Journal of Economics and Sustainable Development www.iiste.org
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.3, No.3, 2012

# Determinants of Food Insecurity in Addis Ababa City, Ethiopia

Ejigayhu Sisay[1*], Abdi-Khalil Edriss[2]

1. School of Agricultural Economics and Agribusiness, P.O.Box 326, Haramaya University, Ethiopia

   Tel: +251-911-309185 * E-mail:Emuyenat@gmail.com

2. Department of Agricultural and Applied Economics, University of Malawi, Bunda College of Agriculture, P.O.Box 219, Malawi, Tel:+265-88 8842268 Email: Abdikhalil@yahoo.com

**Abstract**

Urban areas are faced with the problem of increasing population and consequently inadequate supply of food items. The present study attempts to examine the food insecurity situation and identify the determinants of food insecurity in Addis Ababa city at household level. The primary data source for this work was the Addis Ababa urban household socio-economic data collected by undertaking a survey on 140 households. Three stage cluster random sampling was used. The main tools of analysis for this study include descriptive statistics and Tobit regression model. The Tobit model result revealed six out of eleven variables included in the model as significant ($p<0.05$). Household size, household income, household head age , household head education, ownership of bank account and income from remittance and gift were found to be significant determinants of food insecurity in the study area.

**Key words:** Food insecurity, Urban Households, Determinant, Tobit model and Addis Ababa

## 1. Introduction

Urban food security problems in Africa receive little attention partly because it tends not to be linked to seasonal or community wide process and partly because of a long – held belief that urban populations are better off but urban food insecurity is directly linked to urban poverty and inequality and for this reason research on urban food security must focus on the question of access to food (Maxwell, 2005).

Ethiopia's current urban population is about 13 million (16.5% of the country's total population). Compared to other African countries, Ethiopia's level of urbanization is low. However, the urban population is increasing rapidly with an average growth rate of 4% per year. This population growth rate will probably result in Ethiopia's urban population exceeding 50 million by 2050. Addis Ababa is the capital city with a population of over 3 million, which is 25% of the country's urban population (WFP, 2009).

The impact of inflation has been one key element that has resulted in increased food insecurity in urban areas of Ethiopia. Since mid 2005 the country faced a spiral of price increases and the price of cereals increase by more than 100%. The rapid increases in food prices during 2007 and early 2008 showed the vulnerability of the urban poor to price rises. Although there has been some decline in prices since mid-2008, most analysts believe that prices will not return to the levels of the early 2000s because of continued strong demand for energy and for cereals for food, feed and fuel, as well as to structural land and water constraints and likely food production impacts of climate change (Cohen & Garrett, 2009).

Consequently, urban food security is an emerging area of development concern, and it is fundamentally different from questions of food security within the rural and agricultural sectors. Yet little is known about the determinant of food insecurity in the city of Addis Ababa, making it difficult for development practitioners and policy makers to quantify the challenge and to proactively plan to reduce the food gap that exists in urban areas.

## 2. Objectives of the Study

The main objective of the study is to assess determinants of food insecurity in urban households in Addis Ababa city. The specific objective of the research is to determine the factors affecting urban household food insecurity in the political capital of Africa.

## 3. Materials and Methods

### *3.1. Overview of the Study Area*

This study was conducted in Addis Ababa city. The city is located in the heart of Ethiopia confined between $8^o50'$ North to $9^o06'$ North latitude and $38^o05'$ East to $39^o05'$ East longitude and with a population more than 3.4 million.

### *3.2. Data Sources and Sampling Technique*

Primary data were collected through self-administered structured questionnaire in the field survey. Three stage cluster random sampling with probability proportion to size sampling technique was used to select 140 sample respondents.

### *3.3. Methods of Data Analysis*

Among the most commonly used procedures for setting the poverty line direct calorie intake method were used for this research. According to this method, poverty line is defined as the minimum calorie requirement for the survival; i.e., 2200 kilocalorie per adult per day was used as a minimum calorie requirement to enable an adult to live a healthy and moderately active life, as suggested by WHO. In line with this, a household whose per calorie intake was found to be greater than their demands were regarded as food secured and while households experiencing a deficit were regarded as food insecured (Household food security was measured by dietary calorie intake adjusted for household size, age and gender composition).

Having identified the food insecured and food secured households; the next step is to identify the socio economic characteristics that are correlated with the food insecurity. The econometric model that has been applied for analyzing factors affecting household food security is the Tobit model explained hereafter. This model is chosen because it has an advantage over other discrete models (Logistic and Probit) in that; it measures not only the probability that a household become food insecured, but also the intensity of the food insecurity.

To see the factors influencing food insecurity among the food insecured part of population, following Mc Donald and Moffit (1980), Tobit regression model was adopted and estimated. It was used to examine and establish statistical relationships between the dependent variable (i.e., food insecurity) and independent variables (demographic and socioeconomic variables) that are expected factors that are influencing food insecurity at household levels. It showed the marginal effect of the explanatory variables on the food insecurity status of the households. Following Maddala (1992), Johnston and Dinardo (1997) and Green (2000), the Tobit model that was used in this research can be expressed as follows:

$Finsi = \beta X_i + U_i$ ……..(1)

Where, Finsi = 0 for $Q_i > Z$, and

Finsi = $(Z - Qi)/Z$ for $Q_i < Z$

$X_i$ = Vector at explanatory variables

$\beta_i$= vector of respective unknown parameters

$U_i$ = residuals that are independently and normally distributed with mean zero and a common variance, $\sigma^2$

Finsi = Food Insecurity Status of Household *i* greater than zero

Z = Food Insecurity line (minimum calorie requirement)

Qi = Calorie Consumption of Household *i*

The specific independent variables are captured as:

$X_1$ = Household Size (number)

$X_2$ = Gender of Household Head (1, if male and 0, if female)

$X_3$ = Marital status of household head

$X_4$ =Educational Level of Household Head

$X_5$ = Age of household head

$X_6$ = Dependency ratio

$X_7$= Access to credit

$X_8$ = Owning saving account

$X_9$= Household income

$X_{10}$= Remittance and aid income

$X_{11}$ = Urban Agriculture

## 4. Results and Discussion

Needless to mention that household's food insecurity are determined by various household attributes. Of these attributes demographic and socio-economic characteristics are the ones. In this regard the descriptive results show the variables which have significant influence on food security status. Table 1 and 2 display results for socio-economic and institution characteristics among food secured and insecured households in study area.

### 4.1. *Descriptive Analysis of Continuous Variables*

Age of the household head is also regarded as an important variable with an impact on household food security status. Thus, results revealed that there is significant difference in mean age of the household heads between households, which are food secured and those which are not ($t = -8.8062$).

As shown in Table 1, the mean of per capita kilocalories found to be higher for food secured households than for food insecured households. It exhibited a negative relationship with food insecurity problem. Households with larger family size were more likely to be at risk of becoming food insecured. The survey result indicated that there is a significant difference in mean family size at ($p<0.05$) between food secured and food insecured sample households. Moreover, the result of the survey suggests a significant ($p<0.01$) mean difference in daily food expenditure per adult equivalent (AE) at less than five percent significant level between the two groups.

### *4.2. Descriptive Analysis of categorical variables*

Much more common to observe a good deal of female headed households, especially in the developing countries like Ethiopia they are more likely to be food insecured as compared to their male-headed counterparts. Male headed households comprise 70 percent of which 74 percent are food secured and 30 percent are female headed households, of which 26 percent are food secured female headed households. The survey result showed no systematic relationship ($p >0.10$) between household head sex and food security status.

With regard to marital status the result of the survey showed no significant difference ($p >0.10$) among households on food security status. The results show that 87.86 percent of food secured households did not engage themselves in urban agriculture and only 12.12 percent of food secured households were found to be involved in urban agriculture. Statistically no significance difference ($p>0.05$) was observed between the two groups on the basis of their participation in urban agriculture.

Remittance and gift received from relatives and friends were found to be an important source of additional income in the study area. Most of the food secured households, more than 56 percent, received additional income in form of remittance and gifts whereas 15.15 percent of the food insecured households received remittance and gifts. Moreover, there was significant difference ($p<0.01$) between households that received remittance by the two sample household groups.

Ownership of bank account was found to be a significant variable in determining food security status of households. The chi-square test also verifies that there is a strong relationship between ownership of bank account and food security status.

## *4.3. Results from the Econometric Model Analysis*

An econometric model, Tobit regression, was employed to identify the determinants of household food insecurity. However, before fitting the Tobit model, it was important to check whether serious problem of multicollinearity and association exists among and between the potential continuous and discrete explanatory variables of the model estimation, respectively. For this purpose, Variance Inflation Factor (VIF) and contingency coefficient tests were used for the continuous and discrete variables, respectively. The problem of heteroskedasticity was also checked using Breuch-Bagan **(**BP**)** test. The validity tells the significance of the determinant variables and the predictive efficiency of the model.

Eleven independent variables that were hypothesized to have influence on household food insecurity in the study area were included in the model. The model output revealed that educational status (EDUSTHH) was significant ($p<0.01$). Household size (HSZE), age of household head (HHSX), household income (HHINC), remittance and gift (REMITT) and ownership of bank account (BANKACC) were also found to be significant ($p<0.05$). The remaining four variables, namely, overall dependency ratio (DEPNDRTO), sex of household head (AGEHH), accesses to credit (CRDT), and involvement in urban agriculture (URBAGRI) were not statistically significant ($p>0.1$). In light of the above summarized model results, possible explanations for each significant independent variable are given consecutively as follows:

Household size (HSZE): Given the strong positive relationship between household size and food insecurity already noted in the descriptive part, it is not surprising that the estimated parameters are positive and significant. Household size revealed a positive relationship with food insecurity and statistically significant ($p<0.05$). This positive relationship shows that the probability of being food insecure increase with increase in household size. Other things remaining equal food insecurity increases by a factor of 3.8% as household size increases by one. The possible reason is that with existing high rate of unemployment and less employment opportunity coupled with low wage rate payment, an additional household member shares the limited resources that lead the household to become food insecure. Moreover; it strengthens the results of the descriptive analysis, which was computed previously.

Educational status of household head (EDUSTHH): This result implies that households who have household heads with relatively better education are more likely to be food secure than those headed by uneducated (illiterate) household heads. It is explained in terms of contribution of education on working efficiency, competency, diversify income and becoming visionary in creating conducive environment to educate dependants with long term target to ensure better living condition than illiterate ones. Thus, being literate reduces the chance of becoming food insecure in the sample households. The result coincides with the theoretical evidences that educational improvement could lead to reducing the problem of food insecurity. It is similar with what the findings of Aschalew *et al.* (2006) have been resulted using logit model in the case of Dire Dawa town.

Age of household head (AGEHH): The result regarding the age of the household head was found to be in contrary with what we were expecting. The result showed us that age has a positive and significant influence on household food insecurity. Even if it is contrary to our expectation, it is related to the result we saw in the descriptive part. The possible reason could be as the age of the person increase, one may lose job and one couldn't participate in other income generating activities. Keeping other factors constant, the marginal effect on the side of food insecurity increase by a factor equal to 0.6% when age of the household head increases by one year.

Getting remittance and gifts (REMITT): The fourth determinant variable in the regression coefficient analysis was income received through gift (aid) and remittance. Based on the Tobit model, it has a coefficient of -0.1325154. This signifies that for a unit rise in remittance and gift (aid) income, the level of food insecurity will has reduced by 13.3%. This is due to the fact that an increase in remittance and gifts income will have a positive effect because the change in income will lead to constant change in expenditure. Thus, the income received from remittance and gifts increases the income so that capacity of the households to consume more will increase. In this regard, the sustainability of this income source is in question besides, it creates dependency syndrome.

Household income (HHINC): The survey result shows a negative relation between monthly income per adult equivalent and food insecurity and the coefficient is highly significant ($p<0.01$). The food insecurity, holding other variables constant, decreases by a factor of 6.1% as monthly income increases by one level. The result corresponds with the prior expectation and the possible explanation is that income determines purchasing power of the household with the prevailing price so that those households having higher daily income per adult equivalent are less likely to become food insecure than low income households.

Ownership of bank account (BANKACC): It was hypothesized that ownership of bank account will negatively affect the food insecurity status of households. The sign was as expected and significant ($p<0.05$). As ownership of bank account increased by one unit food insecurity will decrease by 12.5%. Since having a bank account or being a member of saving association means there is excess money to be saved, therefore, the food security status of household may be assumed.

## 5. Conclusions and Policy Implication

The major findings of the study reveal that food insecurity exists severely in the city. Attempts should be made in order to address the problem and it requires participation of both governmental and non-governmental institutions in order to bring change into the life of poor households.

Possible policy recommendations that emanate from the results of this research are presented as follows:

- Household size was found to be directly related with household food insecurity. Larger family households have higher probability to be food insecured. The increasing trends of unemployment coupled with high rate of inflation has contributed to the deterioration of income generation capacity of food insecured households. With these scenario, having a larger household size aggravate the problem of meeting food requirements, leave alone education, health and other non – food demands of household that will bring future return. So, action based awareness, creation on the impacts of population growth at the family, community and national level should be strongly advocated that may lead to reduction in fertility and lengthen birth spacing that may result in smaller household size. Moreover, development actors involved on population issues should encourage households having acceptable number of children through provision of special offers such as covering schooling cost, giving training and other related incentives.
- As income and food insecurity are strongly negatively related on the model results, searching and providing productive technical skills that make trainees competitive on the current market and generate income should be sought and promoted.
- Access to credit can create an opportunity to be involved in economic activity that generates revenue to households. Recently established small and micro business agency in the region has started activity of organizing and training of every business community who are interested. Development partners operating in the study area should implement provision of credit to eligible households using targeting criterion that reflects actual characteristics of food insecured households. The other pressing issue related to provision of credit is the requirement of collateral and group lending procedure, which discourages so many households. People are afraid of holding accountability for others so individual lending should be considered as another option and collateral requirement procedure should be changed if there is a need to lift food insecured households from their current misery. Borrowers should be encouraged to save or contribute as matching fund to reach the limited resources over large number of needy people.

- The result of the research shows there is reliance of households in terms of expecting income from source like remittance and gift. This income source is provisional and the sustainability is not ensured. Government as a policy making body should propose other ways of reducing this dependency syndrome. By trying to make peoples entrepreneur so that they can make more money.
- Another policy implication from the findings of this study is that the effect of education on household food security and this confirms the significant role of the variable in consideration for betterment of living condition. The more household head educated, the higher will be the probability of educating family members and familiar with modern technology, which the twenty first century so highly demands. So, strengthening both formal and informal educations and vocational or skill training should be promoted to reduce food insecurity in Addis Ababa city.

## Reference

Aschalew, F. (2006). Dimensions and Determinant of Household Food Insecurity in Dire Dawa, Ethiopia, Thesis presented to school of Graduate Studies of Alemaya University, Alamaya.

Cohen, M., & Garrett, J. (2009). The food price crisis and urban food insecurity. London: IIED.

Green, W.H. (2000). Econometric Analysis. New York: Prentice Hall International, Inc.

Gujirati, D. N. (1995). Basic Econometrics. 3rd ed. New York: McGraw - Hill Co.

Maddala, G.S. (1997). Limited Dependent and Quantitative Variables in Econometrics. Cambridge University Press.

Maxwell, D. Urban Food Security in Sub-Saharan Africa. Accessed on: July 20 – 31, 2010.

McDonald, J. and R. Moffit. (1980)..The use of Tobit Analysis. Review of Econometrics and Statistics. 62(2):318-321.

WFP. (2009). Food security and vulnerability in Addis Ababa, Ethiopia. Vulnerability Assessment and Mapping (VAM), Addis Ababa, Ethiopia.

***Table 1: Socio-economic characteristics insecured households in entire respondent (continuous variables)***

| Characteristics | Food Security Status | | | | | | |
|---|---|---|---|---|---|---|---|
| | Secured(n=73) | | Insecured(n=67) | | *t*-value | Total(n=140) | |
| | Mean | sta. dev | Mean | sta.dev | | Mean | sta. dev |
| Age | 40.12 | 1.142 | 54.07 | 1.089 | -8.8062 | 54.07 | 1.089 |
| Kilocalorie | 3382.14 | 111.6 | 1428.21 | 39.5 | 15.95 | 2447.04 | 102.8 |
| Family size | 4.260 | 0.206 | 5.104 | 0.245 | -2.6526 | 4.664 | 0.162 |
| Daily Food Expenditure | 12.94 | 0.617 | 5.80 | 0.262 | 10.3655 | 9.37 | 0.458 |

 

***Table 2: Socio-economic characteristics households in entire respondent (categorical variables)***

| Characteristics | Secured | Insecured | $\chi^2$-value | Total |
|---|---|---|---|---|
| | N=73 | N=67 | | 140 |
| | Percent | Percent | | Percent |
| **Gender** | | | | |
| Meal | 74.0 | 65.7 | 1.146 | 70 |
| Female | 26.0 | 34.3 | | 30 |
| **Marital status** | | | | |
| Married | 74.0 | 59.7 | | 61.7 |
| Separated | 4.1 | 11.9 | | 7.9 |
| Divorced | 11.0 | 25.4 | 10.96 | 17.9 |
| Never married | 11.0 | 3.0 | | 7.1 |
| **Urban Agriculture** | | | | |
| No | 87.8 | 87.9 | | 87.9 |
| Yes | 12.2 | 12.1 | 0.005 | 12.1 |
| **Remittance and gifts** | | | | |
| No | 43.2 | 84.9 | 23.639 | 62.9 |
| yes | 56.8 | 15.2 | | 37.1 |
| **Ownership of bank account** | | | | |
| No | 14.9 | 62.1 | | 37.1 |
| Yes | 85.2 | 37.9 | 31.836 | 62.9 |

 

Table 3: Tobit model parameter estimates

| Variable | Coef. | SE | t-value | p-value |
|---|---|---|---|---|
| Household size | 0.0378129** | 0.0157359 | 2.40 | 0.018 |
| Sex of household head | 0.0460376 | 0.0886127 | 0.52 | 0.604 |
| Marital status | | | | |
| Married | -0.0604556 | 0.1322777 | -0.46 | 0.648 |
| Separated | 0.0019456 | 0.1473242 | 0.01 | 0.989 |
| Divorce | 0.0438846 | 0.1408362 | 0.31 | 0.756 |
| Never Married | 0.0224916 | 0.1121721 | 0.20 | 0.841 |
| Education of head | | | | |
| Illiterate | 0.0229175 | 0.077433 | 0.30 | 0.768 |
| Elementary | -0.0024843 | 0.0925751 | -0.03 | 0.979 |
| Secondary | -0.0450257 | 0.0864475 | -0.52 | 0.603 |
| Tertiary | -0.3234132*** | 0.1071577 | -3.02 | 0.003 |
| Household Income | -0.0609085** | 0.238067 | -2.56 | 0.025 |
| Remittance and Gift (Aid) | -0.1325154** | 0.0584698 | -2.27 | 0.025 |
| Urban Agriculture | 0.0330326 | 0.0765936 | 0.43 | 0.667 |
| Access to credit | 0.0192898 | 0.0713361 | 0.27 | 0.787 |
| Ownership of bank account | -0.1246611** | 0.531967 | -2.34 | 0.021 |
| Household Income | -0.0609085** | 0.238067 | -2.56 | 0.025 |
| Remittance and Gift (Aid) | -0.1325154** | 0.0584698 | -2.27 | 0.025 |
| Dependency Ratio | -0.1376248 | 0.1147773 | -1.20 | 0.2232 |
| Constant | -0.082229 | 0.1808053 | -0.05 | 0.964 |

| | |
|---|---|
| Number of observation | 140 |
| LR chi2(16) | 118.38 |
| Prob > chi2 | 0.000 |
| Pseudo $R^2$ | 0.732 |
| Log likelihood | -21.566 |
| Left censored observations at ratio <=0 | 73 |
| Uncensored observations | 67 |
| Right censored observations | 0 |

Note: ***significance at 1%, **significant at 5%, * significance at 10%

Source: Survey result, 2011