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DETERMINANTS OF POVERTY FOR RURAL AND URBAN
HOUSEHOLDS IN IRAN

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Determinants of Poverty for Rural and Urban Households in Iran

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Abstract:

Poverty alleviation is a key policy debate in recent development literature. The elaboration of policies for poverty alleviation requires a thorough knowledge of the poverty phenomenon as well as an understanding of the efficiency of implemented programs. The study used primary data from the Household Survey of 1382 carried out by the Statistics Center of Iran which is covered 12175 rural and 10951 urban households. Food poverty line and total poverty line were estimated using Food Energy Intake method and nonparametric regressions in rural and urban sectors in Iran. In addition, poverty and its determinants in Iran were investigated by probit model. Results indicated that poverty in rural was more widespread compare to urban areas. Household size and number of employed persons in the household were among the most important determinants of poverty in Iran.

Keywords: poverty line, Food energy Intake (FEI) method, nonparametric regression, determinants of poverty, probit model

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Introduction

Poverty alleviation has become an important issue in development literature. Some researchers believed that fight against poverty is a necessary condition for growth (Emwanu et al., 1995). In this way, knowledge of poverty phenomenon is as important as efficiency of implemented programs and policies for poverty alleviation. So, it seems the first step in planning of the poverty alleviation program is investigation and determining the poverty status in a society (Khaledi and Perme, 2005; Arab mazar and Hoseini nejad, 2004).

In Iran, the goal of anti poverty program within the third Five-Year Development Plan (2000-2004) proposed by the government in 1999 was to reduce poverty and this is to be continued in the fourth plan aiming such that absolute poverty in Iran disappear by the end of this plan period(2009). Despite that the Iranian government is highly interested in poverty and inequality alleviation in Iran, available evidence reveal that poverty has not been reduced as planned in the post revolution periods. Then, it seems that identifying poverty, its dimensions and determinants in Iran is one of the necessary factors for implementing this program successfully.

Although study of the determinants of poverty in Iran is rather rare there are many studies in developing countries which have been focused on this subject. For example, Madzingira (1997) showed that some demographic groups in Zimbabwe are more likely poor such as people who have 60 or above years old. Also, the majority of the very poor are mostly women and rural residents. Other effective factors of poverty were unemployment, drought, low wages and high prices. The lack of convenient technology in crisis conditions can be added to above poverty causes in rural areas. Grootaert (1997) found that in Cote de Ivore, education reduces the probability of being poor, using a probit equation. Results for rural areas indicated that each year added to education reduces the likelihood of being poor twice of that in urban areas. This study showed that the location of house in urban areas is another effective factor of being poor and people who live in capital city would not be poorer than they live in other cities.

There are several factors which influence the poverty status in rural areas. Seasonality of agricultural activity, subsistence and low income, climate risk, the lack of education and big households have been identified as the main factors that explain causes of poverty in rural areas in West Africa (Hill, 1982). The factors for urban areas are different. Sahn et al. (1996) believed that external and political shocks are the most important factor in urban areas and also discussed that poverty is not so important in urban than rural areas due to public employment possibility in these areas.

Estimating poverty line is the first step in all poverty studies. Poverty for an individual or a household in a narrow sense is defined as a state of

having an income or consumption level below a certain standard, usually known as the poverty line such that, any individual in the population who has a measure of welfare lower than this value, is considered as being poor. It is therefore clear that this value is a critical and decisive factor in the analysis of poverty. Methodologies for the estimation of poverty lines have been mostly developed in the context of the need to fulfill basic physiological functions. The poverty lines are different because there is no exact definitions of what are basic needs, how can they measure and how they inverted to an objective financial equivalent. Against this background of varying regional economic activities, this study had the following objectives:

1. To estimate rural, urban and national food poverty lines to identify poor households.
2. To compute the poverty indices for Iran on the basis of computed food poverty lines.
3. To estimate the key determinants of regional poverty in Iran.
4. To derive policy implications for poverty alleviation in Iran.

Methodology

The study used primary data from the Household Survey of 2003 carried out by the Statistics Center of Iran which is covered 12175 rural and 10951 urban households. The estimation of the "cost of basic needs" usually involves two steps. First, estimation is made of the minimal food expenditures that are necessary for living in good health; we will denote this by z_F. Second, an analogous estimate of the required non-food expenditures, z_{NF}, is computed and added to z_F to yield a total poverty line, z_T. We consider now in some details each of these two steps.

Food poverty lines were estimated using Food Energy Intake method and nonparametric regressions in rural and urban sectors in Iran. This method has been applied by many authors such as Greer and Thorbecke, 1986; Okurut et al. 2002; Anand and Harris, 1994; Asra and Francisco, 2001; Ahmed, 2001 and etc. A nonparametric regression of food expenditures of the household on calories of household were done to compute a food poverty line with a "FEI-inspired" method.

Following Greer and Thorbecke (1986), food poverty line will be calculated for each region in several steps: First, the value of food consumed by individual households will be established by multiplying the quantities of different food types consumed (D_{ij}) by their prices (P_i):

$$V_j = \sum_i D_{ij} P_{ij} \qquad (1)$$

Where V_j is the value of food consumed by the *j*th household, D_{ij} is the quantity of *i*th food items consumed by the *j*th household, and P_{ij} is the local price paid by the *j*th household for the *i*th food item.

In the second step, food consumed per adult equivalent (X_j) will be computed by dividing total value of food (X^*_j) by household size, H_j, used as a proxy for household adult equivalent. Used adult equivalent in this study is reported in table (1).

[Table 1]

In the next step, the calorie equivalent for various types of food consumed by the households will be calculated. Finally, the food poverty line, *Z*, will be estimated as:

$$Z = e^{(a+bR)} \qquad (2)$$

Where *R* denotes the recommended daily allowance of calories per adult equivalent (2400 cal.), and *a* and *b* are estimated parameters of a non-parametric regression of X_j on total calorie intake of household *j* (C_j), that is (Okurut *et al.* 2002):

$$\ln X_j = a + bC_j \qquad (3)$$

Figure 1 illustrates the FEI method to estimate food poverty line. The level of expenditure is measured on the vertical axis and the level of related calorie intake is observed on the horizontal axis. Z_k is the minimum calorie intake recommended for a healthy life (2400 calorie in this study) and *z* in this figure is the food poverty line according to the FEI method.
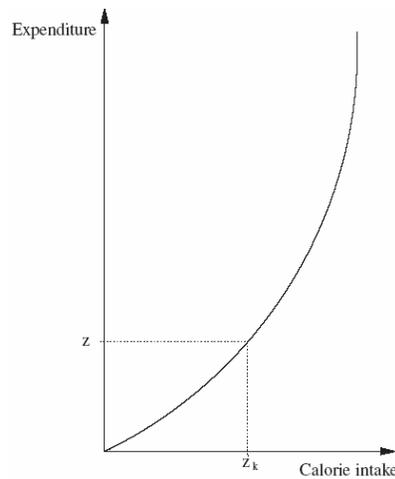

Figure 1: expenditure and calorie intake

Parametric log-linear or quadratic regression of calorie intake on expenditures can be estimated to compute expected expenditure at a given calorie intake (the same as Okurut et al. 2002). The parametric specification of this regression supposes that the functional relationship between expenditures and calorie intake is known by the analyst. This is unlikely to be true everywhere. In such cases, parametric procedure may generate a biased estimator of the "true" poverty line. So, in this study non parametric regression is used which is a more flexible and arguably better approach. In this way only expected expenditures will be obtained as food poverty line and so, testing hypothesis is not necessary for estimated parameters. Non parametrically estimation the food poverty line is done by DAD[1] 4.4 software in this study.

Non food poverty line is another component of poverty line. The larger the food share in total expenditures, the closer the food poverty line should be to the total poverty line. So, it is usual in literature that for estimating the non food poverty line the food poverty line is divided by the share of food in total expenditures. Popular practices vary, but adding to z_F the non-food expenditures of those whose total expenditures equal z_F is one of the most usual methods which is used in this study. This method is explained by figure (2) which shows predicted total expenditures against various levels of food expenditures. A nonparametric regression of total expenditure of the household on food expenditures of the household are estimated for an interval of food expenditures of the household which includes the food poverty line. This method considers the non-food expenditures of those whose total expenditures equal z_F. These individuals are found at point E on Figure (2).
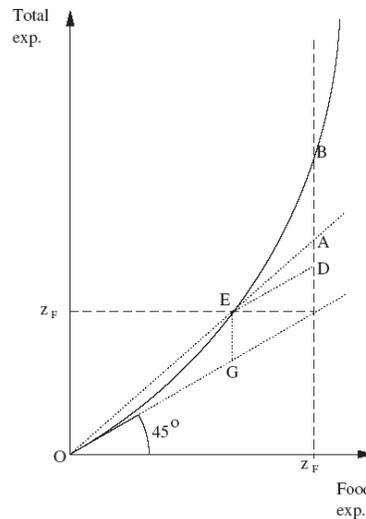

Figure 2: food, non food and total poverty line

Their non-food expenditures are given by the length of line EG on the Figure. Adding these non-food expenditures to z_F yields a total poverty line given by the height of point D (Duclos and Araar, 2005).

Finally, Total poverty line was calculated by adding expected non food expenditures of those whose level of total expenditures equals the food poverty line estimated in first stage to the food poverty line (Duclos and Araar, 2005).

Poverty indexes introduced by Foster, Greer and Thorbecke (1984) (FGT) were be used to measure poverty in Iran:

$$FGT = p(\alpha) = 1/n \sum_{i=1}^{q} [(Z - Y_i)/Z]^{\alpha} \qquad (4)$$

Where Y_i is the *ith* household income, Z is the poverty line, n is the population size, and α is a non-negative parameter which is the weight attached to the severity of poverty. The headcount ratio index is obtained when α is equal to zero that is no weight is given to the severity of poverty. This index gives the proportion of the population who are poor, i.e. their income is less than poverty line. Head count ratio is the simplest index in measuring poverty but it is not sensitive to reducing poor income, income distribution from poor to non poor or income distribution from non poor to poor. So, it does not state that how many resources need to eliminate the poverty (Duclos, 2002; Mehryar, 1994).

If α=1 that is giving equal weight to the severity of poverty among all poor households, the poverty gap or income gap is obtained. This index is not sensitive to the number of poor. The aggregate income short fall of the poor gives the poverty gap which is divided to the poverty line and then normalized by the poor number.

Head count ratio and income gap ratio complete each other. The first states only the number of the poor without any consideration about its depth and the later states the depth of the poverty without any explanation about the number of the poor. However any of them is not sensitive to redistribution of income in the sample.

Finally, severity in poverty is obtained if α=2, which is similar to poverty gap but based on the sum of squared proportionate poverty deficits. For computing the severity of poverty, more weight is given to the poorer. So, this index will be changed if income transfers from one poor to another person whose income is less than the poverty line.

After using this index and determining poor households, the determinants of poverty and their effects on poor and nonpoor households are studied using a probit model. There are several studies that only investigate the poverty and its determinants (Hagos and Holden, 2000; Minot and Baulch,

2002). However there are also studies that measure the effects of each determinant on the poverty statues, using a binary choice model.

Logit and probit models are usually used to transfer the predicted values by linear regression model to percentage of probability and gives the similar results (Salami and Khaledi, 2001). Researchers have used Logit model (Okurut et al., 2002; Bigsten and Shimeles, 2004) or Probit models (Bigsten et al. 2002; Chirwa, 2005; Minot, 1998 and etc.).

The univariate probit model for a binary outcome is:

$$y_i = \beta' X_i + e_i \qquad\qquad e_i \sim N(0,1) \qquad\qquad (5)$$

Where y_i is the dependent variable which is binary (0 / 1), X_i is the regressor vector and e_i is the residual term. In this model, the likelihood of selection of an alternative is showed by (Abdeshahi et al. 2007):

$$P_i = prob[Y_i = 1 \big| X] = \int_{-\infty}^{x_i'\beta} (2\pi)^{\frac{-1}{2}} \exp\left(-\frac{t^2}{2}\right) dt = \Phi(x'\beta) \qquad\qquad (6)$$

In this model the dependent variable is poverty status of household (for poor it is 1 and for others is 0). Independent variables are determinants of poverty includes household size, education status of household (number of educated members, number of student members), number of employed members, characteristics of head of household (gender, age, education and employment), ownership of house, car and mobile and the number of room in home. Marginal effects indicate the relationship between an explanatory variable and the output of selection the alternative of $Y_i = 1$. In other word, marginal effect is the change in the probability of selection of 1 for Y_i respect to one percent change in explanatory variable. Marginal effect of X_k variable on the likelihood of being poor can be obtained from:

$$\frac{\partial P_I}{\partial x_{iK}} = \phi(x'\beta)\beta_K \qquad\qquad (7)$$

where $\phi(X'\beta)$ is calculated from:

$$\phi(x'\beta) = \frac{1}{\sqrt{2\pi}} \exp\left[-\frac{1}{2}(x'\beta)^2\right] \qquad\qquad (8)$$

ϕ indicates that the probability density function of a random variable is normal standard. The sign of marginal effect depends on the sign of β_k and its value is determined by the value of β_k and X_β. It would better that estimated marginal effect is calculated at mean value of independent variables (Greene, 2000). However this method is not convenient for dummy variables. There are various methods to compute the marginal effect of these kinds of explanatory variables. In this study two marginal effects were computed at 0 and 1 value of dummy variable. The difference between these two values can be reported as

the marginal effect for dummy variable. The probit models in this study were estimated by LIMDEP 7.0 software.

Results

By employing cost of living index, poverty lines at rural, urban and national level were estimated. As indicated by Table 2, monthly poverty lines for an adult member of family are 2034707 Rls and 2532995 Rls in rural and urban areas respectively.

[Table 2]

Bused on poverty lines, FGT indices were estimated and shown in Table 3. It indicates that 30, 14 and 23 percent of families live below poverty line in rural, urban and whole country respectively. Income gap was higher in rural (0.112) compare to urban areas (0.036).

[Table 3]

To determine social and personal characteristics of various groups of families, they were divided into poor and non-poor classes. As Table 4 indicates, family size in poor groups was greater both in rural and urban areas while literacy ratio was lower in poor group both in rural and urban areas.

[Table 4]

Tables 5 to 7 show the results of suing probit model regarding determinants of poverty in rural, urban and the whole country. As indicated by table 5, there is a positive relationship between poverty in rural areas, family size and property rights while there is a negative relationship between rural poverty, level of literacy, Job of family heads, number of literates in the family, number of students in the family, number of rooms in the house, car and mobile ownership. The determinants of poverty in urban area are much resembled to rural with the exception that there is a positive relationship between urban poverty and job statues of family head.

[Tables 5, 6 and 7]

Marginal effects of explanatory variables on probability of family being in poverty condition were determined and shown in Table 8. The results indicated that with increase in family size and number of students in the family, the probability of family being in poverty group increases while with increase in number of literate, employed, income earner in the family, and also increase in number of rooms, the probability of family to fall in poverty would decrease.

[Table 8]

In addition, ownership of house, car and mobile would decrease the probability of family to fall below poverty line. The results of the study as shown in table 8 also indicates that in all cases head of family's employment would decrease the probability of family to be in poor conditions.

Policy Implications and Recommendations

Based on findings of study, it could be concluded that dependency ratio, mainly due to increase in family size and number of students in the family' is considered an important determinant of poverty. To remedy the situation extending population control measures and services especially to rural areas and poor segment of urban areas is recommended. Another and even more important determinant of poverty is unemployment and low level of income which call for special programs by government to create jobs and persuade private investment through providing more stable social and economic environment by pursuing sound policies to decrease government size and help create competitive market both in agriculture and industrial sectors. As the findings of study revealed that poverty is more widespread in rural areas, in providing anti-poverty policies greater attention should be made to rural areas especially through expanding non agricultural sector in rural areas.

Another conclusion that could be made based on findings of the study is that illiteracy and low level of literacy would increase the probability of poverty among families and because this problem is more acute in rural areas, it is recommended that the government would increase investment to expand formal education especially in rural areas.

At present, Iranian government spends a large amount of money on general subsidies, especially on fuel and food which is a great burden on government annual budget. To combat prevailing poverty, these subsidies should be targeted toward poor segments of the society. In this regard, it is recommended that newly established Ministry of Welfare to provide a plan for gradual transformation of present general to targeted subsidies and finally a social safety net based on successful experiences of other countries.

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Table 1. Adult equivalent

Age	Men	women
0-1	0.33	0.33
1-2	0.46	0.46
2-3	0.54	0.54
3-5	0.62	0.62
5-7	0.74	0.70
7-10	0.84	0.72
10-12	0.88	0.78
12-14	0.96	0.84
14-16	1.06	0.86
16-18	1.14	0.86
18-30	1.04	0.80
30-60	1.00	0.82
Over 60	0.84	0.74

Reference: Decron and Krishna (1998)

Table 2. Monthly poverty line for adult (Rls).

Region	Food poverty line	Non-food poverty line	Total
Rural	857943	1176764	2034707
Urban	982393	2118947	310340
Iran	2532995	1785520	747475

Table 3. FGT poverty indices

Region	Head count ratio (P_0)	Income gap (P_1)	Poverty severity (P_2)
Rural	0.305	0.112	0.057
Urban	0.139	0.036	0.014
Iran	0.228	0.088	0.046

Table 4- Social and economic characteristics of families

Characters	Rural		Urban		Total	
	Poor	**Non Poor**	**Poor**	**Non Poor**	**Poor**	**Non Poor**
Family size	5.66	4.60	5.44	4.18	5.54	4.44
Literacy Ratio	0.55	0.64	0.68	0.78	0.60	0.71
Student ratio	0.23	0.21	0.29	0.24	0.26	0.22
Income earner ratio	0.29	0.35	0.24	0.30	0.27	0.32
Employed ratio	0.32	0.37	0.32	0.40	0.32	0.38
Head's age (year)	48.67	47.21	46.97	45.66	48.75	46.29
Women's head (percent)	8	7	10	8	9	8
Families with literate head	41	63	58	83	47	73
House ownership (percent)	61	68	61	67	61	68
House tenancy (percent)	9	7	9	5	9	6
Average number of rooms	2.85	3.50	3.22	3.80	3.06	3.65
Average building area (m^2)	69.81	91.85	80.25	105.73	73.34	99.03
Car ownership (percent)	1	10	3	25	3	18
Mobile ownership (percent)	0.2	4	1	16	1	10

Table 5. Coefficients of probit model for rural families

Variables	Coefficients	t	P[|z|>z
Constant	-0.2355	-2.033	0.042
Family Size	0.2716	21.955	0.000
Head's gender	0.0383	0.675	0.4995
Head's age (year)	-0.0054	-0.510	0.6100
Head's education level (year)	-0.2014	-5.181	0.000
Head's Job Condition (first dummy)	-0.2254	-4.456	0.000
Head's Job condition (Second dummy)	0.1391	0.111	0.9114
No. of literates	-0.1673	-10.372	0.000
No. of students	0.1060	0.486	0.000
No. of employed	-0.0304	-1.819	0.0690
No. of income earners	-0.2524	-0.803	0.4222
Form of property right (first dummy)	-0.0426	-0.882	0.3777
Farm of property right (second dummy)	0.1005	1.797	0.0723
No. of rooms	-0.0703	-4.514	0.000
Building area (m^2)	-0.0066	-13.603	0.000
Car ownership	-0.8624	-10.384	0.000
Mobile ownership	-0.8567	-5.550	0.000
McFadden= 0.2187, Ben./Lerman=0.6539			
Cramer = 0.1928 , Rsqrd ML = 0.1776			

Table 6. Coefficients of probit model for urban families

Variables	Coefficients	t	P[|z|>z]
Constant	-0.6888	-4.701	0.000
Family Size	0.2948	18.012	0.000
Gender	0.1309	2.000	0.0455
Head's age (year)	0.0011	0.812	0.4167
Head's education level (year)	-0.0111	-11.000	0.000
Head's Job Condition (first dummy)	-0.0857	-0.325	0.1851
Head's Job condition (See and dummy)	0.2678	2.380	0.0173
No. of literates	-0.1107	-11.000	0.000
No. of students	0.1026	5.059	0.000
No. of employed	0.0244	0.714	0.4752
No. of income earners	-0.0851	-1.882	0.0559
Form of property right (first dummy)	-0.0457	738	0.4604
Form of property right (second dummy)	0.0858	1.155	0.2480
No. of rooms	-0.1268	-6.447	0.000
Building area (m^2)	-0.0050	-9.053	0.000
Car ownership	-0.7510	-1.217	0.000
Mobile ownership	-0.7582	-0.133	0.000
McFadden= 0.2285, Ben./Lerman=0.7759 Cramer = 0.2160 , Rsqrd ML = 0.1899			

Table 7. Coefficients of probit model for the whole country

Variables	Coefficients	t	P[|z|>z]
Constant	-0.03385	0.358	0.7203
Family Size	0.2899	26.344	0.000
Gender	0.0952	1.811	0.072
Head's age (year)	0.0030	3.490	0.0005
Head's education level (year)	-0.2820	-5.868	0.000
Head's Job Condition (first dummy)	-0.0901	-0.749	0.4537
Head's Job condition (Second dummy)	-0.1882	-15.193	0.000
No. of literates	0.0980	6.757	0.000
No. of students	-0.0098	-0.635	0.5252
No. of employed	-0.0934	-3.426	0.0006
No. of income earners	-0.202	-4.861	0.000
Form of property right (first dummy)	0.0438	0.857	0.3913
Form of property right (second dummy)	-0.0688	-4.756	0.000
No. of rooms	-0.0067	-14.965	0.000
Building area (m^2)	-0.0882	-22.016	0.000
Car ownership	-1.0370	-8.522	0.000
Mobile ownership	-1.0370	-8.522	0.000
McFadden= 0.4022, Ben./Lerman=0.7892 Cramer = 0.3691 , Rsqrd ML = 0.3401			

Table 8. Marginal effects of explanatory variables on probability of families' poverty

Variables		Rural	Urban	Total
Family Size		0.089^{**}	0.005^{**}	0.006^{**}
Head's gender		0.013	0.24^{**}	0.003^{*}
Head's age (year)		-0.002	0.002	0.06
Head's education level (year)		-0.067^{**}	-0.019^{**}	-
No. of literates		-0.055^{**}	-0.018^{**}	-0.041^{**}
No. of students		0.035^{**}	0.017^{**}	0.021^{**}
No. of employed		-0.010^{**}	0.004	-0.022
No. of income earners		-0.009	-0.015^{*}	-0.020^{**}
Job status of family head	**Employed**	-0.077^{**}	-0.015	-0.012^{**}
	Unemployed	0.005	0.055^{**}	0.015
	Other	-0.058^{**}	-0.64	-0.03
Form of property right	**Owner**	-0.014	-0.008	-0.044^{**}
	Tenant	0.034^{*}	0.016	0.010
	Other	-0.038^{**}	-0.026	-0.035^{*}
No. of rooms		-0.023^{**}	-0.022^{**}	-0.014^{**}
Building area (m^2)		-0.002^{**}	-0.009^{**}	-0.014^{**}
Car ownership		-0.209^{**}	-0.101^{**}	-0.192^{**}
Mobile ownership		-0.201^{**}	-0.093^{**}	-0.073^{**}