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## Investigation of the Effect of Third and Fourth Programs of economic, Social and Cultural Development on Income Distribution in the Islamic Republic of Iran between Years of 2000 to 2009

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### ABSTRACT

The subject of poverty and richness has always been a concern for human society, and with the advent of economic science since Adam Smith up to now attract the attention of economists. In this article, trend of changes of income distribution in the Iran have been studied during Third and Fourth programs of economic, social and cultural development (2000-2009). Also correlation of Atkinson index at all sensitivity levels to inequality with the Gini coefficient have been studied. Using statistic of cost and income of households which it has been gathered by the Statistical Center of Iran, mentioned inequality indices are calculated by Excel software. To this purpose, the Gini index, Atkinson index, Theil Index and Engle coefficient have been used. This study shows the correlation coefficient between the Gini index and the Atkinson index at all sensitivity levels to inequality, Theil Index and Engle coefficient are positive. The Gini coefficient has compatibility with Atkinson index ( $\epsilon=2$ ) and this shows that despite decrease of the Gini coefficient, we still are in the lowest status from the justice parameter points of view. This parameter should be trying to upgrade to the  $\epsilon=1.5$ . During the studied period, the income inequality in the country has declined. The value of difference in inequality between social groups, poor and rich and different regions of the country, urban and rural, have declined. Calculated inequality values have compatibility with different indices. The results show the distribution of income in rural areas is more unequal than to urban areas

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## INTRODUCTION

The subject of poverty and richness has always been a concern for human society, and with the advent of economic science since Adam Smith up to now attract the attention of economists. There is a few issues in the economic theory like income distribution that accept effect from most of economic policies and has effect on majority of macroeconomic variables. In Iran, in addition to the codification and implementation of five-year development programs, additional protection measures have been designed and implemented to especially tackle poverty. However, it seems that variety of factors such as recession, unemployment, inflation, war, economic sanctions, and other social and economic factors cause that Iran struggle with the problem of poverty. On the other hand, deficiencies of statistics of income distribution and sensitivity of inequality indices for reflection of the effects of macroeconomic indices, it will be necessary to consider data quality and precision of measurements of inequality. Due to increasing of technology and with development in data collection, access to income distribution data of Iran in the form of Micro data, not grouped, and it's processing on personal computers have been provided. This will provide more accurate estimation of indices and trends of inequality in Iran between years of 2000 to 2009. The history of the Iran in this 10-year period have been witnessed many ups and downs such as the Iran-Iraq war (1980-1988), economic adjustment periods from the year of 1988, efforts of governments to expand social justice in the context of three economic and social development programs: the first program (1989-1993), the second program (1995-1999), the third program (2000-2004) and the fourth program (2005-2009).

The main purpose of this study is to analyze the trend of level of economic inequality in Iran by estimation of inequality indices, Gini coefficient, Engle coefficient, Theil index and Atkinson index, using Micro data and determination of economic factors that affecting the Gini coefficient in the period of ten years (2005-2009). For

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this purpose, first, Micro data or the raw data of income (cost) distribution have been gathered and organized based on the income-cost plan of Statistical Center of Iran according to urban and rural areas and its combination throughout the country. Then, economic inequality indices, Gini coefficient, Engle coefficient, Theil index and Atkinson index have been estimated using nonparametric method for the study period.

## 2. Review of Literature:

Faustino & Vali (2011) in years of 1997 to 2007 with studying the effect of globalization on income inequality in OECD countries reached this results that liberalization of trade reduces inequality, while foreign direct investment is related with inequality.

Silisya Garcia (2010), in an article, analyzes macroeconomic variables and income distribution based on the normalized data in the UK between 1961 and 1999. Estimated values based on models that relate periodic variables to distribution of income parameters show that neither inflation nor unemployment have much impact on income inequality. Compared with the conventional methods of direct modeling of income, this approach shows that there was no specific relationship between macroeconomic variables and income distribution in the UK until end of the Twentieth Century.

Carlos and maximo (2004) investigated the changes of income sources in Uruguay after the late eighties decade. Their goal in this study has been the existence of changes in the income distribution through income sources in Uruguay between years of 1989 and 1997. The results show that there was inequality in polarization of the intergroup that was due to factors such as the relationship between sources of income in a household, the number of salary recipients or composition of household. Also, results indicate that income distribution in Uruguay showed a significant change between years of 1989 and 1997, which this change cause impact on trend of income generation through different sources such as labor market and pension systems.

Banderiae (2004) in a study evaluated the economic reform, income inequality and economic growth in Latin America and the Caribbean Basin countries. The results indicate that there is no direct relationship between economic growth and inequality. The only factor that can justifies the economic growth and income inequality is method of execution of economic reforms, so that if policies of economic reforms is towards industrialization of economic, it will leads to increase in inequality of income, because the productivity of capital-intensive industries would be much more efficient than other industries.

Alesina and proti (1996) studied the interaction of income distribution, political and investment inequality. The results show that income inequality will increase the political-social instability, and hence, reduces the investment. Also, they have a different view to this issue, which if redistribution take place by increasing the tax burden on shoulder of financiers and investors, it will reduces propensity to investment. On the other hand, these policies may led to reduction of social tension and open a new political-social circumstance for production activities, and therefore leading to acceleration of economic growth.

Sarel (1987) investigated the impact of macroeconomic variables on income distribution of payments. In this study, the Gini coefficient was the index of income distribution. The results of this study was that variables of logarithm of per capita income, real growth rate of per capita income, net effect of changes in the commercial exchange relation, the ratio of investment to total domestic absorption that is obtained from the sum of private consumption, public consumption and investment all of these variables have a negative impact on the income distribution, and variables of change in the real exchange rate, percentage of the active population, and annual change of the active population have a positive impact on income distribution.

## 3. Theoretical Foundations:

Each of inequality indices used in this study interpreted differently the pattern of income distribution of society, and they measured differently the level of income inequality. Therefore, being aware of interpretation of this process and measurement process is essential for using these indices.

### *Gini Coefficient:*

The Gini Coefficient is the most famous index of income inequality, and it is the most commonly used index in study of income distribution. The Gini coefficient can be thought of as the ratio that shows the area between Lorenz curve and the perfect equality line, 45 degrees, to the entire area between the perfect equality line and the horizontal axis. Numerical value of the Gini coefficient is in the range from 0 to 1. If the Lorenz curve be on the 45 degree line, the Gini coefficient is equal to zero and indicates perfect equality, and if the Gini coefficient is equal to 1, there is a perfect inequality in income distribution.

### *Engle coefficient:*

Engle Coefficient is an index that shows the ratio and percentage of poverty. Variable of ratio of Food costs to total costs, cost of food plus non-food expenditure, represents level of household welfare, and the theoretical justification of this variable based on the Engle theory is that there is a negative relationship between income

level and food costs. This ratio is lower for rich households compared to the poor households. Increase of this coefficient indicates worsening of the welfare situation compare to previous periods and vice versa.

#### Theil index:

Unlike other demonstrability indices that are based on the Lorenz curve and distribution functions, Theil index is based on the concept of entropy in the theory of information. Based on this theory, if the probability an event is greater, information content of that incident will be less. Value of entropy of an information environment changes between zero, when the probability of occurrence of an event in an information environment is equal to 1 and probability of occurrence of other events is equal to zero, and  $\log n$ , when the probability of occurrence of all of events in an information environment is same and equal to  $1/n$ .

Calculation formula of Theil index is as follows:

$$T = \log n - H = \log n - \sum_{i=1}^n p_i \log \frac{1}{p}$$

#### Atkinson index:

Atkinson (1970) unlike the Gini coefficient that it is not consider value judgments, try to propose a criterion for measurement of inequality of distribution of income using value judgments. Atkinson index originates from social welfare that indicates accepted values of society, and it has preference over the Gini coefficient. Atkinson believes that the distribution of income should not be just a statistic indicator of dispersion in pattern of income distribution, and it must have an economic concept and content. For example, it should contain considerations of social and individual utility function caused by income. For this purpose, he proposed a concept entitled "perfectly equal distribution of income". In the distribution of assumed income,  $X_{EDE}$  is per capita income that if it is allocated equally to each individual of society, the entire social welfare, or total utility that is obtained from it, is exactly equal to the total social welfare that is obtained using distribution of assumed income in society. Atkinson also has a weight parameter named  $\varepsilon$  that measures avoidance of inequality. By entering the  $\varepsilon$  as society avoidance of inequality, general equation of Atkinson is as follows:

$$A_{\varepsilon} = 1 - \left[ \frac{1}{N} \sum_{i=1}^N \left( \frac{x_i}{x} \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} \quad \varepsilon \neq 1$$

$$A_{\varepsilon} = 1 - \frac{\prod_{i=1}^N \left( x_i \sqrt[N]{1/N} \right)}{x} \quad \varepsilon = 1$$

Atkinson domain is in the range from 0 to 1. When  $A=0$ , there is perfect equality. If  $A=1$ , there will be a complete inequality. Therefore, if  $A$  has a higher value, the degree of inequality will be higher. If value of avoidance of inequality increases, the value of  $A$  will increase.

#### Correlation coefficient:

The correlation coefficient is intensity of relationship between two variables relative to each other. Generally, the correlation coefficients changes between the -1 and 1, and they can be positive or negative. The correlation coefficient is a symmetric relation. If the correlation coefficient is closer to 1, Dependency rate of two variables is greater. But, dependency is not a cause and effect relation, and the correlation coefficient of zero means that there is no linear relation between two variables.

#### 4. Methodology:

In this study, to evaluate and measure the distribution of income indices, nonparametric methods based on the Micro data of Statistical Center of Iran have been used. To assess the distribution of income and income inequality among different groups, several indices have been used such as the Gini, Engle, Theil, and Atkinson coefficient. The data used in this study was the third program (2000-2004) and the fourth program (2005-2009) and generally time series of 2000-2009 that have been gathered from statistical yearbook of various years, detailed cost and income of households, urban and rural, and other available resources.

#### 5. Results:

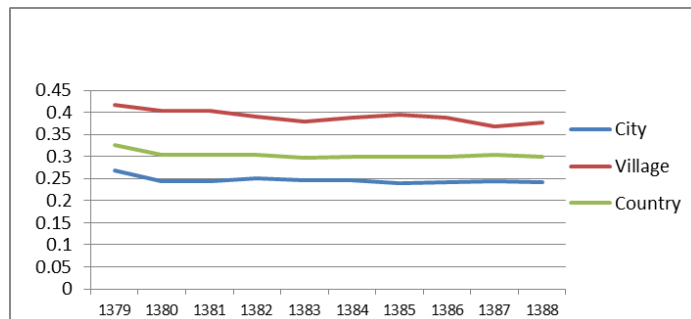
The results of the estimation of the Gini coefficient in rural and urban areas and also country for the studied period are summarized in Figure 1. As can be seen, income distribution is more unequal in urban areas than to rural areas. During the period under review, the trend of changes in urban and rural areas and also country have been descending. In other words, the distribution of income has become more equitable. In the year of 2000, the Gini coefficient for urban and rural areas and also country have the highest value. In other words, at the

beginning of the Third program, inequality was maximum, and during the Third and Fourth programs had a decreasing trend. Overall, for the studied period, 2000-2009, distribution of income had a decreasing trend and the distribution became more equitable.



**Fig. 1:** The Gini coefficient during years of 2000 – 2009 (1379-1388 Persian Date).

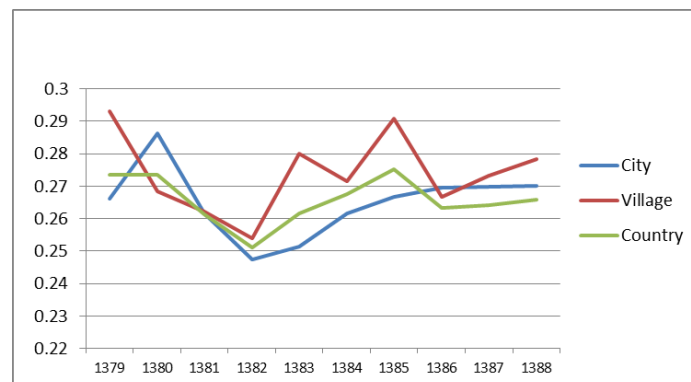
Results that have been obtained from estimation of the Engle Coefficient in rural and urban areas and also country for the studied period have been summarized in the Figure 2



**Fig. 2:** The Engle coefficient during years of 2000 to 2009.

As it can be seen, this distribution was been more unequal in rural areas than to urban areas. The trend of changes in urban and rural areas and also country have been descending like the Gini coefficient. At the beginning of the Third program, like the Gini coefficient, the value of the Engle coefficient was maximum. In other words, in the year of 2000, urban and rural areas and also country witnessed maximum inequality. During the Third program, inequality has a decreasing trend, so that at the end of Third program, inequality has been neutralized, and value of Engle coefficient shows minimum inequality. In the Fourth program, value of the Engle coefficient has a mild decrease. Generally, in the studied period, the trend of Engle coefficient had been descending, and income distribution became more equitable.

Results that have been obtained from estimation of the Theil Index in rural and urban areas and also country for the studied period have been summarized in the Figure 3. As it can be seen, this distribution was been more unequal in rural areas than to urban areas. Value of the Theil in the year of 2003 was been minimum for all the three society. During the Third program, trend of Theil was been descending and distribution became more equitable. In the Fourth program, it has no significant difference. Generally, in the studied period, it was a decreasing trend.



**Fig. 3:** The Theil index during years of 2000 to 2009.

By looking at statistic of Atkinson in the studied range of sensitivity, it can be concluded that there is compatibility between inequality and degree of sensitivity to inequality. By comparing the Gini coefficient for urban and rural areas and country with Atkinson at all levels of sensitivity to inequality, it can be observed that the Gini coefficient has compatibility with Atkinson with degree of sensitivity of 2 to inequality. This shows that despite decline of the Gini coefficient in terms of justice parameter Index, Atkinson ( $\epsilon = 2$ ), we still are in the lowest status. This parameter should be trying to upgrade to the  $\epsilon = 1.5$ .

The results of estimation of the Atkinson index ( $0 < \epsilon < 2$ ) in rural and urban areas and also country for the studied period are summarized in Figure 4. As can be seen, this distribution is more unequal in rural areas than to urban areas. In all levels of sensitivity to inequality, at the end of Third program (2003) the value of Atkinson index for rural and urban society was minimum. In other words, urban and rural households in the year of 2003 witnessed an equal intensity in distribution of income, and during the Third program it has a declining trend. At the beginning of the Third program (2000), Atkinson index in rural areas and also country at all levels of sensitivity to inequality was maximum. During the Third program, it has no significant difference. At the entire period of study, trend of Atkinson ( $\epsilon = 2$ ) for the rural population and the country have been declining, and for the urban population it had a mild increase that can be said was almost constant.

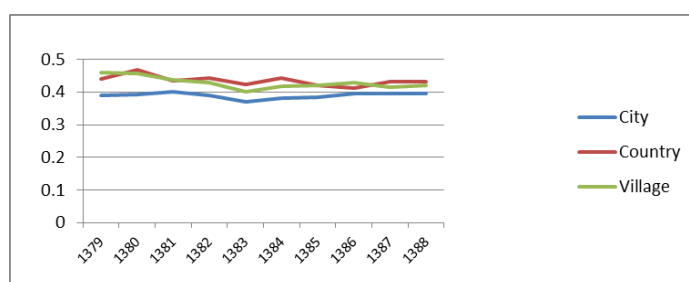


Fig. 4: Atkinson index with sensitivity of 2 during years of 2000 to 2009.

Comparison of Engle and Theil index showed that at the end of the Third program, there was a very strong convergence between these two indices. Unlike the Third program, in the Fourth program, there was a strong convergence between the Atkinson and Gini coefficient. Trend and ranking of inequality is not sensitive to type of estimated indices. For most indices of inequality, distribution of income in rural areas had been more unequal than to urban areas and indicated that intensity of inequality of income distribution of rural households had been higher than urban households.

Considering the Table1, the correlation between the Gini coefficient and Atkinson index indicates that trend of these two indices have the same direction. These two indices have a direct relationship. If the Gini coefficient has a decreasing trend, then, income distribution will became more equitable, also, Atkinson index will have more equitable distribution.

Table1: Rural Atkinson correlation coefficient or all degrees of sensitivity and the urban Gini coefficient during years of 2000-2009.

correlation coefficient	rural Atkinson with sensitivity of 0.2	rural Atkinson with sensitivity of 0.5	rural Atkinson with sensitivity of 1	rural Atkinson with sensitivity of 1.5	rural Atkinson with sensitivity of 2	Gini coefficient of urban
rural Atkinson with sensitivity of 0.2	1	0.99402	0.83599	0.78795	0.7638	0.55244
rural Atkinson with sensitivity of 0.5	0.99402	1	0.880	0.84255	0.82517	0.67449
rural Atkinson with sensitivity of 1	0.83599	0.88601	1	0.9418	0.92811	0.75676
rural Atkinson with sensitivity of 1.5	0.7879	0.49435	0.35242	1	0.95859	0.70844
rural Atkinson with sensitivity of 2	0.7638	0.8252	0.92811	0.95859	1	0.49007
Gini coefficient of urban	0.5436	0.54845	0.54459	0.55006	0.49007	1

By observation of Table 2 and 3, correlation coefficient between the Gini coefficient and the Engle coefficient and the Theil index is positive. There is a direct relationship between the Gini coefficient with the Engle coefficient and the Theil index. In other words, by increasing the Gini coefficient, Theil and Engle indices will increase.

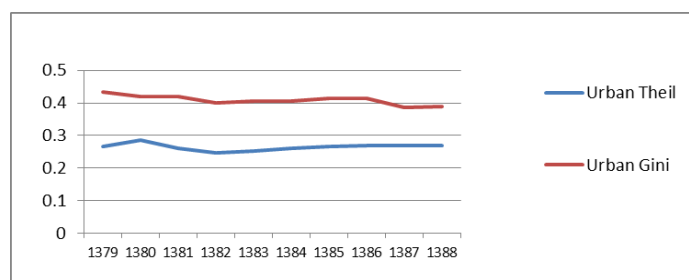
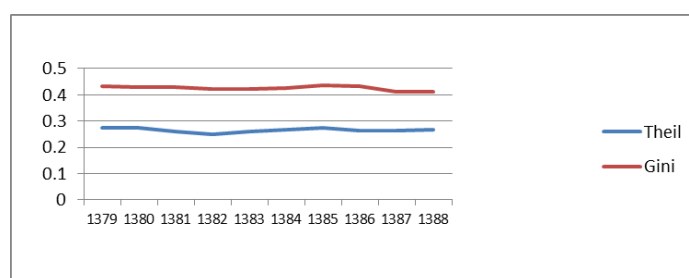
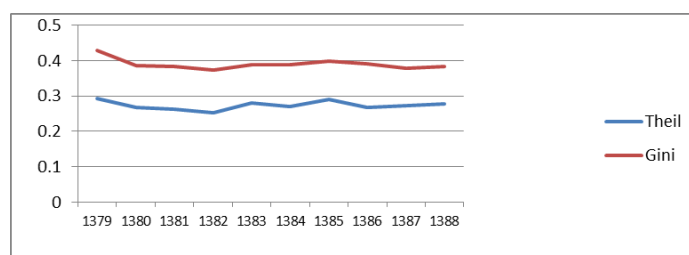
The results obtained from comparison of the Gini coefficient with other inequality indices have been summarized in figures from 5 to 13. During the studied period, the Gini coefficient compare to other inequality indices has more declining trend and more equitable distribution.

**Table 2:** Correlation coefficient of Gini coefficient and Engle coefficient of rural and urban areas and also country during years of 2000-2009.

correlation coefficient	Gini coefficient of rural	Gini coefficient of urban	Gini coefficient of country	Engle coefficient of rural	Engle coefficient of urban	Engle coefficient of country
Gini coefficient of rural	1	0.751412	0.583411	0.652112	0.736989	0.744227
Gini coefficient of urban	0.751412	1	0.892127	0.928698	0.529132	0.547922
Gini coefficient of country	0.583411	0.892127	1	0.783271	0.272357	0.249220
Engle coefficient of rural	0.652112	0.928698	0.783271	1	0.593753	0.626233
Engle coefficient of urban	0.736989	0.529132	0.272357	0.593753	1	0.926889
Engle coefficient of country	0.744227	0.547992	0.24922	0.626233	0.926889	1

**Table 3:** Correlation coefficient of Gini coefficient and Theil index of rural and urban areas and also country during years of 2000-2009.

correlation coefficient	Gini coefficient of rural	Gini coefficient of urban	Gini coefficient of country	Theil index of rural	Theil index of urban	Theil index of country
Gini coefficient of rural	1	0.751412	0.583411	0.762433	0.156586	0.6479833
Gini coefficient of urban	0.751412	1	0.892127	0.301072	0.193812	0.488596
Gini coefficient of country	0.583411	0.892127	1	0.192095	0.083481	0.380929
Theil index of rural	0.762433	0.301072	0.192095	1	0.196986	0.752962
Theil index of urban	0.156586	0.193812	0.083481	0.196986	1	0.702677
Theil index of country	0.647983	0.488596	0.380929	0.752962	0.712677	1

**Fig. 5:** Urban Theil index and urban Gini index during years of 2000-2009.**Fig. 6:** Country Theil index and country Gini index during years of 2000-2009.**Fig. 7:** Rural Theil index and rural Gini index during years of 2000-2009.

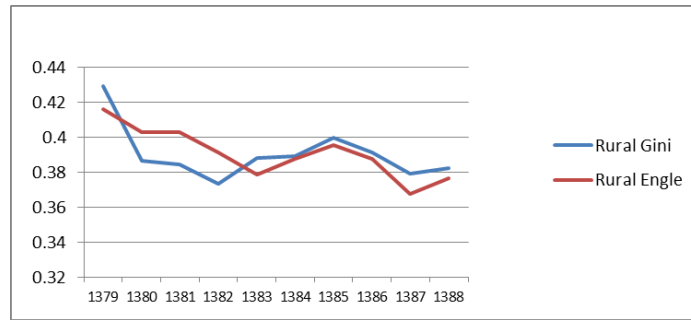


Fig. 8: Rural Engle coefficient and rural Gini index during years of 2000-2009.

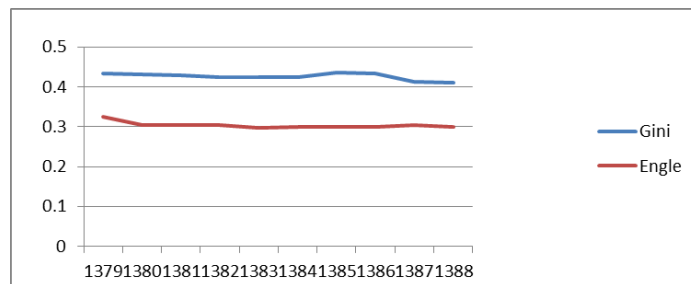


Fig. 9: Country Engle coefficient and country Gini coefficient during years of 2000-2009.

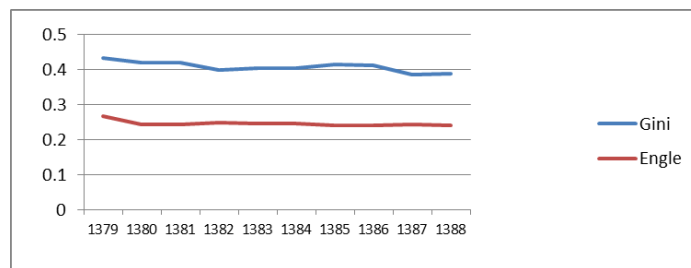


Fig. 10: Urban Engle coefficient and urban Gini coefficient during years of 2000-2009.

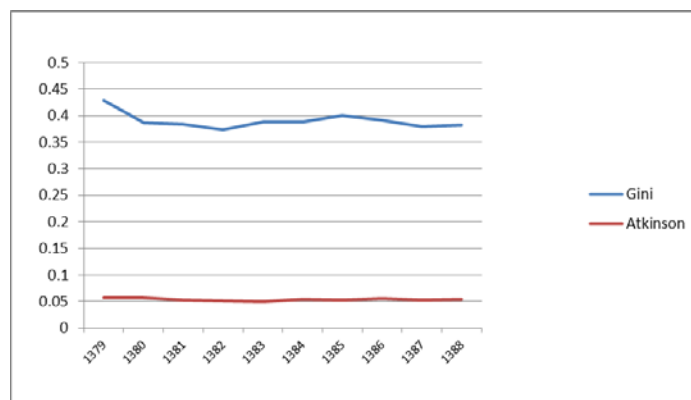
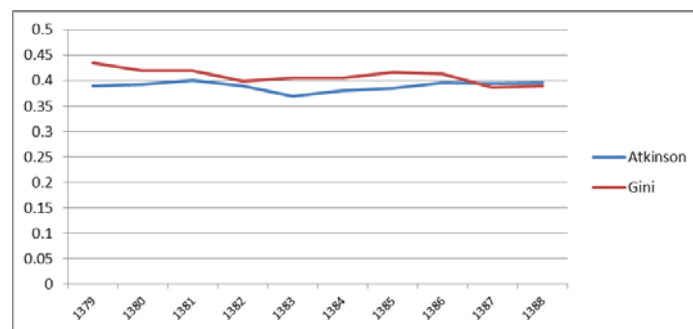
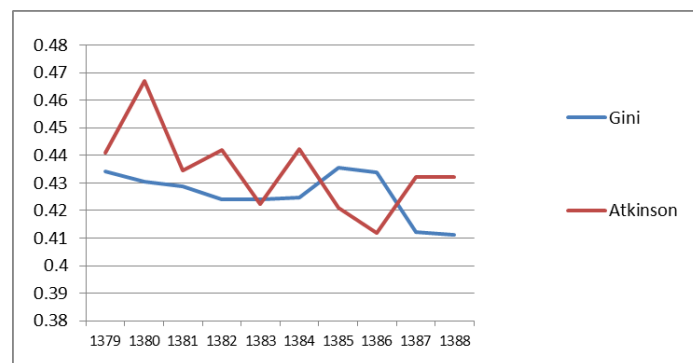


Fig. 11: Rural Atkinson index with sensitivity of 2 and rural Gini coefficient during years of 2000-2009.



**Fig. 12:** Urban Atkinson index with sensitivity of 2 and urban Gini coefficient during years of 2000-2009.



**Fig. 13:** Country Atkinson index with sensitivity of 2 and country Gini coefficient during years of 2000-2009.

#### 6. Conclusion:

Considering trend of inequality indices of income distribution in the third and fourth programs of economic social and cultural development in Iran, most of indices in urban and rural areas had been decreasing during both programs. Therefore, it can be concluded that both programs had a relatively positive impact on trend of income distribution in rural and urban areas of the country. Study of trend of inequality indices for rural and urban areas indicates that difference of social class decreased during the studied period. Basically, one of the basic objectives of studies of poverty and inequality is getting an accurate picture of these two phenomena, and providing policies and strategies by government to tackle them. This article attempt to offer policies that will simultaneously lead to economic growth without having a bad influence on income distribution and poverty. Suggestions of this article are as follows:

1. Policies relating to the regulation of prices and can be used as a means to increase efficiency and decrease income inequality should be used. By raising prices that low-income individuals receive and lowering prices that these individuals pay, intensity of inequality in income distribution can be reduced. Regulation of prices can be applied to market of goods and services and also in market of production factors. In these circumstances, price regulation can be an effective means to increase efficiency and simultaneously, a more equal distribution of income.
2. Policies that aim to increase the productivity of assets belonging to low-income individuals. Three cases should be noted: *A.* Enhancing the quality of assets which are belong to low-income individuals. *B.* Increasing accessibility of low-income individuals to complementary assets which their productivity is related to each other. *C.* Making changes of technology aimed at increasing efficiency such as innovations that they lead to saving in agricultural land, and innovations that increase general productivity of production factors in user activities. Impact of these policies in the distribution of income depends on elasticity of demand for goods that have been produced by low-income individuals.
3. Preventing of capital flight and selection of appropriate strategies for development are a part of most important policies for providing simultaneously economic growth and equal distribution of income and poverty reduction.
4. Lack of social and safety nets lead to that the most damage in the economic policies of governments, both inflation and recession, being concentrated in middle and lower income groups. The solution of conversion of natural capitals to other forms of human capitals are infrastructures, production capacity and environmental capitals. Allocation of foreign currency revenues for investments in education, higher education and researches will enhance production, human capitals, and national productivity.

### REFERENCES

- Alesina, Alberto and Perotti, Roberto, 1996. "Income distribution, political instability & investment", *European Economic Review*, 40(6).
- Alsina & Perotti, 1996. "Reciprocal effects of income distribution".
- Atkinson, A.B., 1970. On the Measurement of Inequality. *Journal of Economic Theory*, 2: 244-263.
- Bandieriae, 2004. Economics reform economicsgrooh and income inequality in America the latin.
- Biancotti, 2006. "Apolarization of inequilty?"
- Carlos, G. and R. Maximo, 2004. "Income distribution and income sorces in URUGUARY" , *journal of applied economics*, LX(1): 49-69.
- Cecilia garer-penalosa, 2009. "Income distribution economic growth and European integration". Springer science.
- Faustino, H., C. Vali, 2011. The effects of globalisation on OECD income inequality: a static and dynamic analysis. DE working papers; n°12/2011/DE.
- SAREL, 1997. Impact of macroeconomic variables on income distribution.
- Sarel, 1997. "Impact of macroeconomic variables on income distribution"
- William, darity,ir, 2005. "Stratification economics: the role of inter group in equality", *journal of economics and finance*, 29(2): 144-153.
- Wisegy, 1980. "Macri economics performance and income distribution in the years following word in American".
- World Bank Group, 1974. The Economic Development of Iran.