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EVALUATING HOUSEHOLD LEVEL DETERMINANTS OF POVERTY IN SOMALIA

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Abstract

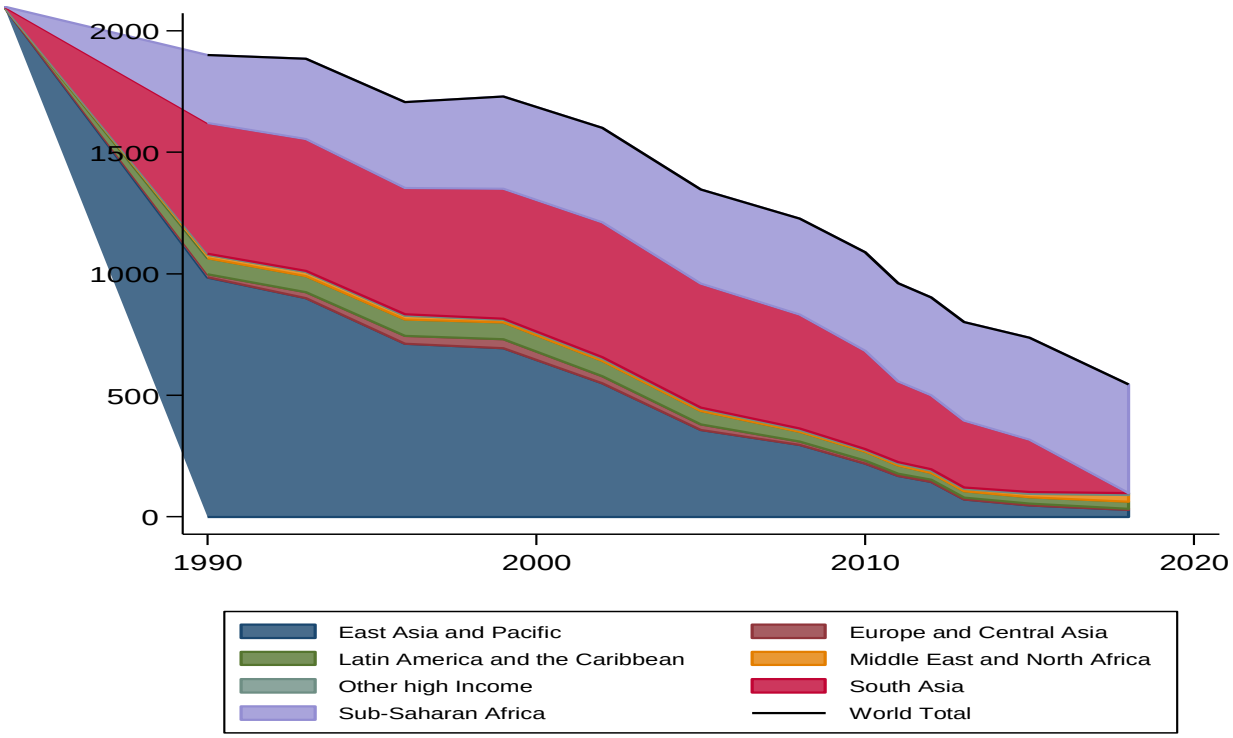
The civil war and the ongoing conflict in 1991 make Somalia among the world's poorest countries. Even by sub-Saharan (SSA) standard, poverty incidence is 19 percentage points higher in Somalia than the SSA average. Thus, this study aims to explore the factors that determine the probability of poverty in Somalia. For this purpose, the latest household survey of Somalia is used, and the poverty equation is estimated using logistic regression. Our empirical investigation indicates that household size, female household head, and living in rural areas significantly increase the probability of a household's poor status. In contrast, literacy, a family with at least one employed member, small business as a source of income, remittance, and access to electricity, reduces the propensity of being poor. The policy implication that emerges from this study is that stakeholders, including the government, NGO's, and the international community should work together to improve the education system, reduce the high unemployment levels, encourage small business and rebuild the essential infrastructures such as electricity to reduce poverty in Somalia

Keywords: Somalia, Poverty, Logistic regression, Somali High-Frequency Survey (SHFS)

INTRODUCTION

The last century has witnessed phenomenal advances in science, technology, and wealth creation. Despite this, poverty in all its manifestations remains deep, pervasive, and intractable. The world is characterized by the division between the *'haves'* and the *'have-nots,'* As people worldwide awake each morning to face a new day, they do so under very different circumstances. While the former leads to untold luxury, the latter suffers from a lack of decent, healthful, and productive lives *(Todaro, 1997).* The global poverty percentage has decreased in every region over the past thirty years. In 1990, more than 36 percent of people lived in extreme poverty, while in 2015, this figure decreased by about 10 percent of the total population. These show that the global poverty rate decreases by an average of one percent per year. Despite this good news, the number of poor people in SSA countries is increasing significantly. For example, 56 percent of Africans were considered poor in 1990, but the poor percentage fell to 43 percent in 2012. However, due to high population growth, the number of people living below the poverty line increased from 280 million in 1990 to 330 million in 2012 (World Bank, 2018).

Figure 1: Number of poor by region, 1990-2018



Source: PovcalNet (World Bank 2019)[1]

[1] Consumption per capita is the preferred welfare indicator for the World Bank's analysis of global poverty. However, for about 25% of the countries, estimates correspond to income, rather than consumption.

In 2016, about 27% of the African population was classified as severe food insecurity, almost four times that of other regions. Alarmingly, food insecurity is on the rise, specifically in sub-Saharan Africa. From 2014 to 2016, food insecurity increased by about 3% (Organization, 2018). Poverty has remained a global problem, and consequently, it has been studied many times at a worldwide level. Some countries like in East Asia are about to escape from the category of least developed countries, partly for their continuous fight against poverty.

Poverty in Somalia varies between 26 and 69 percent in the Somali population, using the international poverty line of UD $ 1.90 in 2011 PPP and total consumption expenditure. The incidence of poverty is 19 percentage points higher in Somalia than the unweighted average of low-income countries in Sub-Saharan Africa (51 percent) in 2017. The country has the sixth-highest poverty rate in the region, only after the Democratic Republic of Congo, Central African Republic, Madagascar, Burundi, and South Sudan. More than 40% and 90% of Somalis need access to an improved water supply and better sanitation; this is far below the average of 31% and 75% in low-income African countries. (Pape, 2017).

Somalia stems from 27 years of political instability and economic hardship but missing data for evidence-based planning. The civil war and the ongoing conflict that began in 1991 disjointed the country, weakened political institutions and created widespread vulnerability. Conflict exceeded statistical infrastructure and capacity; the conflict-affected the country's statistical infrastructure due to lack of reliable data, policymakers, and donor's works in a statistical vacuum. Significant progress is underway to rebuild the country's institutions, although the Somalis face a devastating struggle to overcome the conflict and fragility (Randa, Whimp, Abdullahi, & Zacchia, 2015).

In the absence of representative household surveys, not much was known about the poverty of Somalia for the last two decades; this poses a threat to the design and implementation of policies and programs needed to support economic resilience and development as well as assistance in the event of shocks (Pape, 2017). Despite the existence of Regional and Federal government interventions and international organizations working to contribute their part in poverty reduction, their intervention is not research-based to see the extent of poverty. In this paper, we attempt to focus on the following questions about poverty in Somalia. What are the household characteristics and geographic factors that determine rural and urban poverty in the country? Moreover, how do living standards, and hence poverty, vary between rural and urban areas? The remainder of the paper is organized as follows. Section two reviews the relevant literature for the available poverty studies in Somalia and less developed countries. Section three is presented the models and describes the data. Section four discussed the estimation results. Finally, some concluding remarks are made in section five

LITERATURE REVIEW

Poverty is not a new issue, and the root of interest is on the way to the beginning of the 17th century. However, the widespread and continuation of poverty, which is described as mass poverty, has increased visibly from the middle of the 18th century (Önder & Şenses, 2006). Poverty has become increasingly widespread with the economic, political, and social crises intensified in the late 20th century. Together with some other globalization influences, the tensions in living standards and opportunities have increased poverty by diversifying human rights and needs(Burkett, 1991). Poverty is a multidimensional concept, a situation that can change according to time and place. If poverty is defined or assessed only by gender or another variable, the judgment to be reached will be incomplete. Poverty is not only an economical category, but it is also a social situation that people live in, understand, and apply to various ways to cope (Erdoğan, 2002). Poverty is a concept involving isolation from society and pushing out of the community beyond being a problem caused by Marshall's economic crisis (1999). Depending on the perspective considered and the directions to be emphasized, further poverty analysis can be carried out. In a diversity of studies, the first classification is objective and subjective poverty; likewise, we may refer to absolute and relative poverty, depending on reference used to determine the thresholds. Lastly, we can classify into static studies and dynamic studies. Most of the poverty classification are unidimensional, such as consumption or income. However, one indicator alone cannot capture all aspects of poverty.

Analytical work on determinants of poverty in Somalia is scarce. Most of the available studies are conducted before 1990 and focus mainly on measurement issues in poverty. The earliest survey of poverty estimates in Somalia was done by Hopkins, Hicks, and Haaland & Keddeman during 1978/79. They disagreed on measuring the poverty of nomads, farmers and urban, lack of data, different methodology, the nature and cultural difference of nomadic, and farmers' diets are all but some problems. According to Hopkins (1978), studies on poverty and basic needs in Somalia, using rural price differentials in the Middle Shebelle region survey, found that Somalia's poverty incidence is 49 percent for nomads, 67% for farmers, 42% for the Urban. Hicks (1978) also used the same data and methodology but found a different figure for the nomads (70%) and almost the exact statistics for the farmers and urban.

Haaland and Keddeman (1984) reported the special programming mission to Somalia shows that 70 percent of poverty incidence for the nomads and 75 percent for the farmers, using a livestock census and acreage data converted to Somali Shillings.

Jamal (1981) used the same data from livestock census, acreage data national accounts converted to calories. He develops two different poverty line estimated for the urban and rural (nomads and farmers), using calories for the urban and minimum basket for rural. His study

revealed a lower poverty incidence than the previous studies, 33 percent for Nomads, 34 percent for Farmers, and 5 to 7 percent for the urban.

Kakwani discovered that the household size, age, and education level of the head of household are determinants of poverty in Côte d'Ivoire. The higher the household size and the age of the head of the household (over the age of 45), the higher the probability of falling into poverty. His study also revealed that with the higher education level attained by the family head, deprivation decreases monotonously, implying that education even up to primary school can significantly reduce poverty. (Kakwani, 1993). Geda, De Jong, Mwabu, and Kimenyi (2001) found the determinants of poverty variables are the size of household, places of residence (urban or rural), level of schooling, and engagement in the agricultural activity, both in rural and urban areas using a binomial and ordered logit analysis.

Baiyegunhi and Fraser (2010) have argued that a household headed by an older population is more vulnerable to poverty than youth. Besides, they explained that most older people had to pay for themselves and that, most of the time, there was no one to support them with remittances.

Dzimbanhete and Dube (2017) explored the determinant of household poverty and factors that negatively affected the household; gender of the head of household, the head of household, household size, life skills training, and distance to nearest economic niche, total cropping area, and maize production.

METHODOLOGY

Research Approach

Several different regression techniques are used to investigate the determinant of poverty. Therefore, there is no agreement on the choices of a model. The types of regression used are i) linear regression of per capita household income or consumption against a set of independent variables transformed in a logarithmic form; ii) and probit or logit regression, where the dependent variable is binary of whether the household is poor & non-poor (Goaed & Ghazouani, 2001). The logit and probit models do the same job, give similar (though not identical) results, and differentiate them except only in a few cases when we have unbalanced data and large sample size. Logit is somehow common since the coefficients can be interpreted in terms of odds ratios. This model estimates the probability that a household is poor or not poor when family characteristics and other variables make its socio-economic environment. In the logistic model, the determination coefficient is considered pseudo R^2 and does not have the same weight as in the linear model. The binary logistic model is less limited than linear assumptions, so this model is seen as the appropriate method when a variable can be expressed in binary

form. Since the Logit model calculates the logarithm of the probabilities, there are no up or down restrictions. Income is generally the measure of choice in developed countries, while the preferred metric in developing countries is an aggregate of a household's consumption expenditures (Sahn & Stifel, 2003). For this reason, this paper is aimed at evaluating poverty determinants in Somalia with logistics regression.

Empirical Model

Although no economic model is precise in assessing the relationship between the regressed and explanatory variables and predicts its significance, any study's policy implication depends on how close accurate the specified model is. This brings us to the issue of econometric modeling. To explore poverty with the variables thought to be important in explaining poverty, a Logistic regression model was employed. The dependent variable is the dichotomous variable of whether the household is poor (1) or not poor (0). The explanatory variables considered in the analysis are demographic (sex, age, household head, family size), educational level, employment, area of residence and pre-war region of living, access to water, electricity, and remittance and dependency. In this study, we employed a Logit model, and the response variable Y_i^* defined by the regression relationship is depicted as follows.

$$Y_i^* = \alpha_i + \beta X_i + \mu_i \quad (1)$$

Where; i stands for households run from 1 to n

Y_i^* is the status of household i

α_i is the intercept term

β is a set of coefficients

X_i is a set of explanatory variables (determinants)

μ_i is a cross-section error term

Y_i^* is unobservable. What we observe is a dummy variable Y_i defined by Y_i^* = 1 if Y_i^* >0, Y_i = 0, otherwise. Therefore, the variable's response is binary, taking two values, 1 if the household is poor, 0 if not. The probability of being poor depends on a set of variables X_i so that

$$\text{Prob}\,(Y = 1) = F(\beta' X) \quad (2)$$

$$\text{Prob}\,(Y = 0) = 1 - F(\beta' X) \quad (3)$$

Where, F is a cumulative distribution function

Data

The data used in this study are from the Somali High-Frequency Survey conducted in 2017/18 (SHFS) by the World Bank with the Ministry of Planning, Investment & Economic Development

of Somalia. The survey achieved more excellent geographical, and population coverage than Wave 1 of the Somali High-Frequency Survey (SHFS) conducted in 2016 and the Somaliland Household Survey (SLHS) carried out in 2013. The SLHS and Wave 1 of the SHFS generated much-needed indicators, but their geographic coverage was limited while excluding nomads. Further, SLHS did not cover settlements of internally displaced persons (IDPs). For the first time, Wave 2 included the Somali nomadic population and many households in insecure areas. Wave 2 targeted almost 6,400 households distributed among rural and urban areas. The sample also featured nomads, households in IDP settlements located in urban areas, and households in IDP host communities. The survey interviewed 6092 households, 4,011 urban households, 1,106 rural households, 468 households in Internally Displaced People (IDP) settlements, and 507 nomadic households.

Description of Variables

This study has used the probability of being poor (poverty based on consumption per capita) as a dependent variable. The explanatory variables considered in the analysis are household head characteristics, household characteristics, geographical location, and infrastructure access. The explanatory variables used are related the one's susceptibility to poverty.

Table 1. Definition of variables to be used in the estimated equations

Dependent Variable	***Measurement***
Poverty	*P=1 if poor, 0 otherwise. Poverty estimated based on consumption per capita*
Independent Variables	
Age & Age SQR	Age of the household head in years
Area of residence:	=1 if urban and 0 otherwise
Gender of Household Head	=1 if Male, 0 otherwise
Household Size	Total Members in Household
The household head is literate	=1 if HHH is literate and 0 otherwise
Dependency ratio	The ratio of Dependent members to the productive age group
A household has at least one employed member	=1 if has at least one employed member and 0 otherwise
Household source of income:	
- Salaried Labour	=1 if salaried and 0 otherwise
- Small family business	=1 if small family business and 0 otherwise
- Agriculture, fishing & hunting	=1 if agriculture, fishing, and hunting and 0 otherwise

- Aid and remittance	=1 if aid and remittance and 0 otherwise
- Other sources of income	=1 if other sources of income and 0 otherwise
Household has electricity	=1 if has electricity and 0 otherwise
Remittances receipt (internal + international)	=1 if receive remittance and 0 otherwise

Table 1…

The analysis was made with approximately 6092 households. In each household, the characteristics are assumed to affect all the household members equally. We used the household as a unit of analysis has assumed that all the resources at their disposal are shared equally among household members.

ANALYSIS AND FINDINGS

Mean Test of Poor and Non-Poor Households

This section performed the mean test of household characteristics (household size, age, dependency ratio, number of children, household head literate, electricity in households, and remittances) of poor and non-poor households' category. We estimated the means of various household characteristics of the two groups. We then find the difference between these two means and conduct the mean comparison test using a t-test.

Table 2: Demographic attributes of poor households

Household Characteristics	Poor	Non-Poor	Mean Difference
Household size	5.89	4.75	1.14***
Age of the household head	38.55	36.63	1.92***
No. of Children	3.07	2.21	0.86***
Dependency ratio	1.48	1.14	0.33***
HHH literate	49.06	57.28	8.18***
Electricity	56.94	70.38	13.44***
Remittances received	15.02	24.00	9.00***

Source: Authors' calculations based on the SHFS 2017-18.
Note: Significance level: 1% (***), 5% (**), and 10% (*). The value displayed for t-tests is the differences in the means between poor and non-poor households.

The household size is an essential factor in determining the poverty status of households. Household size is expected to influence the poverty status of a household. The average household was 5.44 members, with 5.89 members for poor households and 4.75 members for non-poor families. Overall, poor households have 1.14 more members than non-poor households. This difference is statistically different at $p<0.001$.

Studies have shown that the incidence of poverty generally increases with the age of the household head. The average age of household head for the poor households was 38.5, while that of the non-poor households was 36.6, with a statistically different p<0.001.

Education allows people to access better economic opportunities and improve their overall wellbeing. Our t-test results indicated that the mean proportion of literate in poor households head is 49.06 compared to non-poor households of 57.28. Overall, the proportion of literate members in the families is eight percentage points lower in poor households compared to non-poor (p<0.001)

Inferential Statistics

Our empirical investigation indicates that household size, been in female household head, and living in rural or nomads, significantly increase the probability of a household's poor status. While literacy, families with at least one employed member, a household whose income source is small-business, remittance, and access to electricity, reduces the propensity to be poor. The age and other sources of income are insignificant. The logit model reports coefficients of the predictor variables in log-odds units. They show the expected change in the log-odds of being poor for a unit increase in the corresponding predictor variable, holding all other variables constants. The odds ratios are not discussed in this here but rather marginal effects.

Table 3: Result of Logit Model

VARIABLES	Logit	Odds ratio
Being below the 2011 PPP poverty line		
Age	-0.00155	0.998
	(0.0134)	(0.0134)
Age square	3.56e-05	1.000
	(0.000152)	(0.000152)
Area of residence	0.587***	1.799***
	(0.0760)	(0.137)
Gender of Household Head	0.123**	1.131**
	(0.0613)	(0.0693)
Household Size	0.319***	1.376***
	(0.0197)	(0.0271)
The household head is literate	-0.151**	0.859**
	(0.0652)	(0.0561)
Dependency ratio	0.0246	1.025
	(0.0306)	(0.0313)
At least one employed member	-0.297***	0.743***
	(0.0759)	(0.0564)
Income: Small family business	-0.201***	0.818***
	(0.0772)	(0.0631)

Income: Agriculture fishing & etc.	-0.126	0.881
	(0.105)	(0.0923)
Income: External Support	-0.0543	0.947
	(0.114)	(0.108)
Income: Trade	-0.122	0.885
	(0.167)	(0.148)
Income: Other	-0.0597	0.942
	(0.105)	(0.0987)
Remittance	-0.583***	0.558***
	(0.0761)	(0.0425)
Electricity	-0.732***	0.481***
	(0.0766)	(0.0368)
Constant	-0.773***	0.462***
	(0.278)	(0.128)
Observations	5,952	5,952

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3…

Conditional Poverty Profile: Marginal Effects

The marginal effect analysis was done to get the effect of a unit change of each predictor variable on the probability of being poor. The marginal effects measure the instantaneous rates of change of the likelihood of being poor for a unit increase in continuous variables and the discrete changes of dummy variables from 0 to 1. In other words, they measure how the predicted probability of being poor changes as the binary independent variables changes from 0 to 1, holding all other variables at their means.

When the household's size increases by one person, the probability of that household being poor increases by 0.068. This implies that increasing the household size by one person raises the poverty level of that household by 7%. Our results match, for example, a study done by Anyanwu (2014) that indicated one-person families negatively and significantly reduces poverty while the addition of members to the household progressively increases the probability of being poor. The results show that household poverty is much higher in the rural and nomadic areas than in the urban areas. The household living in rural or nomadic areas was 12.5% poorer than those living in urban areas. Our results are like the research done by Daka, Fandamu (2016), Md. Deen Islam, Jamil Sayeed & Md. Nazmul Hossain (2016) showed that households living in rural negatively significantly raise the probability of being poor.

Similarly, the households headed by a female were 2.6% poorer than those led by a male. Somalia's situation is the same as in Sub-Saharan African countries, where there is discrimination against women in the labor market and education. Deressa and Sharma (2014) found that female-headed households are adversely affected by poverty than male-headed households in Ethiopia.

Table 4: Marginal Effects

	Marginal effects
Age	-0.001
	(0.003)
Age square	0.000
	(0.000)
Area of residence	0.124***
	(0.016)
Gender of Household Head	0.026**
	(0.013)
Household Size	0.068***
	(0.004)
The household head is literate	-0.032**
	(0.014)
dependency ratio	0.006
	(0.006)
At least one employed member	-0.062***
	(0.016)
Income: Salaried labor	(Reference)
Income: Small family business	-0.043***
	(0.016)
Income: Agriculture fishing & etc.	-0.027
	(0.022)
Income: External Support	-0.011
	(0.024)
Income: Trade	-0.026
	(0.036)
Income: Other	-0.013
	(0.022)
Remittance	-0.123***
	(0.016)
Electricity	-0.155***
	(0.016)
N	6050

Standard errors in parentheses * $p < .1$, ** $p < .05$, *** $p < .01$

When the proportion of literate household increases by one unit, the probability of that household being poor reduces by 0.032. This implies that increasing the proportion of literate households by one unit reduces that household's poverty level by 3%.

When the household with at least one employed member increases by one unit, the probability of being poor decreases by 0.062. This implies that one unit's rising households' employment creation reduces that household's poverty level by 6%. These findings show the rate at which households' poverty status improves as the proportion of household literacy also

increases. This emphasizes the need for putting more effort into the long-term cycle of empowering the Somali population with relevant knowledge and study skills.

Our results show that households receiving remittances are less likely to be poor, i.e., the non-recipient remittances were 12% poorer than families receiving remittances.

Our study results indicate that poor households are less likely to have access to infrastructure. The families who were not receiving electricity were 15% poorer compared to those accessing electricity. Similarly, the households whose income come from the small business were 4.2% richer compared to those who their revenue comes from the other sources of agriculture, finishing, and aid

CONCLUSION AND POLICY RECOMMENDATIONS

This study's main aim is to explore the factors that determine the probability of poverty in Somalia. For this purpose, the latest household survey of the Somali High-Frequency Survey was used, and the poverty equation is estimated using logistic regression. Our empirical investigation indicates that household size, been in female household head, and living in rural or nomads significantly increase the probability of a household's status to be poor. In contrast, literacy, household with at least one employed member, a household whose source of income is small-business, remittance, and access to electricity reduces the propensity of being poor. The age and the other sources of income are insignificant determinants of poverty

The notable thing is the consistent increase in the chances of escaping a household's poverty as the proportion of household members attains education. It means that as educational achievement increase, the likelihood of a household to be poor declines. A higher proportion of household members' literacy enhances the household's earning potential, and consequently, the increased earnings will elevate the household out of poverty. The Somali government should improve quality, boost enrolment, and access primary, secondary, and tertiary education. This noticeably proposes that education for all programs is one appropriate policy choice for the government.

The inflow of international remittance in developing countries has increased dramatically since the 1990s, rising from US$30 billion in 1990 to US$325 billion in 2010 (Peković, 2017). Somali has also experienced a similar trend, far broader in magnitude and growth than in other developing countries. During 2015– 2017, the Somali diaspora sent home about an official US$1.3 billion per year, but remittances may be significantly larger when considering unrecorded flows. Our results indicated that only 58 percent of remittance-recipient households in Somalia is poor, compared to 71 percent of non-recipient households. This result concurs with a study done by Adams and Page, indicating that international remittances significantly

reduce the level, depth, and severity of poverty in the developing countries (Adams Jr & Page, 2005).

Based on this analysis, the stakeholders, including the government, NGOs, and the international community, should improve the education system, increase employment levels, encourage small-business and rebuild the essential infrastructures such as electricity to reduce poverty in Somalia. Also, there is a need to reduce the household size by devising policies that control the country's rapidly increasing population growth.

It would be interesting in future studies to investigate further the determinant of poverty in Somalia in the following areas; 1) the regional variability of the poverty 3) and the differences in the effect of gender on the risk of becoming poor, 3) the channels through which remittances may influence poverty.

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APPENDIX

The following table provides the correlation matrix between the dependent variable and explanatory variables. As shown in Table 5

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
1. Poorppp	1											
2. Age	0.0667***	1										
3. Age square	0.0594***	0.982***	1									
4. Literacy	-0.052***	-0.148***	-0.136***	1								
5. Residence area	-0.0016	0.0952***	0.0909***	-0.164***	1							
6. Gender	0.0230	0.217***	0.195***	0.0619***	0.174***	1						
7. Size	0.268***	0.223***	0.185***	-0.078***	-0.0118	0.0274	1					
8. Dependency Ratio	0.121***	-0.101***	-0.108***	-0.0165	-0.0013	-0.082***	0.442***	1				
9. One Employed Member	-0.053***	-0.070***	-0.085***	0.050**	-0.194***	0.053***	0.107***	-0.019	1			
10. Source of Income	0.0362*	0.0797***	0.0775***	-0.094***	0.268***	0.00428	-0.0056	-0.007	-0.29***	1		
11. Remittance	-0.114***	0.00466	0.00578	0.0710***	-0.103***	0.00574	-0.0223	0.011	-0.0131	0.017	1	
12. Electricity	-0.132***	-0.088***	-0.081***	0.139***	-0.465***	-0.098***	-0.046**	-0.038*	0.188***	-0.276***	0.144***	1

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$