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An Investigation into Income Distribution in Zanjan Province: A Case Study of Rural Households in Abhar County

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Abstract

The present study aims to investigate income distribution in Zanjan Province, for which the statistics of cost-income of the households in rural areas of Abhar County were used. They were available in the Statistical Center of Iran. In order to measure income distribution, the indicators of Lorenz curve, the Gini coefficient, the proportion of high-income groups to low-income groups, as well as the comparison of decades and quintiles are described below. The results indicated that 20% of the richest households in the rural community of Abhar County had more than half of the revenue, and four poor decades had less than 10% of revenue. The richest farmer docile had an income about 28 times as high as the poorest decade, and the richest non-farmer docile had an income about 74 times as high as the poorest non-farmer docile. The results of the Gini coefficient of the two occupational groups suggested that the Gini coefficient of people working in the agricultural sector was equal to 0.55, and that it was 0.56 for non-agricultural workers by comparison. The results of correlation analysis indicated a negative relationship between the age of household's head and their annual income. Moreover education level of household's head had a positive relationship with their annual income. In addition, there was no significant difference among annual incomes of households heads with different occupational groups.

Keywords:
Abhar, income distribution, the Gini coefficient, Lorenz curve, rural areas

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INTRODUCTION

Economists have discussed income distribution issues for decades. These issues have recently emerged as major political debates even in developed economies (Meltzer & Richard, 2015 As Sarel (1997) refers, income distribution has been a relevant issue in positivistism (what it is) and normativism (what it should be).. Inequality is a universal and robust phenomenon, not bound by either time or geography, but for scholars, it has a few statistical regularities, as is the case with income and wealth distributions over a wide range of societies and across different time periods (Soriano-Hernández et al., 2016). In the oldest economy literature, the explanation of the theory of distribution constitutes the major concepts of the economists' views. Several theories have been formed to investigate the distribution of personal income. Based on the historical order and the relationship between ideas, Sahota (1978) has divided the theories of income distribution to the ability theory, the scholastic theory, the individual choice theory, human capital theory, theories of educational inequalities, the inheritance theories, life cycle theory, public income redistribution theories, more complete theories, and theories of distributive justice. In this regard, the investigations into the effects of macroeconomic performance and indicators and economic policies on income distribution have begun since the last few decades. According to Fluckiger and Zarin–Nejadan (1994), although traditionally studied in micro-economic issues, today the income distribution is broadly considered as a macro-economic issue. As Kaasa (2003) has noted, these factors can be found in five groups of economic development, including demographic factors, political factors, and historical factors, cultural, natural and macroeconomic factors. Investigation of the effect of development on inequality has begun with a research study by Kuznets (1955). Examination of the status of income distribution in Iran has suggested that the Gini coefficient of income distribution in the 1940s and 1960s was about 0.45 and then, it increased to about half percent in some years in 1971-1978. The Gini coefficient has had an upward trend from 1979 to mid-1991 with high fluctuations and had a downward trend in recent years. The Gini coefficient of income distribution in the past half century has always been much higher than high-income industrialized countries. In addition, the ratio of urban to rural families has had a downward trend until mid-1996 and has increased in recent years (Barati, 2010). However, the government spends a considerable amount of resources to solve these problems. It is well known that about 20% of Iranian households are below the poverty line. This ratio is typically less than 10% in developed countries (Dadgar, 2005). On the other hand, most poor people in developing countries who live in rural areas are often engaged in agriculture. Understanding the distribution of income among farmers living in rural areas can help identify the extent of poverty in the community (Toudeh Rousta & Mir Mohammad Sadeghi, 2013).

Abbas et al. (2014) investigated causes of rural-urban migration from west of Esfahan, Iran. They suggested that poverty, lack of jobs, inadequate educational services, lack of public transportation systems, inappropriate roads, and lack of proper medicine, as well as hospitals and health facilities are the main factors contributing to rural-urban migrations. In order to increase rural-urban migration, it is necessary to solve the problems which rural residents are suffering.

Income distribution, despite many differences in culture, history, and social structure, seems to follow a particular universal pattern (Chakrabarti et al., 2013). Regarding the importance of the agricultural and rural sector in the economy of the country and considering the fact that a large part of the population lives in rural areas, it is necessary to take basic actions to reduce rural poverty and improve income distribution, because the biggest factor causing poverty in rural areas is not only the lack of money but unequal distribution of income. Therefore, to evaluate the inequality of the distribution of income in the society and specifying the contributing factors and roots, as well as ways to mitigate it is, for many reasons, an issue that should be focused on by economists and economic programs and the issues of social justice and sustainable eco-

nomic development should be considered. In order to contribute solving this problem, the present paper investigates the income distribution in rural areas of Abhar, Iran. The purpose of the research is to estimate the income distribution in rural households as well as comparing income distribution of rural households employed in agriculture sector and non-agriculture sector.

MATERIALS AND METHODS

The present study is a descriptive-analytical research study in nature. In the descriptive analysis, the mean, percentages, and ratios were used for investigating the studied households; and in the inferential section, the data were analyzed and investigated through the statistical methods. The required information was collected by referring to the Statistical Center of Iran, using the demographic data of expenditure and income of rural households in Abhar county in 2015. After collecting and extracting the desired data, all data were transmitted to the computer using the SPSS and Excel statistical software to perform statistical analyses. In order to measure income distribution, the indicators of Lorenz curve, the Gini coefficient, the proportion of high-income groups compared to the share of low-income groups and the comparison of decades and quintiles are described below.

Gini coefficient

Another way to measure income distribution is the algebraic method that the Italian statistician Gini has developed.

According to equation (1), the Gini coefficient is a number between 0 and 1, where 0 means the perfect equality and the Gini coefficient of 1 means complete inequality. In other words, the closer the Gini coefficient to 1, the more unequal the income distribution is in that economy. Now, regarding the available information and income statistics, the Gini coefficient is calculated as equation (1) (Barati, 2006).

$$G = 1 - \frac{1}{N}\sum_{i=1}^{N-1}(y_{i+1} + y_i) \qquad (1)$$

where G is the Gini coefficient

Y_i: The percentage of total household income,

N: the number of income groups.

In this formula, 1/N is the grouping ratio (if the decade is used, it is 1/10 and if the twenties is used, it is 1/20 and ….).

The ratio of the share of high-income groups to the low-income groups:

In this criterion, the proportion of high-income groups to low-income groups is calculated. The most important part is the calculation of the share of the 20 percent of the high-income households to the 40% share of low-income households and the share ratio of 10% of the high-income households to 10% of the low-income households (Ruzbehan, 1997; Toudeh Rousta & Mir Mohammad Sadeghi, 2003).

Decades and quintiles of income

In order to specify the income decades and quintiles, at first the whole population of the community is classified from small to large in terms of income. Then, these people are divided into ten groups (decades) or five groups (quintiles) and the total income of each group is calculated (Ruzbehan, 1997; Toudeh Rousta & Mir Mohammad Sadeghi, 2003).

Factors affecting income distribution in rural households of Abhar County

In order to investigate the relationship between independent variable and dependent variables, t-test, F-test as well as Pearson correlation coefficient are applied in SPSS v22 software.

RESULTS AND DISCUSSION

Lorenz curve, Gini coefficient and the share ratio of different decades to get the Lorenz curve and the Gini coefficient, the percentage of the total population and the income for both occupational groups are calculated whose results are presented in Table 1.

The results of the Gini coefficient of the two occupational groups suggest that the Gini coefficient is 0.55 for people working in the agricultural sector and 0.56 for those working in non-agricultural sector (see Table 2).

Table 1
Cumulative Percentage of the Population and the Annual Gross Cost Regarding the Occupational Groups

Farmer and non-farmer		People employed in non-agricultural sector		People employed in agricultural sector	
The cumulative percentage of population	The cumulative percentage of income	The cumulative percentage of population	The cumulative percentage of income	The cumulative percentage of population	The cumulative percentage of income
40.21	8.97	42.05	10.9	37.23	9.52
60.41	20.51	58.04	20	57.97	19.04
73.43	30.76	71.70	30.9	72.26	29.57
82.19	41.02	81.54	41.81	83.58	41.85
88.81	51.28	89.32	52.72	88.14	51.38
93.36	61.53	93.83	61.81	91.53	61.90
96.43	71.79	96.97	77.72	94.34	71.42
98.47	82.05	98.63	81.81	96.82	80.95
99.48	91.02	99.59	90.90	98.66	90.47
100	100	100	100	100	100

The ratio of high-income and low-income groups of the rural households of Abhar County

One of the most common metrics in investigating the status of the income distribution is to calculate the ratio of the costs of high-income and low-income groups. In this study, the share of the richest 20% of households, the share of the poorest 40% of households, and the average share of 40% of households were calculated at first and then, the 20% share of the richest households to the 40% share of the poorest households and 10% of the richest households to the 10% of the poorest households were calculated.

The results of the share of 20% of the richest households indicates that 20% of the richest households among the farmers have 57.9% of the costs, non-farmers have 58.1% of the cost and the whole rural population of Abhar county have 40.41% of the cost.

The results of the share of 40% of the poorest households indicates that 40% of the poorest households among the farmers have eight and a half percent of the costs, non-farmers have six point two% of the cost and the whole rural population of Abhar county have six point six% of the cost.

The results of the share of 40% of the average households indicates that 40% of the average households among the farmers have 33.5% of the costs, non-farmers have 35.8% of the cost and the whole rural population of Abhar county have 32.9% of the cost.

The ratio of the cost of high-income groups to low-income groups was investigated whose results indicate that the share of 20 percent of the richest farmer households to the 40 percent share of the poorest households has been equal to 6.8. This ratio has been 9.4 for the non-farmer households and 9.1 for the whole rural population of Abhar county.

-The share ratio of 10 percent of the richest farmer households has been 27.9% in comparison to the share ration of the poorest 10% of the farmer households, this ratio is 74.4 for the non-farmer households and 77.3for the entire rural community of Abhar city. (Table 3)

The share of gross cost of the various decades

The results of investigating various decades' share of costs among the villagers ofAbhar city

Table 2
Gini Coefficients with regard to the rccupational rroups

Occupational group	Gini coefficient
Workers of the agricultural sector	0.55
Workers of the non-agricultural sector	0.56

Table 3
The share ratio of various decades of the rural households of Abhar County

Description	Farmer	Non-farmer	The whole villagers
The 40 percent share of the poorest households (percent)	6.7	6.2	8.5
The 40 percent share of the average households (percent)	32.9	35.8	33.6
The 20 percent share of the richest households (percent)	40.4	58.1	57.9
The 20 percent share of the richest households to the 40 percent share of the poorest households (percent)	9.1	9.4	6.8
The 10 percent share of the rich households to the 10 percent share of the poorest households (percent)	77.3	74.4	27.9

Table 4
The gross cost Share of various decades among the villagersv of Abhar City (percent)

Decade	Share (%)
First decade	40.2
Second decade	20.2
Third decade	13
Fourth decade	8.8
Fifth decade	6.7
Sixth decade	4.5
Seventh decade	3.1
Eighth decade	2
Ninth decade	1.1
Tenth decade	0.4

indicates that the richest decade has 40.2% of the total cost and the poorest decade has only 0.4% of the total cost, the results also indicate that the top 3 decades of the communityhave 73.4% of the total cost and the remaining 7 decades have only 30% of the costs, the share of three poor decade indicate that these decades have allocated only 3.5% of the costs to themselves which is very less in comparison to the share of the three top decades. (Table 4)

The cost share of various quintiles

Table 5 shows the cost share of each quintile of the total cost of households in Abhar county. Investigating the results of the cost share of various quintiles of the cost of households in rural areas indicate that the richest quintile has 60.4% of the costs and the poorest quintile has only 1.5%. The results also indicate that the 2 richest quintiles have 82.2% of costs while the 2 poor quintiles account for only 6.6% of the costs.

Table 5
The cost share of various quintiles among the rural community of Abhar County (percent)

Quintile	Share (%)
First quintile	60.4
Second quintile	21.8
Third quintile	11.2
Fourth quintile	5.1
Fifth quintile	1.5

The cost share of various quintiles among the occupational groups

Table 6 indicates the cost share of each quintile from the total cost of the farmer and non-farmer households in Abhar county. As it can be observed in Table 6, 20% of the richest people in the agricultural sector (first quintile) have 57.9% of the costs and the poorest 20% of this group (fifth quintile) account for only 3.2% of the costs. With respect to non-farmer individuals, the first quintile (richest) have 58.1% of the total

Table 6
Cost share of different quintiles in the rural community of Abhar County among the occupational groups

Quintile	Agricultural	Non-agricultural	Farmer and non-farmer
First quintile	57.9	58.1	60.4
Second quintile	25.6	23.5	21.8
Third quintile	8	12.3	11.2
Fourth quintile	5.3	4.8	5.1
Fifth quintile	3.2	1.3	1.5

Table 7
Relationship between the characteristics of the studied households and their annual income

Variable 1	Variable 2	Test	Coefficient	p-value
Annual Income	Age	Pierson correlation	-0.221*	0.046
	Education Level	Pierson correlation	0.467**	0.000
	Family Size	Pierson correlation	0.027 ns	0.815
	Gender	t-test	6.253**	0.000
	Employment Status	F-test	1.110 ns	0.358

*p<0.05** p<0.01 ns: Non- significant

cost and those in the fifth quintile (the poorest) account for 1.3%. About the whole rural community of Abhar county (farmers and non-farmers), these ratios have been 60.4 and 1.5, respectively.

Bivariate analyses

The results of Pearson correlation coefficient show a negetive relationship between the "age of households' heads" and their "annual income". Hence, the relationship between the "annual income" of households' heads and their "housheols size" is not significant. Nevertheless, the relationship between the "education level" of housholds' heads and their "annual income" is negative significantly.

The results of t-test indicated no significant difference between the "annual income" of households whose heads were men and of those whose heads were women.

In order to investigate the difference among "income levels" of households with different "occupational groups", F-test was employed. The results of F-test revealed that the "annual incomes" of households with different "occupational groups" did not differ significanly.

CONCLUSION

The results of investigating the annual gross cost of farmer and non-farmer families indicate that the average annual cost of farmer families is 80,972,819 IRR and the minimum and maximum costs of this group of people are 9,539,526 and 414,101,476 IRR, respectively. The average annual cost of non-farmer households is 60,774,147 IRR and the minimum and maximum costs of this group of people are 1,418,888 and 381,636,190 IRR, respectively.

According to the Gini coefficient for the villagers of Abhar county, the Gini coefficient of the people employed in the agricultural sector is equal to 0.55 and that of non-agricultural employees is 0.56. Comparing the Gini coefficient of the two groups, it can be contended that the situation of workers in the agricultural sector is more appropriate in comparison to the other people. However, this does not indicate an extreme inequality between the two occupational groups and it can be said that the distribution of income between the two groups does not differ much from each other and join a relatively equal distribution.

The results of investigating 20% share of the richest households indicates that 20% of the richest households among the farmers have 57.9% of the costs among the farmers, non-farmers have 58.1 percent of the cost, and the rural population of Abhar has 40.41% of the cost which indicates that 20% of the rich rural community of Abhar have more than half of revenue and this indicates the unequal distribution of income in these areas.

The results of investigating 40% share of the poorest households indicates that 40% of the poorest households among the farmers have 8.5% of the cost, non-farmers have 6.2% of the cost and have the 6.6% of the cost among the whole rural community of Abhar county. This is an evidence for the previous claim which is indicative of the desperate situation of 4 poor decade of the rural community in Abhar county.

The share of various quintiles cost between the occupational groups indicates that the farmers included in the first quintile (20% of

richest farmers) have allocated about 60% of the costs to themselves and the fifth quintile (20% of the poorest farmers) have allocated only 3.2% of the costs to themselves which is indicative of the dramatic difference between these two quintiles. These conditions are severe for the non-farmers so that the first quintile of non-farmers (the richest people in this group) have allocated over 58% of the costs to themselves and the fifth quintile (the poorest people in this group) have allocated only 1.3 percent of costs. About the whole rural community of Abhar county (farmers and non-farmers), these ratios have been 60.4 and 1.5, respectively.

Considering that the income of the households whose heads were male was higher and had a significant difference with female-headed households, it is recommended to increase social support of female-headed households and the conditions of these households be improved through implementing appropriate support programs.

The results of investigating the difference between annual income of households with marital status indicated poor conditions of the individuals whose spouse has died, whereas the husbands whose spouses have died constitute more than 15 percent of the households in the study which is pretty significant. So, it is suggested that families without spouse especially those in which the spouse has died should be included in the priority programs to be supported.

Because of better conditions of people involved in agriculture in comparison to other people, that shows the status of the farm, it is recommended to provide the background of improving income distribution in these areas through the development of agricultural activities in rural areas of Abhar County, in addition to increasing employment and reducing rural migration.

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