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# Does economic growth reduce income inequality in Iran? WALS approach

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## **Abstract**

This paper explores the effect of economic growth on income inequality in Iran using annual data over the period 1976-2010. Weighted-average least square (WALS) approach has employed to analyze the effect of economic growth on income inequality. The results indicate that economic growth in Iran is inclined to more inequality. Thus economic growth policy needs to be revised fundamentally.

## **JEL classifications:**

**Keywords:** Economic growth, Income inequality, Weighted-average least squares (WALS).

## **1. Introduction**

Economic growth showed by growth of GDP is considered as a powerful force to reduce poverty. High and sustained economic growth increases the labor demand and wages which in return will reduce poverty (Tabassum and Majeed, 2008). But the extent of poverty reduction as a result of economic growth related to how the distribution of income changes with economic growth (Kakwani et al., 2004). If income inequality increases, then economic growth does not lead to a significant poverty reduction. This economic growth is named “trickle-down” growth in economic literature. It implies that the benefits of economic growth go to the rich first, and then

in the second round the poor begin to benefit when the rich start spending their gains (Kakwani and Pernia, 2000). Thus the proportional benefits of growth going to the poor will always be less and distribution of income will be worse. Considering poverty reduction as the principal goal of development, governments have focus on “pro-poor” growth policy on their economic programs. Kakwani and Pernia (2000) defined pro-poor growth as one that enables the poor to actively participate in and significantly benefit from economic activity. In other words, pro-poor growth reduces poverty in conjunction with inequality reduction.

Empirical evidence about the influence of economic growth on income distribution has revealed both positive (e.g. Lopez, 2006; Liang, 2006) and negative (e.g. Birdsall and et al., 1995; Jäntti and Jenkins, 2001) relationship between inequality and economic growth and there is no consensus about the relationship. Overall, it can be said that the effect of economic growth on income distribution and extension of poverty reduction is a complex one, and is also determined by economic structure of the studied country.

This paper investigates the question whether economic growth reduces income inequality or worsens the distribution of income. Approaching the question, Weighted-average least square (WALS) is employed to analyze the effect of economic growth on income inequality in Iran during 1976-2010. Section 2 discusses the reason for applying WALS approach. We also present the data and empirical results of the paper in section 2, and section 3 concludes.

## 2. Methodology and Empirical Results

In this section we use Weighted-average least squares (WALS) to study the effect of economic growth on income inequality in Iran. Gini coefficient and real GDP growth are used in the model as measures of income inequality and economic growth respectively. To overcome the problem of omitted variable bias, many potential explanatory variables are regarded in the model. All the variables based on growth rate and ratio, though are stationary. The data are annual from 1976-2010, obtained from Central Bank of Iran (CBI).

### 2.1. The WALS Analysis

One of the most important privileges about WALS analyzing is the high level of trust in coefficients estimated in explanatory variables. Because these coefficients are not estimated based on just one model. They are derived from averaging model of estimated coefficients in every single variable with many recapitulations (here  $2^{14}=16384$ ) or effective samplings. Thus we discuss more confidently about the effect of each explanatory variable (here such as economic growth) with using WALS approach. The coefficient for each of WALS estimates is calculated in this way:

$$\hat{\beta}_1 = \sum_{i=1}^I \lambda_i \hat{\beta}_{1i}$$

$\lambda_i$  is the possibility of "i" numbers of model and  $\hat{\beta}_{1i}$  is an estimation of  $\beta_1$  which is gained in case of  $M_i$  model being. Table (1) shows standard error and t-ratio for each of the WALS estimates which shed some light on the relative importance of each regressor. Now we are going to analyze regarding the results of table (1):

**Table (1):** The results of WALS estimation

Variable	Coefficient	Standard error	t-ratio
Constant	0.2940	0.0857	3.43
GDP growth rate	0.1092	0.0459	2.38
The square of GDP growth rate	-0.1031	0.3466	-0.30
Ratio of oil revenue to GDP	0.1526	0.1261	1.21
Inflation rate	0.0248	0.0257	0.96
Unemployment rate	0.0036	0.0017	2.12
Literacy rate	0.0197	0.0599	0.33
Raito of high school students to population	-0.1615	0.4318	-0.37
Ratio of government current expenditure to GDP	0.1805	0.1204	1.50
Ratio of health expenditure to GDP	-1.7061	1.0486	-1.63
M2 (broad money) to GDP ratio	0.0170	0.0523	0.32
Ratio of total tax to GDP	-0.1974	0.2215	-0.89
Growth of exchange rate	0.0174	0.0142	1.23
The share of exports plus imports to GDP	0.0481	0.0316	1.52
Dummy variable	0.0095	0.0103	0.92

Note: Dummy variable is used in the model in order to consider the effect of war (1980-1988) on income distribution. This dummy variable adopts one for war years and zero for other years.

Statistical significance of a regressor is evaluated by t-ratio of respective coefficient. In the papers where WALS approach is used, the criteria of significance of explanatory variables is usually considered  $t \geq 2$  when the number of observations is too high. For instance in the studies with panel data the aforementioned criteria ( $t \geq 2$ ) is considered. But in the studies with time series data, as this study, with a few number of observations, the criteria  $t \geq 1$  is used. In this circumstance we can be less strict about statistical significance. Thus regarding  $t \geq 1$  for robustness of a regressor, the results of the table (1) may be explained as follows:

We see that GDP growth rate is by far the most robust auxiliary regressor with  $t = 2.38$ . It has a positive impact on Gini coefficient which indicates economic growth worsens the distribution of income and causes more inequality. The coefficient of this variable has been obtained 0.11 which indicates that averagely for each percent increase in the economic growth, the Gini coefficient will be increased % 0.11. Therefore, the nature of economic growth in Iran is inclined to more inequality. As a matter of fact, economic growth of Iran is generally in conjunction with oil revenue increase or price reform and liberalization policies which worsen the distribution of income.

As we see in Table (1) there are also other explanatory variables effecting the Gini coefficient as a measure of income inequality. The coefficient of unemployment rate is statistically significant and the significance is fairly robust. It is positive which indicates unemployment causes more inequality. According to Gustafsson and Johansson (1999), unemployment has inequality increasing effects, because high unemployment worsens the situation of those at the bottom of income distribution.

The share of exports plus imports to GDP used as a volume of trade measurement, has a significant positive effect on income inequality. Thus liberalization policy and an increase in the volume of economy openness are less beneficial to lower income group and they access less to their benefit. Moreover an increase in the volume of economy openness indicates an increase in foreign exchange revenue and more rent-seeking opportunities which has a negative effect on inequality.

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The ratio of government current expenditure to GDP is found to have significant positive effect on Gini coefficient which means an increase in this ratio results in higher degree of inequality. This is probably due to more extensive use of government services by higher income groups of people whereas lower income groups have less chance of using government service. In fact, welfare policies and social spending of government for supporting vulnerable groups has not been efficient. This conclusion pertains to all expenditures of government in all sectors. As argued by Cornia and Kiiski (2001), the influence of the government expenditure depends on its composition. Therefore, it is possible that the government expenditure deteriorates the distribution of income in some sectors but in others ameliorates the distribution of income. As we see in table (1) the effect of government expenditure in health sector is positive and significant.

The coefficient of exchange rate growth is positive and significant. The rise of exchange rate will entail a rise in price of intermediate and capital goods needing to domestic industries which inclines to increase in production costs and inflation. Besides it causes a rise in price of imported consumption goods and reduction in purchasing power of households. It seems lower-income groups and fixed salary receivers are more vulnerable to exchange rate fluctuations and price rising. Because the adjusting of their incomes lags behind price rising for long. Moreover this adjusting does not fulfill completely.

The ratio of oil revenue to GDP has a positive impact on Gini coefficient. Considering economic condition of Iran, oil revenue has an impact on GDP, economic structure and providing the state budget. This result is corresponding with rentier state theory<sup>1</sup> in Iran economy. So that interest groups try to possess greater share of oil rents by penetrating into budgeting and financial resource allocation. Accordingly, it seems oil revenue increase has expanded higher opportunities of rent-seeking and corruption in Iran economy. Besides competitive ability of national products has decreased with increase in availability of foreign exchange resources and more imports of consumption goods and ground is prepared for non-productive and speculative activities and income gap increasing.

According to table (1), Inflation rate and dummy variable are found insignificant based on considered criteria for robustness. But these variables are close to be significant and have a positive effect on income inequality as we expected.

The estimation suggests that the square of GDP growth rate has no significant effect on Gini coefficient which means there is no quadratic relationship with GDP growth rate and income distribution. Also other variables including ratio of total tax to GDP, literacy rate, ratio of high school students to population (as an indicator of human capital) and  $M_2$  to GDP ratio (as an indicator of financial development) have no strong relationship with income inequality.

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<sup>1</sup> In political science and international relations theory, a rentier state is a state which derives all or a substantial portion of its national revenues from the rent of indigenous resources to external clients. This theory was first postulated Mahdavy in 1970.

### 3. Conclusion

Economic growth showed by growth of GDP is considered as a powerful force to reduce poverty. The extent of poverty reduction as a result of economic growth is related to how the distribution of income changes with economic growth. If income inequality decreases, then economic growth does not lead to a significant poverty reduction. But if not, reduction of poverty is conducted with a higher pace. Having consideration about the important role of economic growth on income inequality and poverty reduction, this paper investigates the question whether economic growth reduces income inequality or worsens the distribution of income. Approaching the question, Weighted-average least square (WALS) is employed to analyze the effect of economic growth on income inequality in Iran over period 1976-2010. The results indicate that economic growth in Iran is inclined to more inequality. As a matter of fact, economic growth of Iran is generally in conjunction with oil revenue increase or price reform and liberalization policies which worsen the distribution of income. According to the aforementioned results, it is necessary to revise economic growth policies on benefit of low-income groups of people. In addition, renovation of budgeting process and allocation of resources with aim to reduce rent-seeking opportunities and more privileges of low-income groups must be considered by policy makers.

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