest itself through inequality in landholdings. In other words, those with relatively large amount of land will demand labor in the rural labor market and those with relatively low amount of land will sell their labor in the rural labor markets. The same argument is made with respect to the per capita village income: households with relatively higher per capita income are likely to be employers in the rural labor markets. Thus, it is likely that for the kind of off-farm employment we analyze, the village income inequality is an important factor in influencing the availability of wage employment to the relatively poor households. In the next section we describe how these theoretical implications were operationalized for empirical estimation.

VARIABLES AND ECONOMETRIC ESTIMATIONS

(a) Dependent variables

As in Isigut's 2004 work, we use the share of village income from labor markets over total cash income (SHARE) as the first dependent variable that indicates the extent of participation in the rural labor markets. We also take the number of households in a village who reported to have supplied their labor to the rural labor markets (ACT_W) in the survey year as another dependent variable.¹⁹ From a policy perspective, while the former dependent variable is relevant in indicating the extent to which rural poor households depend on the income derived from the rural labor markets, the latter gives an overview of the participation rate in the supply side of these markets.

(b) Predictor variables

(i) *Development in other rural markets:*

To capture the interconnectedness of rural labor markets with other markets, we focus on the rural credit market because it is assumed to relax the cash constraints at the village level. The indicator of the village cash constraint is measured by the proportion of households which have at least one member who participated in formal financial and/or informal financial arrangements (CREDIT).²⁰ As derived in the theoretical framework, the relaxation of cash constraints reduces participation in rural wage employment at household level. However, we note that the relaxation of cash constraints may have an opposite effect on labor supply in case of unemployment, through its positive effects on the labor demand. Therefore, the square of this variable (CREDIT_SQ) is included to capture this complex relationship.

(ii) Agricultural assets:

As pointed out in the section 2, labor allocation is likely to be affected by land availability. Thus, we include the per capita cultivated land in the survey year (PER_LAND). According to Yao's study of rural China, agricultural land is both a wealth variable and production factor, and therefore, it is expected to have multiple effects on participation in rural labor markets.²¹ First, as a wealth variable, land may induce confidence to households with a relatively large amount of land (confidence in what they can produce with their land). This effect, which Yao termed "insurance effect of land," reduces participation in wage employment in the rural areas. Secondly, as a factor of production, land can be either complimentary to labor or a substitute for labor. The complimentary nature of land and labor is expected to have dominated in rural Tanzania due to the form of technology used in small-scale farming (hand hoe cultivation). However, at village level, per capita landholding may have negative effects on the labor supplied off-farm while at the same time inequality in landholding is likely to have positive impacts on the rural labor markets (because households with low land endowment are employed by those with relatively large per capita land). Thus, we include the gini coefficient in land holding (GINI_LAND) as one of the explanatory variables, in addition to per capita cultivated land in the survey year.

(iii) Infrastructure development and transaction costs:

We include proximity to important economic centers (including main roads) to capture costs related to marketing, transaction, rationing, and information. We tried two proxies to capture these aspects. The first proxy used was the average distance, in kilometers, to the nearest major/essential economic center, such as shops, market place, main road, and health centers.²² The alternative proxy is the average travel time (DISTC_HRS) to the nearest economic center. In the course of estimation, the travel time was found to be more appropriate than distance measured in kilometers. The travel time approach tended to fit the data better than distance in kilometers because travel time captures both the differences in terrain and the quality of the paths/roads.

(iv) Human capital stock and labor resources:

We use education indicators as proxies for the stock of skills in the village. For most studies in Sub-Saharan Africa, the cut off point has been primary education (and above) vs. no education. Thus we use the proportion of those who have primary education and above (PR_EDUC) in the population of individuals above 15 years of age. The square of this variable (EDUC_SQ) has also been included to capture the nonlinearity of the relationship, for the kind of wage employment analyzed here is expect to decline with the increase in education (as households shift to other preferred form of off-farm employment, e.g. self-employment). Thus, we expect the square of education to have significant negative effects on the participation and the share of labor income in the total cash income.

As indicated in the theoretical framework at household level, we include the average age (AGE) of the population between 15 and 65 years in the village. We have also included the square of age (AGE_SQ) to capture the lifecycle in the participation in the rural labor markets. Moreover, the average household size (HH_TOTAL) in the village was included as an indicator of the available labor resources in the village. However, to account for a non-working population in the village, we also included the average dependency ratio (DEP_RATIO) within the village, which is expected to reduce the rate of participation in rural labor markets. The dependency ratio was computed as the ratio of the population below 5 years plus above 65 years to the population between 15 and 65 years. The square of dependency ratio (DRATIO_SQ) was also included to capture possible non-linearity.

(v) Economic development and diversification:

Average time used per week on the primary activities (ACT_HRS1) and the secondary activities (ACT_HRS2) in the village are included as measure of rural economy diversification. The primary activities are essentially farm and livestock activities. The secondary activities are mainly off-farm activities such as fishing, mining, tourism, construction, and employment in the government and parastatals. However, a large proportion of the secondary activities take the form of off-farm self-employment. As an alternative way of including the proxies for economic diversification in the village, we also include the ratio of average time per week used in the primary activities to average time per week used in the secondary activities (denoted as ACT1_to_2). Furthermore, we include the number of petty traders in the villages (TRADE) and its square (TRADE_SQ), to capture wage employment generated by expansion in other off-farm activities, particularly off-farm self-employment.

To control for differences in well-being of the people across villages, we include the proportion of households in the village that have access to safe water (SAF_WATE) as computed by Tanzania's National Bureau of Statistics. The square of this variable (WATER_SQ) is included to capture the nonlinearity of this relationship. We also include the proportion of households in the village that are connected to the national power grid (ELEC_PW), expecting that the villages with high proportions of their households connected to the national power grid will have better developed rural labor markets. Further, we include the square of this variable (ELEC_SQ) to capture nonlinear relationship. By including access to water and electricity as proxies of the village development level, we avoid the endogeneity problem that would be caused by the direct inclusion of per capita income (because income reported in the survey is necessarily a function of labor allocation in that year). However, we have included the gini coefficient of per capita expenditure (GINI_EXP) to capture possible wage employment provided by relatively rich households to the poor households in the village. This is a particularly important aspect when a substantial portion of the inequality is generated by incomes derived from activities located in the rural areas (thus increased labor demand). However, if a substantial portion of the inequality is generated by incomes from outside the rural areas, the effects of inequality on the rural labor markets remain ambiguous.

Data source and descriptive statistics

The data used in this study represents 519 ‘true rural’ villages (the enumeration areas) used in the 2000/01 Household Budget Survey (HBS) in Tanzania. According to Tanzania’s National Master Sample (NMS), a true rural enumeration area shares the same boundary with the village in which it is defined. The 2000/01 HBS was a nationally-representative survey whereby the fieldwork was conducted between May 2000 and June 2001. Between 12 and 24 households were surveyed in each sampled village. More details of this survey can be found in the HBS main report published by in 2002 by Tanzania's National Bureau of Statistics. Table 1 provides the descriptive statistics of the data used in this study.

Table 1A: Descriptive statistics of the data used

Variable	Mean	Std. D	Min	Max
Share of labor income in total income (proportion)	0.08	0.04	0.01	0.20
act_w (# of households) Households interviewed in the village	1.41	1.69	0	10
Age (log)	12	5	8	24
Gini_exp (gini coefficient)	3.76	0.13	3.36	4.13
Gini_land (gini coefficient)	0.39	0.13	0.14	0.89
Pr_educ (proportion)	0.47	0.17	0.11	0.92
Depratio (proportion)	0.74	0.14	0.28	1.00
Elec (proportion)	0.23	0.17	0.09	0.43
Trade (proportion)	0.05	0.10	0.00	0.64
Credit (proportion)	0.44	0.30	0.00	0.64
Safe_water (proportion)	0.08	0.11	0.00	0.31
Hh_total (log)	0.46	0.38	0.00	0.60
Act_hour1 (log)	1.63	0.28	0.77	2.67
Act_hour2 (square root)	5.93	0.75	2.07	8.25
Dist_hrs (hrs)	3.14	0.38	1.06	4.58
	0.91	1.37	0.00	9.00

It is apparent from Table 1 that about 8% of total cash income comes from the rural labor markets. This is a substantial amount as most of the rural wage labor incomes are intended to relax cash constraints when other sources of cash income, e.g. from selling agricultural products, are not available (as noted by the latest USAID report on the state of food security in 2004). Table 1 also shows that on average, 10% of the households interviewed reported participating in off-farm wage employment. In general, this is a relatively low rate of participation as compared to in some other countries in Sub-Saharan Africa as shown in a recent study by Mduma and Wobst published in 2005. Figure 1 also shows geographical distribution of the importance of labor income in the rural areas. The lowest shares are in Dodoma, Lindi, Mtwara, Ruvuma, and Rukwa regions. These regions are known for their relative lag in many economic aspects such as transport infrastructure. The relatively large share in the Coastal region (Pwani) could probably be explained by the influence of being close to Dar es Salaam.

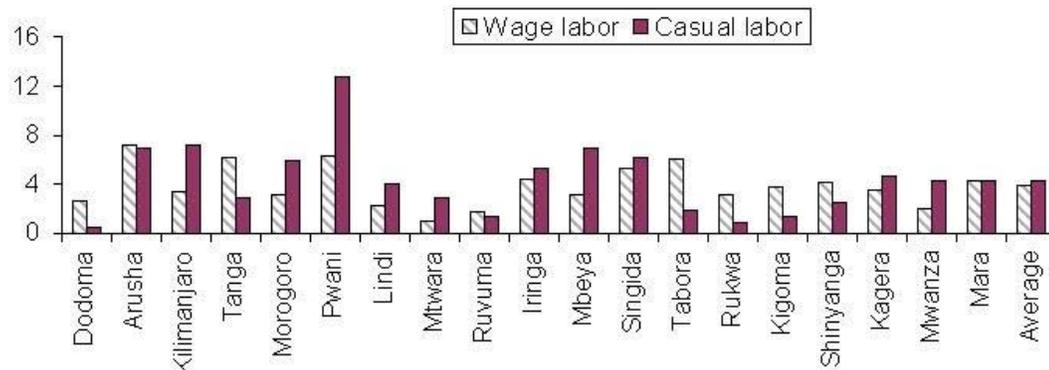


Figure A1: Geographical distribution of the share of labor income in total cash income in rural Tanzania

Source: NBS (2002). Household Budget Survey

It is important to emphasize that rural labor markets in Tanzania are mainly agricultural based. The 2000/01 Integrated Labor Force Survey, which was conducted parallel to the 2000/01 HBS, shows that 97.8% of the households in rural Tanzania were involved in agriculture. Of those, 5.8% had hired employees, which is relatively high as compared to only 1.5% for those working in the non-farm rural sector. Table 2 provides other dimensions of the rural labor markets, including the gender dimension where it is apparent that more males are reported to be working for a wage than females.

Table A2: Percentage distribution of currently employed persons by area, main status of employment and sex in rural Tanzania in 2000/01

Area/Employment Status	Sex				Total	
	Male		Female		Number	%
	Number	%	Number	%		
Paid employee	362,528	2.6	101,792	0.7	464,320	3.3
Self employed-with employee	35,590	0.3	9,892	0.1	45,482	0.3
Self employed-without employee	244,852	1.7	154,168	1.1	399,020	2.9
Unpaid family helper (non-agric)	186,604	1.3	282,835	2.0	469,439	3.4
On own farm (shamba)	6,055,955	43.3	6,562,260	46.9	12,618,215	90.2
Total	6,885,529	49.2	7,110,946	50.8	13,996,476	100

Source: NBS (2002a). Integrated labor force survey report

Estimation techniques

For the first dependent variable SHARE (the share of labor income in total cash income), we use a truncated regression because the distribution of the variable is bounded between zero and one. Furthermore, given the discrete (count) nature of the second dependent variable (the number of households which sold labor in the rural labor markets, ACT_W), the empirical model was estimated using a negative binomial model. The reason for using the negative binomial regression is that, although ordinary least squares (OLS) could be used, the preponderance of zeros and small and discrete values of the dependent variable poses econometric problems.²³ Alternatively, we could have used standard Poisson regression. However, one restrictive assumption of the standard Poisson model is that the mean and the variance are equal.²⁴ Often, this restriction may not agree with sample data and may cause an “over-dispersion” problem (i.e. the mean deviates from the variance).

RESULTS AND DISCUSSION

(a) Model diagnostics:

The overall results of our estimations are presented in Table 3. The last three rows in the table show the model diagnostics. The two estimations, namely the share of labor income and the number of households supplying labor in rural labor markets, fit the data fairly well. The null hypothesis that all coefficients are zero is rejected at one percent significance level in the two estimations. Furthermore, several regressors are individually significant at the conventional levels as indicated by an asterisk (*) in Table 3. The test for over-dispersion shows that there is significant over-dispersion, which justifies the use of the negative binomial model.

(b) Estimated coefficients and their implications

It is apparent from Table 3 that average household size (HH_TOTAL) in the village, age (AGE), and the dependency ratio (DEP_RATIO) are among the variables that are not significant. Although this could be a result of aggregation to the village level, the most likely reason is the theoretical indeterminacy of some of these variables, for example household size. However, many regressors have the expected signs and are significant.

As expected, costs related to marketing, transaction, rationing, and information (DISTC_HRS) — the average travel time to the nearest economic center — has a negative effect on the number of households participating in the rural labor markets. Although it has the expected sign, it is not significant in influencing the share of rural labor income in total cash income. The non-significant effects on the share of labor income could mean that this variable will have similar effects on other sources of cash income (e.g. off-farm self-employment, leaving the composition of different sources unchanged). Thus, this result is supported by the findings of many other studies that conclude access to markets plays a significant role in enhancing development in off-farm employment and in improving the welfare of the rural poor.²⁵

Relaxation of the cash constraint (CREDIT) has a positive and significant effect on the number of households participating in rural labor markets. However, this variable

is not significant in influencing the share of labor income in the cash income of the village. Even though the participation rate increases, this finding could imply that relaxation of cash constraints increases income from off-farm self-employment faster than it increases the wage income. In general therefore, this finding is contrary to Woldehanna's 2000 findings at household level, which show that the relaxation of cash constraints reduced participation in the rural labor markets in Ethiopia.²⁶ The reason for this difference is that our analysis at village level captures the effects of liquid households in providing employment to cash constrained households. However, the square cash constraint (CREDIT_SQ) is negative, which indicates that the relationship is not linear and that after some time the increase in cash flow in the village may reduce the number of households that participated in the rural labor markets. This could result from the ability of some households, who initially were wage workers, to overcome entry barriers in self-employment.

Table A3: Determinants of wage labor in the Tanzanian villages:

Variables	Share of off-labor income on total incomes		Number of Households participating in wage labor
Constant	-18.77		-38.22
Age	9.52		19.38
Age_sq	-1.34		-2.64
Gini_exp	-1.48	***	0.03
Gini_land	0.21		0.41 *
Per_land	-0.03		-0.15 *
Pr_educ	-0.31		8.07 **
Educ_sq	0.48		-4.57 **
Dep_ratio	-2.29		-0.45
Dratio_sq	1.69		0.25
Elec_PW	1.83	**	-1.70 *
Elec_sq	-0.45		1.31 ***
Trade	0.30		2.40 ***
Trade_sq	-0.63	*	-2.45 ***
Credit	0.89		3.37 ***
Credit_sq	-1.58		-5.08 ***
Saf_water	-0.51		1.71 ***
Water_sq	0.70	**	-1.37 ***
HH_total	-0.11		0.06
Act_hour1	-0.06		0.25 **
Act_hour2	-0.19	**	-0.10
Dist_hrs	-0.03		-0.09 ***
alpha			0.13 ***
log likelihood	-2167.8207		-727.902
LR chi2	399.69	***	234.87 ***

Key: ***, **, * stand for significant at 1%, 5% and 10%, respectively

The indicator of wellbeing at village level, safe water availability (SAF_WATE), is positively associated with the number of households supplying labor in rural labor markets in a village and the share of labor income in total income. The square of this variable also is negative and significant, indicating that wage employment and safe water availability are not necessarily linearly related. Furthermore, the other wellbeing-related indicator, access to electrical power (ELEC_PW) is positively related to the number of households supplying labor in the rural labor markets and the share of income derived from these markets in the total cash income. We find that, contrary to our expectation, inequality in per capita expenditure has negative effects on the share of labor income in the total cash income. This partly implies that the inequality in the rural areas (Gini coefficient of 0.39) is a result of incomes generated from outside the rural areas such as remittances. Note, however, that there is significant evidence that land inequality is positively associated with the number of households that supplied labor in the rural labor markets. Moreover, as expected, per capita land has negative effects on the participation in rural labor markets as a supplier. Thus, these results in general imply that past policies in Tanzania that have favored egalitarian land holding/distribution partly explain the relatively low development of rural labor markets in Tanzania as compared to some other countries in the region, for example Malawi.²⁷

Indicators of economic diversifications in the rural economy, the hours worked in the main activity (ACT_HRS1) and in the secondary activity (ACT_HRS2) do have the expected effects. We find that the number of hours worked on the main activities in rural Tanzania (which are generally farming and livestock activities), increases the share of wage labor income in total cash income. However, number of hours worked on secondary activities in rural Tanzania (which are generally off-farm self-employment) reduces the number of households supplying labor in the rural labor markets. Similar results are obtained when these variables are replaced by their ratio in the regression.²⁸ It is established at 5% level of significance that the increase in the ratio of hours worked in primary activities to hours worked in secondary activities increases the share of labor income in total cash income. However, the effect of this ratio was not significant in determining the number of households selling labor in the rural labor markets.

The implication of this finding is that agriculture still has the dominating role in the rural economy of Tanzania as compared to other forms of off-farm self-employment. This is because most of the rural off-farm self-employment enterprises are generally small and provide employment only to their proprietors. This argument is also reflected in the findings which show that villages with larger a number of petty traders (TRADE) are associated with a low share of labor income in total cash income. This last finding could mean that the kind of wage labor analyzed here is considered to be an inferior option as compared to other off-farm self-employment. This argument is in line with the argument of distress-pushed participation in wage labor discussed in the 1997 work of Islam who identified the major factor for distress-pushed participation as successive droughts that depress agricultural income and hence increase the need for alternative sources of income.²⁹ Furthermore, these results show that off-farm self-employment is a substitute for distress participation in rural wage employment. Thus, while promotion of off-farm self-employment may be an end unto itself, it is likely to reduce distress wage labor participation and increase wage in rural labor markets. In this case, promotion of

off-farm self-employment can be welfare enhancing for both sub-sectors of rural off-farm employment, namely wage employment and self-employment.

The results with respect to education are as expected. We find that this type of labor market participation declines with education (the square of education is negative). As the type of wage labor analyzed here is predominately for the poor and less educated, our results indicate that education empowers rural households in their search and participation in other off-farm employment such as self-employment. Furthermore, a positive and significant coefficient of education implies that even for this inferior form of rural wage labor, education is important. It emphasize that villages with a relatively educated population will offer more wage opportunities than villages a with relatively uneducated population.

SUMMARY AND CONCLUDING REMARKS

This paper has considered factors that determine the number of households that supply labor in the rural labor markets at village level in Tanzania and the share of labor income (derived from supplying labor to these markets) in total cash income. Due to high transaction and supervision costs (involved in the rural labor markets) as well as poor transport infrastructure in rural areas of Tanzania, each village was considered to constitute a local labor market of its own.

We have shown that the factors significant in determining the development of village labor markets are access to credit, education level, per capita agricultural land, and market access. Thus, interventions that relax cash constraints through increased access to credit for some households are likely to indirectly increase the participation of other households in the rural labor markets. For the case of education, we however noted that even though education is important for the development of rural labor markets, relatively high education (in the rural context) is likely to induce participation in self-employment because it is generally considered superior to rural wage employment.

Other factors that are significant in determining the development of village labor markets are diversification of economic activities in the village and inequality in both per capita expenditure and landholding. Economic diversification occurs mainly in the form of off-farm self-employment. As most of these self-employment enterprises do not have employees apart from their sole proprietors, we found that they have negative impacts on the number of participants in wage labor markets. As such, we found that in the current rural setting in Tanzania, rural labor markets are mainly tied to the farming sector (including the issue of land inequality discussed above) as opposed to the off-farm sector.

Therefore, we argued that since a substantial portion of labor supplied in the rural labor markets is a result of economic distress, the promotion of off-farm self-employment is likely to reduce distress-push participation in the wage labor markets. If the promotion of the rural self-employment can bid up wages in the rural labor markets, then it can be welfare enhancing for both sub-sectors of rural off-farm employment (i.e. wage and self-employment).

NOTES

1. See Leavy and White 2003; Ruben and Berger 2001; FAO 1998; and Lanjouw 1998.
2. World Bank, 2000. See Barrett et al. 2002, for recent review of the importance on non-farm employment in Sub-Saharan Africa.
3. This classification is based on Barrett et al. (2001) in which they present the components of rural household in income a three-way classification. The classification may be based on (i) earned income (income from productive assets); (ii) type of the sector (farm vs non-farm); (iii) function (wage vs. self-employment); (iv) space (local vs. migratory).
4. The two findings based on the two national surveys reported in NBS, 2002a and NBS, 2002b.
5. Reardon et al. 2001.
6. Reardon, 1997, is one of those few studies of rural labor markets in Africa but concentrated mainly on wage employment in the non-farm sector. Leavy and White, 2003, argue, however, that a substantial amount of wage employment is obtained from the farm sector.
7. See Bigman and Fofack, 2000, in their excellent book on methodology and applications of geographical targeting for poverty reduction.
8. Bryceson, 2000.
9. See for example Temu et al. 2001.
10. Anselin, 2002.
11. Rosenzweig, 1988.
12. Singh et al. 1986; Lofgren and Robinson 1999; Taylor and Adelman 2003.
13. Reardon et al. 2001.
14. See, for example, studies cited in Woldehanna, 2000.
15. Ferriera, 1996.
16. Woldehanna, 2000 and Mduma, 2003.
17. Woldehanna, 2000 and Mduma, 2003.
18. Mduma, 2003.
19. Isguti, 2004.
20. In general, most of the credit that has been made available to rural households is intended to facilitate purchase of commercial farm inputs (e.g. fertilizers and pesticides) and is typically extended on the basis of cropping seasons (Temu et al. 2001).
21. Yao, 2001.
22. The 2000/01 HBS collected information on distances to 20 socio-economic centers/points which we consider as measuring access to markets and information. In this study, we have only dealt with the average of all of them. The full discussion of each component is found in NBS, 2002b.
23. Wooldridge, 2001.
24. Greene, 2001.
25. See also the review in Reardon et al. 2001.
26. Woldehanna, 2000.
27. See for example, Edris et al. 2004 for the case of Malawi.

28. Other results for this regression are omitted because they are similar to those discussed here.

29. Islam, 1997.

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