THE EFFECTS OF GOVERNMENT SIZE ON INEQUALITY IN IRAN

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ABSTRACT
Inequality is the most important issue in economics that always has been considered by governments and policy makers. The main objective of this study is to examine the effects of government size on inequality such as income distribution and Gini coefficient. In this paper we have applied the total government expenditure - GDP ratio as a basic indicator of government size and also, Gini coefficient to assess the effects of government size on inequality. The methodology is based on vector auto regression (VAR) model. The results have shown that if government size, economic growth and inflation rate increase, the income distribution would be worsen in this period. So, the government should transfer to private sectors and reduce its economic activity and pay attention more to governance and regulatory obligations.

Keywords: *Inequality, Gini Coefficient, Government Size, Vector Auto Regression model.*

1. INTRODUCTION
Gross Domestic Product is one of the most important economic indicators in macro level. This variable depends on several factors, such as: Oil shocks, Outbreak of war and also monetary and foreign exchange shocks. In oil-exporting countries, such as Iran, oil revenues can affect GDP growth rate considerably, so oil shock can be one of the most important reasons of creating GDP fluctuations and also changing the growth rate of economics [11]. Since 1971 Iran's economy has been faced with rising oil revenues that its result was a notable presence of government to achieve stable growth and sustainable development in the economy. But later the subjects of economic adjustment, Government downsizing and privatization of public companies have been placed at the top of government programs. Besides improving income distribution can contribute to the economic and political stability in each country and it is one of the goals of economic policymakers. Although inequality may not be a big issue in short run, it may increase the poverty in long run. Changes in the distribution of income may be create indirectly with reform of the land tenure systems and applying employment policies or price policies by government in long run or it may be done through government expenditure and taxation. On the other hand, increasing taxes and government borrowing for financing its expenditure cause to decrease its finance recourses and also decrease incentives of private sector for investments and grow government size more than ever.

2. LITERATURE REVIEW
Iran's governmental budget depends on oil and oil revenues so that it can effect on economic growth. In Iran, several studies have done by researchers that shown the oil revenues affect on economic growth. Komayjani and Mehmandoost [7] observed the dynamic effect of oil shocks and monetary policy on Iran economic growth and calculating the share of each one in economic growth from 1974 to 2006 in an article titled and analyzed an assessment of shock effect and monetary policy on Iran economic growth and dynamic interaction effects due to made shocks in pattern with use of (VAR) model includes: Variance decomposition of the forecasting error (EFVDs) and Impulse response functions (IRFs). The gained results through this research shows: oil shocks in Iran were effective considerably on economic growth, but in spite of effectiveness of oil shocks on liquidity and creating gained expansionary monetary policy, monetary shocks couldn't affect economic growth. Another study in Iran [11] shows that oil shocks are the most important reasons of real GDP volatilities and changes in economic growth. Dollar and Kraay studied the effect of trade, inflation, government consumption and financial development on the income of bottom 20% population [5]. They find that trade openness improves the income of the poor, but inflation, government consumption and financial development worsen income inequality. Barro [2] and Li and Zou [8] investigated the relationship between financial development and income inequality with the battery of other variables. They found that financial development, trade and government spending on education and health care improve income distribution while inflation produces the opposite effect. Kappel noted that financial development narrows income inequality through enhanced loan markets and stock market development [6]. The study by Clarke et al, suggest that, in the long run, inequality is less when financial development is greater, their results also suggest that in addition to improving growth, financial development also reduces inequality [4].

2.1. Gini Coefficient and Economic Growth in Iran

By national account and Gini coefficient we can academically consider the status of inequality and economic growth rate in Iran.
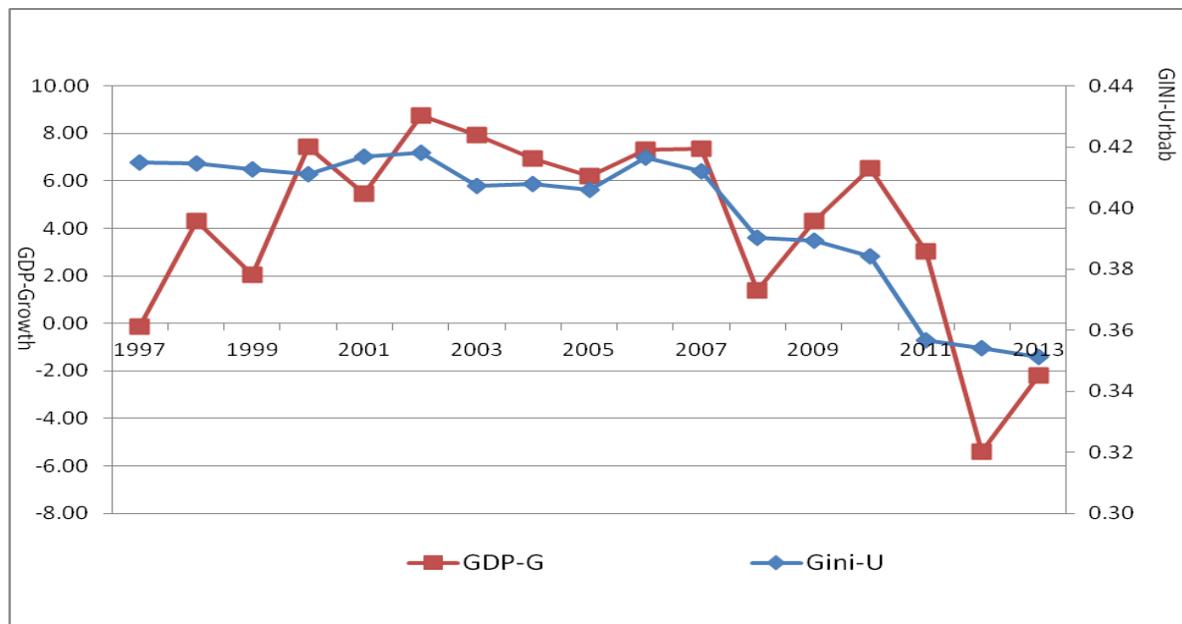

Figure 1: Gini Coefficient and Economic Growth Rate in Iran
Source: Statistical Center of Iran, Authors' Processing.

Figure 1 illustrates the status of GDP Growth Rate in Iran during 1997-2013. A study of GDP growth rate shows that the highest rate happened in 2002. Meanwhile, this figure shows that Gini coefficient has decreased from 1997 to 2013 in Iran.

3.   DATA AND RESEARCH METHOD
This section deals with the Procedure, Data Definition of Variables and Methodology. In order to evalute the effect of government size on inequality we have applied data and information from the statistical center of Iran [12] and Economic Reports of Central Bank of Iran [3]. The data from 1979 to 2009 has been applied.

3.1. The Variables of Model
The paper has included the variables such as total public expenditure, consumer expenditure in public sector, public budget, tax revenues and budget deficit. According to our goal to investigate the relationship between government size and income distribution, absolute values of government size are not be able to measure them. Because absolute values (such as public expenditure, public investment, public budget, etc) are related to the data items from government and these items may vary over time due to a condition. The real indicators contain relative values for measuring economic activities of government [10]. And it has also included the relative variables. Relative values are more important than absolute values, because the relative values provide useful information rather than absolute values. And also relative values have comparison possibility versus absolute values. Thus the relative values are studied with respect to other aspects of economic activity. According to discussion about indictors in this paper, the relative indictors of government size are continued to explain more about the factors that are discussed in greater generality. The relative values are as follows: a) Public expenditure to GDP ratio;   b) Public investment to GDP ratio; c) Public budget to GDP ratio; d) Budget deficit to GDP ratio; e) Public employment to full employment ratio. By using these variables it would be possible to examine the number of workers and can discuss about government size in terms of labor employment in the public sector [1]. Finally, for this purpose the following variables has been calculated and applied.
- Gini Coefficient
- Government Size (GS): It is equal to the Government (public) expenditure to GDP ratio.

- Inflation rate$\left(\dot{P}\right)$: It is equal to the growth rate of the price index of goods and services.

- Economic growth$\left(G\dot{D}P\right)$: It is equal to growth rate of real GDP.

Statistics for these variables are collected from Central Bank of Iran and Statistical Center of Iran. The data for model have been used between 1979 to 2009 years after the Islamic Revolution in Iran.

3.2. Econometric Model
In the vector auto regression model, Correction of the structural models in short term is not required from the model variables. Especially when the complete and accurate information of model is not available, the vector auto regression model is inevitable. Based on general VAR model can be formed as follows;
The vector y contains the following four variables that have been included in the model:

$$y = (Gini, GS, \dot{P}, G\dot{D}P)$$

We will now write the vector y in VAR models:

$$y = \varphi_0 + \sum_{i=1}^{4} \varphi_i\, y_{t-1} + \varepsilon_t$$

$$\begin{bmatrix} \varphi_{01} \\ \varphi_{02} \\ \varphi_{03} \\ \varphi_{04} \end{bmatrix} + \begin{bmatrix} \varphi_{11} \cdots \cdots \varphi_{14} \\ \cdots \cdots \\ \cdots \cdots \\ \cdots \cdots \quad \cdots \cdots \\ \varphi_{41} \cdots \cdots \varphi_{44} \end{bmatrix} \begin{bmatrix} Gini_{t-1} \\ GS_{t-1} \\ \dot{P}_{t-1} \\ G\dot{D}P_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \end{bmatrix} \begin{bmatrix} Gini \\ GS \\ \dot{P} \\ G\dot{D}P \end{bmatrix}$$

4. EMPIRICAL RESULTS
Before estimating the vector auto regression model, it is necessary to evaluate stationary of all the variables used in the study and the number of optimal lags determine with valid criteria. Based on auto regression model, first we need to identify stationary or non stationary of variables and one of the most common tests for estimating stationary or non stationary of variables is Adjustment Dickey-Fuller test [9].

Critical value			ADFO test	Variable
10 Percent	5 Percent	1 Percent		
-2.63	-2.99	-3.73	-2.49	Gini
-2.62	-2.96	-3.67	-3.25	GS
-2.62	-2.96	-3.67	-3.05	$\dot{P}$
-2.62	-2.98	-3.71	-2.12	$G\dot{D}P$

Table 1: The results of stationary of variables by Adjustment Dickey-Fuller test

Critical value			ADFO test	Variable
10 Percent	5 Percent	1 Percent		
-2.62	-2.98	-3.71	-6.11	Gini
-2.62	-2.96	-3.67	-6.02	GS
-2.62	-2.97	-3.68	-5.39	$\dot{P}$
-2.62	-2.98	-3.71	-5.65	$G\dot{D}P$

Table 2: The results of first order differential by Adjustment Dickey-Fuller test

Based on the results of tables 1 and 2 there is a time difference of the above variables with a high degree of confidence for stationary. In order to determine the optimal lags, various criteria are used such as Schwartz Criterion (SC), Akaike Information Criterion (AIC) and Hannan-Quinn information Criterion (HQC) have done. According to the result and their criteria, it has an optimal number of lags (K=1).

(HQ)	(SC)	(ALC)	Lag
11.20	11.33	11.14	0
10.08[5]	10.73[5]	9.79[5]	1
10.30	11.46	9.77	2

Table 3: Determine the number of optimal lags for VAR model

4.1. Estimation of VAR Models
The developed VAR models are estimated after surveying stationary and their optimal lags by Eviews software and the results of the VAR models is measured in Table 4.

	Gini	GS	GḊP	Ṗ
Gini(-1)	0.85	-13.6	-106.03	-30.71
	(0.09)	(10.02)	(47.7)	(70.47)
GS(-1)	0.0001	0.426	0.418	-1.95
	(0.001)	(0.18)	(0.86)	(1.28)
GḊP(-1)	0.0005	-0.021	0.244	-0.43
	(0.0004)	(0.04)	(0.204)	(0.30)
Ṗ(-1)	-0.0002	-0.039	0.141	0.29
	(0.0002)	(0.028)	(0.136)	(0.28)
C	0.064	10.3	44.11	40.85
	(0.04)	(4.8)	(23.17)	(34.23)
R-squared	0.83	0.39	0.42	0.36

Table 4: The results of VAR model estimation

4.2. Estimated long-run relationship between the variables
In order to examine the long-term equilibrium relationship or relationships between economic variables are used to form a time series of Johansen co-integration model. In this method, the estimated coefficients of the long-term equilibrium relationship between the variables can be calculated with coefficients of auto regression model and Johansson co-integration test. According to Johansson co-integration test, we usually use Trace test and Maximal Eigen Value test for that. Statistics of Trace test and Maximal Eigen Value test based on each of the five models are determined as follows:
A) Without intercept and trend
B) With limited intercept and without trend
C) With unlimited intercept and without trend
D) With unlimited intercept and limited trend
E) With unlimited intercept and trend
Based on one lag for the first pattern, one co-integration vector is confirmed by Trace test not Maximal Eigen Value test. In the second pattern, two co-integration vectors are confirmed by Trace test and one vector by Maximal Eigen Value test. But in the third pattern, four co-integration vectors are confirmed by Trace test and one vector by Maximal Eigen Value test. In the fourth pattern, there are two co-integration vectors by both of tests and finally in the fifth pattern, there are four vectors by Trace test and two vectors by Maximal Eigen Value test.

	H₀	H₁	Pattern I	Pattern II	Pattern III	Pattern IV	Pattern V
	r=0	r≥ 1	43.81	71.63	66.91	84.25	81.10
	r≤ 1	r ≥ 2	21.13	37.50	32.79	48.46	46.15
Trace	r≤ 2	r ≤ 3	8.97	18.42	17.42	20.34	19.86
	r≤ 3	r ≥ 4	2.69	6.27	5.27	8.14	7.76
	r=0	r=1	22.68	34.13	34.12	35.79	34.94
Max-	r≤ 1	r = 2	12.15	19.07	15.36	28.12	26.28
Eigen	r≤ 2	r = 3	6.28	12.15	12.14	12.19	12.10
	r≤ 3	r = 4	2.68	6.27	5.27	8.14	7.76

Table 5: Trace test and Max-Eigen test for determination co-integration vectors

Based on Trace test and Maximal Eigen Value test, the existence of a vector for the model is verified. Normalized vector which reflects the equilibrium relationships between the variables are shown in the table;

C	$\dot{GDP}$	$\dot{P}$	GS	Gini	Variable
-1.009	-0.013	-0.009	-0.056	-1	Normalized vector

Table 6: The results of Johansen co-integration test

Thus, the equilibrium relationship between income distribution, government size, inflation rate and economic growth can be achieved during Islamic Revolution years, as follows:

$$\text{Gini} = 1.009 - 0.056 \; \text{GS} - 0.009 \dot{P} - 0.013 \dot{GDP}$$

$$t \text{ -Value}: \quad (5.8) \quad (-12.32) \quad (6.6) \quad (7.2)$$

The above equation shows that, all coefficients of the variables are statistically significant at the 5% level of confidence and the equilibrium relationship between the variables is confirmed. Long-run equilibrium relationship between the variables in the above equation indicates a negative relationship between government size, economic growth and inflation rate with Gini during 1979 to 2012 in Iran.

5.   CONCLUSIONS AND RECOMMENDATIONS
Inequality is the most important issue in economics that always has been considered by governments and policy makers. The government size is one of the most important economic issues, especially when we want to determine its effect on income distribution and Gini coefficient as well. Thus, the relationships between these variables including income distribution, government size, inflation rate and economic growth were examined by auto regression model and some data in this study. Based on the long term study, government size has more negative effects on income distribution. The most important result of this study is that in the short term, the effect of government size on income distribution is positive, but the long-term effect on distribution of income is negative. The study suggest that, According to Implementation of General Policies of Article 44 of Iran's Constitution, there are some necessary strategies to achieve optimal size of government in Iran such as; determining limits and extent of government intervention in the economy, creating transparency of government policies for private sector, adopting Antitrust policies, creating a supportive environment for private sector, replacing financial discipline instead of financial expansion or contraction and extending foreign investment, etc.

6. REFERENCES

[1] I. Abounori, The effect of macroeconomic variables on income distribution, Economic Research, No. 51, (1997)**,** pp. 150-117.

[2] R. Barro, Inequality and Growth in a Panel of Countries, Journal of Economic Growth, 5, (2000), pp: 5-32

[3] Center Bank of Iran, Economic Accounts reports, Various Years and (2013)

[4] G. Clarke, L.C. Xu, and H. Zou, Finance and Income Inequality: What Do the Data Tell Us? , Southern Economic Journal, 72, (2007), pp. 578-596.

[5] D. Dollar and A. Kraay, Growth is Good for the Poor, Journal of Economic Growth, 7, (2003), pp. 195-225.

[6] V. Kappel, *The Effects of Financial Development on Income Inequality and poverty*",Working Paper 10/127, CER-ETH – Center of Economic Research at ETH Zurich,(2010).

[7] A.Komaijani and, A Mehmandoost, Assessment of the impact of oil shocks and monetary policy on economic growth, Journal of Economic Studies, Issue 92, (2010).

[8] H. Li, and H, Zou , Inflation, Growth, and Income Distribution: A Cross-Country Study, Journal of Economics and Finance, 3, (2002), pp: 85-101.

[9] M. Nouferety, Unit roots and cointegration in Econometrics, Publishing expressive, Tehran, (1999).

[10] J. Purmoghim, Public Economic, Ney Publication Tehran, (1991).

[11] S. Taati ,N. Hakimipour, M. S. Alipour, R. Saberi, A. Faramarzi, Analysis of Conditional Asymmetric Volatility of Real GDP and Main Economic Sectors Growth Rates in Iran ,International Journal of Research and Reviews in Applied Sciences, (2015).
     http://www.arpapress.com/Volumes/Vol23Issue1/IJRRAS_23_1_01.pdf

[12] Statistical Center of Iran, Statistical Yearbook, Various Years and (2013