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The contribution of female non-farm income to poverty reduction

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Abstract

There is a widely held view that off-farm income in developing countries tends to reduce poverty, leading to the conclusion that policies should focus on the further diversification of income options of rural households. However, much off-farm employment might be initiated rather as a survival strategy but as a sustainable way to reduce poverty in the long run. Using a rich data set from Tanzania, this study examines the potential income increases generated by off-farm income with a particular focus on off-farm income contributed by women. The findings indicate that women's contributions to household income through off-farm activities are limited and smaller as compared to those of men. Investigating the possible reasons, fetching water and collecting firewood as well as the number of dependants limit women's time that can be spent on off-farm activities.

Keywords: Income diversification, off-farm employment, women

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1. Introduction

There is a widely held view that off-farm income in developing countries tends to reduce poverty, leading to the conclusion that policies should focus on the further diversification of income options of rural households. However, much off-farm employment might be initiated rather as a survival strategy but as a sustainable way to reduce poverty in the long run. Using a rich data set from Tanzania, this study examines the potential income increases generated by off-farm income with a particular focus on off-farm income contributed by women. Women face several constraints when entering the labor market or starting a small business. Particularly the latter has been found to be difficult for women as access to finance is often limited and thus many small scale enterprises lack the potential for growth as own money does often not suffice to make productivity increasing investments.

Poverty in Tanzania is widespread and severe—about 36% of the population is estimated to live below the basic needs poverty line (URT 2005). One of the strategies promoted in the National Strategy for Growth and Poverty Reduction (NSGRP) or MKUKUTA is to support the micro-, small- and medium-enterprise sector (MSME) which is believed to generate the potential to reduce poverty in the long-run. Although the incidence of this sector varies across time and the data employed (see Lanjouw, Quizon and Sparrow 2001) the Tanzanian National Bureau of Statistics (URT 2004) estimates that—based on data from the Household Budget Survey (HBS) 2000/01—about 40% of household incomes in rural areas are derived from non-farm activities.

In most of the cases, households engage in the informal labor market which absorbs a huge share of the national labor force. 40% of all Tanzanian households are engaged in off-farm activities in the informal labor market, whereas most work on their own account. Paid labor makes up only a small share and account for only 0.4% (URT 2006). The size of the businesses differs to a large extent. Most of them operate without employees (92%) and exhibit only a limited potential for growth (Lanjouw, Quizon and Sparrow 2001). However, despite this low potential and the criticism on the capability of SMEs to contribute to country wide economic growth, there are nevertheless still two arguments which might justify why non-farm employment can be an important means to shift household income above the poverty line in at least two ways:

First, the empirical evidence largely supports a positive correlation between non-farm income and poverty reduction (see for example Canagarajah, Newman and Bhattamishra. 2001, de Janvry and Sadoulet 2001, Ferreira and Lanjouw 2001, Reardon, Berdegue and Escobar 2001). Studies conducted in Tanzania and Kagera region in particular found that non-farm activities helped farmers to increase their incomes (Kamugisha 2004, Kessy 2004, Lanjouw, Quizon and Sparrow 2001). The reasons for the positive link may be seen in the large amount of surplus labor in rural areas of developing countries and the resulting low marginal product of labor. However, in other countries it has been found that non-farm employment is not always, or in every context, the route out of poverty (van de Walle 2004, Lanjouw 2001). The source of such failure can be attributed to a lack of capital that prohibits the engagement in activities which exhibit high productivity. Furthermore, markets may not be sufficiently developed to ensure a steady supply of inputs as well as a sufficient demand for the goods produced. In the light of such shortcomings, running a business is rather a survival strategy to maintain a subsistence level of welfare which keeps households from falling even deeper into poverty.

Second, the diversification of income sources allows for a more stable income stream and thus functions as an informal insurance which reduces vulnerability to exogenous shocks, as illness, drought, or death of a household member (Christaensen and Boisvert 2000, Ferreira and Lanjouw 2001). Those insurance systems have been found to promote

economic growth as due to the reduced risk, households are able to undertake investments which they otherwise would not do because of the related risk. In the long run, reducing risks and vulnerability spurs income growth and increases productivity as has been demonstrated for Zimbabwe by Elbers, Gunning and Kinsey (2003).

Women play an important role in generating non-farm income: according to the Tanzanian National Bureau of Statistics (URT 2006), the female share of the labor force employed in the informal sector is 45%. Although women entrepreneurs often run enterprises that exhibit low productivity, they provide important supplements to household income. More than 39% of those women who are employed in the informal sector as the main activity report that they do this in order to generate additional income for the family as opposed to 25% of men. The aim of this study is to quantify the effects of women's income on household welfare and to compare the outcome with that of male off-income contributions.

2. Empirical approach

To investigate the women's contribution to household income from entrepreneurship or non-farm employment the households are distinguished by two regimes:

Regime 1: households where female household members generate non-farm income

Regime 2: households where female household members do *not* generate non-farm income

To improve the comprehensibility of the following exposition, regime 1 is named NONFARM and regime 2 is named FARM. Each regime is easily identified by the data which contains information on the different activities that household member pursue. The distinction of regimes that require the estimation of a welfare function for each state separately has the advantage that parameter heterogeneity across regimes is accounted for which would not be captured by the inclusion of a single dummy variable for women's off-farm activities or interaction terms. The primary goal here is to estimate the marginal

distributions of women's income given that men either work off the farm or not and compare the outcome to that of male off-farm income.

For each regime, I first estimate a household expenditure function, applying a selection model to account for the fact that the choice to participate in the off-farm labor market may be related to household characteristics. In principle, for such an exercise one would rather use household income instead of expenditure. In practice, the use of expenditure per capita has a number of advantages over available income. Due to usually large seasonal fluctuations, income streams are not stable over time and therefore difficult to measure. Expenditure per capita lends itself as an alternative measure of welfare because it is much less subject to seasonal fluctuations. While income may shift up and down between seasons—and is therefore also subject to recall errors depending on the time of the interview—households are assumed to cope with income shortfalls through savings in order to maintain a certain level of consumption (see Deaton 1997 for further discussion).

The expenditure model is estimated using a selection model proposed by Lee and Trost (1978) which has in the present setting the advantage that the choice between NONFARM and FARM regimes can be explicitly modeled. The model is specified as follows:

NONFARM:

$$Y_{i1} = X_{i1}\beta_1 + u_{i1} \quad \text{iff} \quad Z_i\gamma \geq u_t$$

FARM:

$$Y_{i2} = X_{i2}\beta_2 + u_{i2} \quad \text{iff} \quad Z_i\gamma < u_t$$

Sample separation, that is, whether women work off the farm or not is fully observed and indicated by the variable I where

NOFARM:

$$I_t = 1 \quad \text{iff} \quad Z_i\gamma \geq u_t$$

FARM:

$$I_t = 0 \quad \text{iff} \quad Z_i \gamma < u_t$$

The estimating equations are then given by:

NONFARM

$$Y_{i1} = X_{i1} \beta_1 - \sigma_{i1} f(Z\gamma) / F(Z\gamma) + \eta_{1i}$$

FARM

$$Y_{i2} = X_{i2} \beta_2 + \sigma_{i2} f(Z\gamma) / (1 - F(Z\gamma)) + \eta_{2i}$$

where the expected values of η_{1i} and η_{2i} conditional on $I = 1$ and $I = 0$ respectively are assumed equal to zero. The independent variable used for the expenditure equation is the log of total expenditure per capita, while the dependent variables can be divided into two categories:

1. *Individual characteristics*: sex of the head of household, age of the head of household, age of the spouse, average educational level of females, average educational level of males, male time use on primary activity, female time use on primary activity, dummy for female non-farm wage employment, dummy for male non-farm wage employment.
2. *Household characteristics*: number of adults, number of dependants, asset endowment of land and durables, livestock holdings, total value of inputs used for non-farm business, total value spent on agricultural inputs, number of persons hired, amount of remittances received, total amount of credit obtained.
3. *Community characteristics*: Community characteristics are summarized by a set of dummy variables. The selection equation contains the same set of variables as the expenditure function.

Based on the parameter estimates from the NONFARM model, the welfare changes that would arise if a woman from a non-participating household were to engage in off-farm employment are simulated. This is done by predicting the expected expenditure of FARM households using the parameters obtained from estimating the NONFARM model. Subtracting the predicted income from the observed expenditure of the FARM households yields the welfare change these households face due to not having women pursuing non-farm activities.

3. Data and setting

The data stems from the 2004 Kagera Health and Development Survey (KHDS). The data set provides a rich collection of information on household members' activities and time use, income levels and sources, as well as on productive assets and loans obtained. All these data are available on individual level—only the information on asset endowment is limited to the household level. The KHDS 2004 has been developed for gathering data on the impact of AIDS on poverty and labor supply. The survey covers 3,015 households from rural areas and was conducted in Kagera region, which is located in the outermost North-West of Tanzania bordering to Uganda, Rwanda, Burundi and the Lake Victoria. As in other remote regions of Tanzania, agricultural production is the mainstay of the economy of Kagera. The main cash crops produced are bananas and coffee, from which farmers derive a living which is in terms of poverty at the Tanzanian average (URT 2005). Besides agriculture, only a few enterprises are established employing a total of 35,401 employees which is again at the Tanzanian regional average (URT 2004). Off-farm income generating activities are very common: in 74.6% of the surveyed households is at least one household member partially or fully employed outside agriculture. The rate of female off-farm labor participation is high and out of total off-farm employment 48.8% is pursued by women.

There is almost no formal market for credits in the villages. Almost all money lenders are relatives of the borrower which finds its expression in that about 45% of the respondents indicate that they have received money as a friendly gesture without specific purpose.

The second most important reason to borrow money is not for the purpose of investment which makes up only 3.2% of the loans taken, but in most cases to satisfy subsistence needs of the household.

The means of the data, shown in table 1, suggest that land is among the most important productive assets in Kagera, as households are more likely to obtain land rather than livestock or business assets. Primary education is almost equally distributed across gender, which reflects the present gender equity of access to primary schooling, which has lasted in Tanzania for some decades. Conform to the current situation, more men than women have been exposed to secondary schooling, although the absolute level of secondary education is very low. Only 8% of male heads have been at secondary school, while this holds for only 4% of the women. A striking feature of table 1 is the time allocation pattern. Women spent significantly less time in off-farm activities as compared to men. The hours spent on fetching water or collecting firewood even exceeds the time that women commit to off-farm income generation.

4. Results

The results given in table 2 reveal the impact of household characteristics on welfare for both regimes. Column 2 shows the estimated parameters for households where at least one woman is employed outside agriculture, while column 4 gives results for households where none of the female household members are engaged in any off-farm activity. The effect of asset endowment—land, livestock and business assets—exhibits a nonlinear relation to household welfare, whereas consumption levels first decrease with the value of asset and then after having achieved a turning point begin to increase. A similar finding has also been reported in van de Walle and Cratty (2004).

The coefficients for female education are both positive and significant whereas the returns for secondary education are substantially larger. Surprisingly, the dummy for primary education of men does not achieve any conventional level of significance. The

indicator for secondary schooling of men is positive and significant, but smaller than the dummy for women. An F-test ($F_{1,831}$: 2.91) of the equality of the two coefficients in the NONFARM model yields a statistic slightly below the 10%-level of significance. This result is interesting, particularly because the returns to female primary education exceed those from male secondary schooling. This might be due to higher productivity of women in the household but it may also be due to a matching effect of couples: women with secondary education might be more likely to marry prosperous men. The employment status of the male head of household has no implications for household per capita expenditure in the NONFARM model, but is positive and significant in the FARM model. The time needed to fetch water reduces expenditure in both models, which suggests a time constraint effect. Household size and dependency ratios have both negative signs and are both highly significant in the FARM and the NONFARM model. This may be a reflection of the aim of poor couples to have more children as old age security and household labor (Jensen 1990). Furthermore, a larger share of dependants requires more time to be allocated towards care taking and thus reduces the options to generate additional income.

Below the coefficients of the expenditure model, the results of the selection equation are shown, which give an insight into the determinants of the probability that a woman works in an off-farm activity. Female education is an important driving force to become employed outside agriculture. Male education on the other hand, has a negative effect on the likelihood of women to work off-farm. Education might reflect male productivity and thus women may not engage in other survival strategies. The male employment dummy is positive and significant, revealing that there might be network effects that foster male and female off-farm employment. A working male might facilitate female off-farm employment through establishing necessary contacts. A further explanation is that male income may serve as a basis for savings which can be employed for start up investments of women. Household size and the dependency ratio are both positive in the NONFARM model.

The same two models have been estimated regarding male off-farm income as well and the results are given in table 3. Asset holdings reveal the same non-linear pattern as compared to female off-farm income. The parameter for primary education of women is not significant at any conventional level. This could imply either that female education is not allocated efficiently or that unobserved effects like ability drive the parameter estimate. The parameter for female employment is negative in both models, although it is only significant in the FARM model.

In the selection equation, most notably, the sign of the dependency ratio in the first model is negative and strongly significant while for women, the same coefficient is positive, which might imply that women only work off-farm as a consequence of income shortfalls. This finding is equivalent to that reported by the ILO (2003), where it is stated that many female off-farm employment serves as a survival strategy. This might also be the reason why women rather engage in many micro enterprises at once instead of growing vertically (ILO 2005).

Figure 1 shows the distributions of the predicted per capita expenditures for FARM and NONFARM households for female off-farm income. The solid line represents the simulated expenditure that would result if the given households with no female off-farm income were engaged in off-farm activities. The three distributions confirm that women's off-farm employment appears to serve as a survival strategy rather than a substantial income increment. Comparing this finding to the results from the male off-farm income models suggests that rather men are involved in off-farm activities that are capable of reducing poverty. The respective distributions shown in figure 2 reveal the difference. Households, not previously generating male off-farm income would benefit from this while attempts to engage in female off-farm activities suggest only a limited potential to increase household income. The results need nevertheless be treated with some caution as the decision of women to engage in off-farm income activities might be driven by idiosyncratic shocks not included in the model. However, it still seems reasonable to argue from the results that female entrepreneurs' levels of productivity need to be increased.

How are these findings related to the probability that women engage in different forms off-farm activities separately, i.e., entrepreneurship and wage employment? Table 4 gives in column 2 and 3 the results of a probit model with female business activities as the dependent variable. The presence of daily and periodically markets turn out to be negatively related to the probability that women engage in off-farm business, which is quite unexpected. A possible explanation might be that women rather sell their agricultural produce on a daily market instead of starting a business. Reardon et al. (2001) report a similar finding from studies on nonfarm employment in Latin America and explain it through increased competition on nearby markets. The distance to the markets show the expected negative sign, which is significant on the 10% level, for the periodically markets, which implies that distance poses to be a time constraint. The time constraint effect becomes significant with respect to the time spent on collecting water and fetching firewood. This result is consistent with the findings from Mduma (2005) and shows a potential for time saving investments in water facilities as well as alternative sources of energy to increase the female labor market participation rate. The coefficient for women's education is significant and positive, while the results for male education exhibit negative signs. This finding may reflect a substitution effect, that is, that if men work off-farm than women do not, because they have to maintain the farm and vice versa. The household size parameter is positive as well indicating that in large families more household farm labor is available. The results for female wage labor do not entirely fit to this picture as the signs of the coefficients representing time constraints are always positive, but insignificant though. However, the distance to markets may reflect the size of the market, which is might be positively related to wage employment.

Table 5 presents the results on the determinants of the amount of time that women spend in off-farm activities. The parameter for daily market again exhibits a negative sign, which might be due to the same reason as to the likelihood of engaging in a business. Fetching water and collecting firewood exhibits a strong and negative relationship to the time spent on business activities. A further constraint is indicated by the dependency ratio, which has a negative coefficient. Caring for children appears to significantly reduce

the time that women have available for other activities. Land as a measure of welfare should be interpreted in terms of time needed for agricultural labor, which is reflected by the negative coefficient. The model for time spent in wage employment reveals again different signs regarding the market indicators as well as regarding the distance to the markets, but is similar with respect to the education variables, which are together with land the only variables that achieve the conventional 5% level of significance.

5. Conclusions

The major goal of this study is to explore the potential of female non-farm income to reduce poverty on household level. The results from the two different expenditure equations demonstrate that female off-farm activities are rather a survival strategy than a means to achieve sustainable welfare increases in the long run. The results also cast doubt on the often cited conclusion that off-farm employment leads to poverty reduction. This might be true in the short run but does not necessarily hold for longer time periods as the off-farm labor market is subject to substantial fluctuations. Van de Walle and Cratty (2004) report a similar finding for Vietnam. However, the figures for male off-farm employment reveal the potential for generating significant income increases. Policies therefore need to address the underlying reasons of the unstable formal and informal labor markets in order to render incomes from the labor market more stable in the long run. A second issue that policy makers need to consider is women's employment in off-farm activities. Given that the incidence of off-farm employment among women is significantly large and also not much smaller as compared to men, increasing the productivity of women's small scale businesses seems to be warranted. One possible option may be investments into time saving infrastructure. Among all factors, fetching water and collecting firewood were significantly and negatively correlated with the probability of women starting a business. Particularly with the time spent in off-farm business, the effect becomes apparent. However, one should not exaggerate the options and success for generating supplemental income of micro enterprises. If women are not able to diversify the portfolio of products they offer, the oversupply of goods and labor may be followed by a loss of welfare instead.

References

- Berdegúe J. A., E. Ramírez, T. Reardon, and G. Escobar. 2001. Rural nonfarm employment and incomes in Chile, *World Development*, 29(3).
- Canagarajah, S, C. Newman and R. Bhattamishra. 2001. Non-farm income, gender, and inequality: evidence from rural Ghana and Uganda, *Food Policy*, 26(4).
- Christaensen, Luc and Richard N. Boisvert. 2000. On measuring household food vulnerability: Case evidence from northern Mali., mimeo.
- Deaton, Angus. 1997. The analysis of household surveys. A microeconomic approach to development policy. Washington DC: World Bank.
- de Janvry, Alain and Elisabeth Sadoulet. 2001. Income strategies among rural households in Mexico: The role of off-farm activities, *World Development*, 29 (3).
- Ferreira, Francisco and Peter Lanjouw. 2001. Rural non farm activities and poverty in the Brazilian North East, *World Development*, 29 (3).
- Elbers, Chris, Jan Willem Gunning and Bill Kinsey. 2003. Growth and Risk: Methodology and Micro Evidence, *Tinbergen Institute Discussion Papers* 03-068/2, Tinbergen Institute.
- Jensen, E. R. 1990. An econometric analysis of the old-age security motive for childbearing, *International Economic Review* 31(4): 953–68.
- Kamugisha, C.A. 2004. Situating household food security in Kagera region. *Tanzania Journal of Development Studies* 5(3): 39-51.
- Kessy, Flora. 2004. Rural income dynamics in Kagera region, Tanzania, Economic and Social Research Foundation, Dar es Salaam.
- Lanjouw, P. Quizon, J. and R. Sparrow. 2001. Non-agricultural earnings in peri-urban areas of Tanzania: evidence from household survey data, *Food Policy*, 26(4): 385 - 403
- Lee, L.-F. and R.P. Trost. 1978. Estimation of some limited dependent variable models with application to housing demand. *Journal of Econometrics* 8: 357-382.
- Maddala, G.S. 1983. *Limited-Dependent and Qualitative Variables in Econometrics*. Econometric Society Monographs in Quantitative Economics. Cambridge: Cambridge University Press.
- Mduma, John. 2005. Gender differences if rural off-farm employment participation in Tanzania. Is spatial mobility an issue? mimeo.

- Pagano P. and F. Schivardi. 2003. Firm Size Distribution and Growth. *Scandinavian Journal of Economics*, 105(2): 255-274.
- Ravallion, Martin and Chen, Shaohua. 1999. Measuring Pro-Poor Growth, World Bank Policy Research Working Paper No. 2666, World Bank, Washington DC.
- Reardon, T., J. Berdegue, and J. Escobar. 2001. Rural nonfarm employment and incomes in Latin America: Overview and policy implications. *World Development* 29(3): 395-409.
- Rosenzweig, M. 1988. Labor Markets in Low-Income Countries. In: H. B. Chenery and T.N. Srinivasan. (eds.): *Handbook of Development Economics*, Vol. 1, Amsterdam: North-Holland.
- United Republic of Tanzania, 2005. Poverty and Human Development Report, Research and Analysis Group, Dar es Salaam.
- United Republic of Tanzania, 2004. Basic Demographic and Socio-Economic Characteristics, Tanzania National Profile, National Bureau of Statistics, Dar es Salaam.
- United Republic of Tanzania, 2002. Integrated Labour Force Survey 2000/01, Analytical Report, National Bureau of Statistics, Dar es Salaam.
- van de Walle, Dominique and Dorothyjean Cratty. 2004. Is the emerging non-farm market economy the route out of poverty in Vietnam? *The Economics of Transition*, 12(2).
- Vandenberg, Paul. 2006. Poverty reduction through small enterprises: Emerging consensus, unresolved issues and ILO activities. ILO, Geneva.

Table 1: Summary table

Variable	Mean	Std. Dev.
Log Expenditure per capita	12.18	0.74
Log of value of land owned	10.38	5.49
Log of value of livestock owned	5.74	5.39
Log of business assets	3.50	4.93
Primary Education Female	0.48	0.50
Secondary Education Female	0.04	0.20
Primary Education Male	0.47	0.50
Secondary Education Male	0.08	0.27
Business female dummy	0.19	0.39
Employment female dummy	0.23	0.42
Business male dummy	0.34	0.47
Employment male dummy	0.41	0.49
Log of household size	1.42	0.62
Dependency ratio	0.36	0.23
Sex of head of household	0.21	0.41
Age of head of household	41.80	16.94
Time spent in off-farm activities, females	13.00	39.91
Time spent in off-farm activities, males	22.84	42.07
Time spent on fetching water/ collecting firewood	15.81	42.07

Table 2: Determinants of women's off-farm contribution to household welfare

	NONFARM		FARM	
	Coefficient	t-value	Coefficient	t-value
Land	-0.158	-9.596	-0.123	-8.131
Land squared	0.011	9.162	0.007	7.461
Livestock	-0.050	-3.363	-0.056	-5.030
Livestock squares	0.005	4.047	0.005	5.598
Business assets	-0.042	-2.495	-0.001	-0.053
Business assets squared	0.005	3.912	0.002	2.008
Primary Education Female	0.115	2.326	0.094	2.626
Secondary Education Female	0.226	4.533	0.293	5.787
Primary Education Male	0.019	0.360	-0.010	-0.244
Secondary Education Male	0.078	1.991	0.120	3.677
Employment Male	0.001	3.207	0.000	0.952
Time worked, female	0.001	1.669	0.001	0.127
Time worked, male	-0.044	-3.015	-0.029	-1.378
Fetching water/ collecting firewood	-0.041	-0.610	-0.006	-0.089
Distance to daily market	0.022	0.880	-0.074	-0.405
Distance to periodic market	-0.083	-1.145	-0.207	-0.869
Daily market dummy	-0.054	-0.270	-0.011	-0.263
Periodically market dummy	0.068	0.322	0.139	3.345
Household size	-0.413	-7.965	-0.253	-2.796
Dependency Ratio	-0.591	-5.744	-0.572	-10.345
Sex of Head of Household	-0.051	-0.673	0.118	104.741
Age of Head of Household	-0.003	-1.903	-0.005	-0.019
Constant	13.434	40.178	13.504	48.960
Selection Equation				
Land	-0.050	-8.134		
Land squared	0.001	7.458		
Livestock	0.012	-5.018		
Livestock squares	-0.002	5.586		
Business assets	0.166	-0.055		
Business assets squared	-0.010	2.012		
Primary Education Female	0.429	2.660		
Secondary Education Female	0.525	5.826		
Primary Education Male	-0.350	-0.247		
Secondary Education Male	-0.192	3.667		
Employment Male	0.840	3.702		
Time worked, male	0.000	-2.542		
Fetching water/ collecting firewood	0.002	-0.259		
Distance to daily market	0.019	-1.042		
Distance to periodic market	-0.071	-1.099		
Daily market dummy	-0.269	-0.041		
Periodically market dummy	0.324	3.346		
Household size	0.399	-6.088		
Dependency Ratio	0.887	-6.302		

Sex of Head of Household	-0.003	2.127
Age of Head of Household	-0.215	-4.736
Constant	-0.994	42.078

N	2615
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Table 3: Determinants of men's off-farm contribution to household welfare

	NONFARM		FARM	
	Coefficient	t-value	Coefficient	t-value
Land	-0.122	-8.102	-0.138	-7.674
Land squared	0.008	7.559	0.009	7.518
Livestock	-0.061	-5.698	-0.057	-4.068
Livestock squares	0.006	6.413	0.006	4.886
Business assets	-0.041	-3.827	-0.041	-1.911
Business assets squared	0.005	5.885	0.003	1.385
Primary Education Female	0.026	0.887	0.207	4.385
Secondary Education Female	0.351	4.652	0.715	6.153
Primary Education Male	0.054	1.504	-0.076	-1.445
Secondary Education Male	0.227	4.029	0.319	3.556
Employment Female	-0.021	-0.644	-0.204	-2.413
Time worked, female	0.001	2.443	0.002	3.207
Time worked, male	0.001	3.472	0.000	-0.455
Fetching water/ collecting firewood	-0.036	-3.111	-0.016	-0.997
Distance to daily market	-0.001	-0.070	0.005	0.144
Distance to periodic market	-0.051	-0.638	-0.062	-1.031
Daily market dummy	-0.090	-0.559	-0.207	-0.720
Periodically market dummy	0.065	0.277	0.021	0.106
Household size	-0.365	-9.113	-0.357	-6.791
Dependency Ratio	-0.608	-6.806	-0.415	-3.413
Sex of Head of Household	-0.007	-0.137	0.131	1.709
Age of Head of Household	-0.005	-3.535	0.000	0.141
Constant	13.365	46.663	12.879	32.419
Selection Equation				
Land	0.072	2.464		
Land squared	-0.004	-1.690		
Livestock	0.057	2.290		
Livestock squares	-0.006	-2.789		
Business assets	0.130	4.079		
Business assets squared	-0.001	-0.325		
Primary Education Female	-0.346	-4.845		
Secondary Education Female	-1.076	-6.744		
Primary Education Male	0.280	3.688		
Secondary Education Male	0.261	1.918		
Employment Female	0.868	10.091		
Time worked, female	-0.001	-1.608		
Fetching water/ collecting firewood	-0.059	-2.251		
Distance to daily market	-0.010	-0.334		
Distance to periodic market	-0.449	-3.570		
Daily market dummy	-0.335	-1.339		
Periodically market dummy	-0.284	-0.857		
Household size	0.288	3.562		
Dependency Ratio	-1.028	-5.618		
Sex of Head of Household	-0.993	-10.793		

Age of Head of Household	-0.020	-8.427
Constant	2.129	4.886

N	2615	2615
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Table 4: Determinants of female off-farm activities

	Business		Wage Employment	
	Coef.	T	Coef.	T
Daily	-0.703**	-2.02	0.286	0.710
Period	-0.453*	-1.7	0.654	1.630
Distdly	-0.078	-1.56	0.088*	1.750
Distprd	-0.189*	-1.94	0.207	1.510
Water	-0.003**	-1.97	0.033	1.250
lnhhsz	0.473**	6.27	0.055	0.810
Prim_fem	0.485**	6.64	0.176**	2.590
sec_fem	0.564**	3.84	0.800**	5.700
Prim_male	-0.401**	-5.5	-0.405**	-6.260
sec_male	-0.421**	-3.64	-0.520**	-4.390
Depratio	0.103	0.56	0.269	1.560
age_head	0.003	1.63	-0.008**	-3.860
Lnland	-0.030**	-4.76	-0.014**	-2.150

Table 5: Regression of female time spent working in off-farm activities

	Business		Wage employment	
	Coef.	t	Coef.	T
Daily	-3.415 **	-1.990	2.181	0.850
period	-0.938	-0.470	0.771	0.330
distdly	-0.677 **	-2.540	0.558 *	1.790
distprd	0.253	0.410	-0.456	-0.560
lnwater	-0.281 **	-2.080	0.226	1.430
lnhhsz	2.674 **	6.310	0.029	0.070
Prim_fem	2.336 **	6.010	1.358 **	3.200
sec_fem	2.183 **	3.020	5.520 **	7.080
prim_male	-1.276 **	-3.470	-1.859 **	-4.490
sec_male	-1.083 *	-1.820	-2.665 **	-3.480
depratio	-1.616 *	-1.720	0.192	0.180
age_head	-0.033 **	-2.490	-0.022	-1.610
lnland	-0.166 **	-5.120	-0.159 **	-4.280
constant	-1.415	0.571	-6.214 *	-1.790
N	2623			
Chi2(57)	257.79	0.000		
Pseudo R2	0.0704			

Figure 1: The effect of non-farm income earned by women

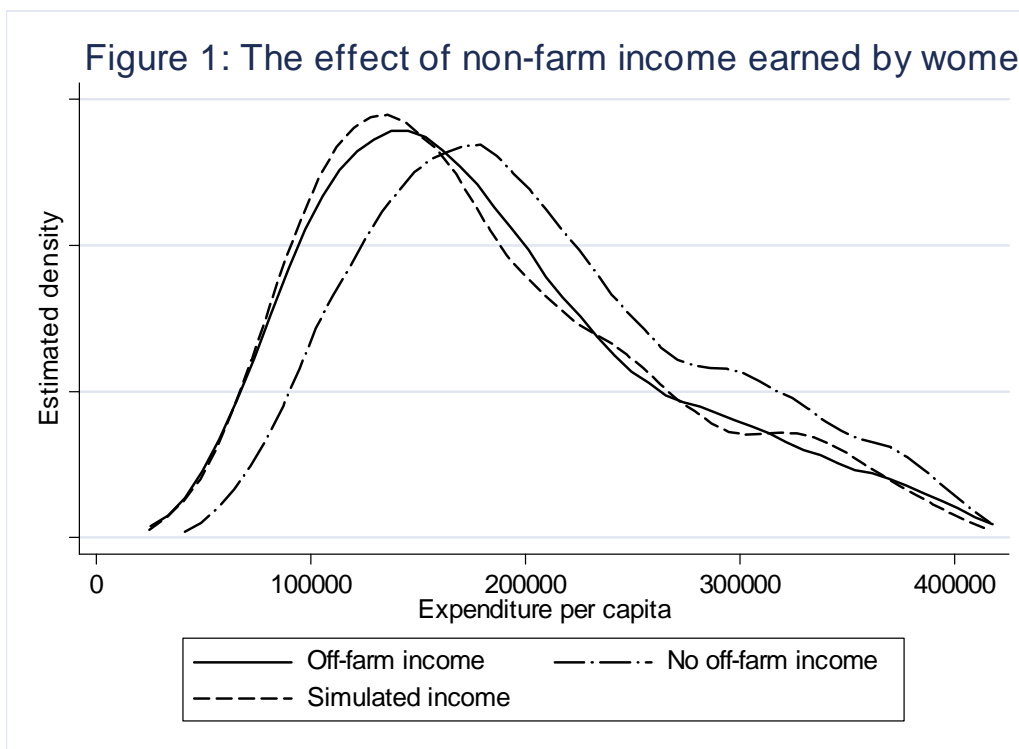


Figure 2: The effect of non-farm income earned by men

