An analysis of the effects of taxes and GDP on employment in Iran's economy

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Abstract

Taxes are one of the sources of government revenue. With the increase of economical science and the involvement of government in different economic fields, obtaining a realistic and fair tax can solve many important social and economic issues of governments such as deficit, the unemployment sensations, and lessened urge of investment in production units. Tax and GDP are parts of macroeconomics variables which have noticeable impact on labor market. With regards to the important effect of economic policies on real economic variables such as employment, analyzing the relationship between tax and GDP and employment and the effects they have on employment seems to be a necessary step to take. This study analyses the effects of tax and GPD on employment in Iran during the years 1976-2007 based on the autoregressive distribution model (ARDL). The results obtained from the estimation of long-term and short-term pattern reveal that tax has a negative and significant effect on employment and GDP has a positive and significant effect on employment.

Keywords: tax, GDP, employment, ARDL, Iran

Introduction

From the practical point of personality, employment can be seen as the origin of identity and the means of human happiness. In economic studies, the analysis of the effects of economic policies including macroeconomic variables such as tax, commerce, GDP, and currency on labor market is of great importance (Nazari and Goharian, 2001).

Tax and labor supply are two of the most important economic issues in the public sector. Also, the governments' financial activities are being studied from politi-cal, social and economic aspects. The economic evaluation of the governments' financial activities in the fields of tax and spending, grants this opportunity to determine the results of these activities in various economic sectors (Sharifi, 2011). Tax is known to be an efficient means of implementing economic policies, including those distributive and financial, and even of directing the economy towards the macroeconomic objectives such as economic stabilization, employment, economic growth, and social welfare (Mojtahed and Ahmadian, 2007). Taxes are effective on both free labor and labor supply (Naderan and Seddighi, 2008). During the twentieth century, the level of taxation in developing countries significantly increased. Taxes have increased from 5-10 percent of GDP at the beginning of the last century to 20-30 percent of GDP in the present (Folster and Henrekson, 2000). Therefore taking the effects of tax on employment into consideration is very important. Taxes, due to the effect they have on return on investment in physical and human capital, can be effective on economic decisions and eventually, on growth and employment (Jafari and Hasanzadeh, 2001). Expansionary fiscal policy of tax cuts, causes an increase in market demand and prices, thus an increase in wages and employment (Azimi, 2000). Gross Domestic product (GDP) is of economic variables effective on employment, as with its increase, one can expect an increase in employment of work force. In this regard, this article is an attempt to examine the effects of tax, GDP and currency rate on employment in Iran's economy.

Literature review

Taxes are one of the sources of government revenue and of the most important theoretical foundations of the economy. Also, tax policy is one of the most effective policies regarding the public sector (Keane, 2011). With development of economic science and the in-

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volvement of government in various economic sectors, new functions are intended to taxes (Meghir and Phillips, 2012). Obtaining fair and realistic taxes can help government solve many social and economic issues such as deficit, the phenomenon of unemployment, reduction of investment in the manufacturing sector (Rangriz and Khorshidi, 2011). Tax can be referred to as an economic infrastructure which provides sustainable development, social justice through redistribution of income and wealth and resource allocation (Eissa and Liebman, 1996). According to the concept of IMF in government financial statistics manual, tax is an obligatory, non-compensatory, non-refundable fund which is obtained by a government for general purposes (Zanjani and Dehghani, 2010). Tax is an economic category which has been developed over a long period of time. In the course of this development and evolution, circulation of money in the economy, production, employment, division of labor and transfers of products to other markets has had an important role. In fact, tax system is influenced by political systems, economic comments, financial requirements, and management practices. The experimental results from most developed countries show that tax revenues are of the most important sources of income and tax plays an important role in implementation of economic policies. Nevertheless, developing countries practice an inefficient tax system, using which the governments cannot meet their financial and tax purposes. Therefore, these countries are in need of a new and stable tax system which can play its role in economy to the fullest. In the early twentieth century, after the economic transformation of capitalism to guided economy and with wider involvement of the governmental sector, and with the increase of government spending, sources of government revenue and their volume increased. Various industries replaced arable lands and estate which were government property so that sources of income could be supplied. With the expansion of governments' expenditures and administration tasks, taxes increased also. So, today a considerable amount of national income of a country comes from the taxes obtained by the government in order to finance its expenditures (Rangriz and Khorshiri, 2011). It is commonly seen that, in order to encourage taxpayers to pay their taxes or to pay their taxes on time, some tax liability payment projects are introduced, or when planning the taxes, some amounts are ordered per good produced for the cost of projects. In consequence, the implementation of these decisions consists of two components: the first component is obtaining taxes from one sector and the second component is paying for the cost of projects in the same sector or other economic sectors. Both of these are fathering for other elements effective on the economy (Sharifi, 2011). Notice that improving the level of employment can only be achieved through accurate economic management and obeying the operating principles of economics. Also, in this process the role of government shall be highlighted. The most important task of government is to set proper policies and to make an effort to keep the economy in balance. Without a doubt, an important means of government is to take proper use of financial policies in which the role of taxes is highlighted (Kleven and Kreiner, 2004). Taxes, not only as a source of income for public expenditure, but also due to their interchangeable role in changing the investment and production directions, are effective on the changes applied to the level of employment. It is clear those human resources especially employment and labor market are influenced by government economic policies (monetary and fiscal) and Iran is no exception in this case. So the government's role in the labor market using the tax policy, expenditures and resources, is essential and significant (Blundell, 1995). Fiscal policy instruments include income tax, taxes on wages, payments on goods and services, wages and salaries, subsides, interest, transfers, capital expenditure, loan and loan repayments (Eissa et.al, 2004). Using the mentioned instruments, the government affects the level of employment, inflation, production, current account, balance of payments, the composition of aggregate demand, savings and investments, and as a result resource allocation. Tax leads to realization of income and substitution effects. Income effect acts due to the increase in marginal utility of income with the reduction of the real income of the taxpayer, and causes an increase in jobs. The substitution effect, because of the changes it makes in the final value of leisure and rest, acts in accordance with the rewards. The income effect is subject to the changes in total revenue and the substitution effect is subject to changes in final income. Taxation affects both total revenue and final income. Therefore, the net effect of tax on jobs can be both negative and positive and it is not predictable and depends on the intensity of income and substitution effects (Pazhuyan, 2001). Therefore, tax system can increase, or decrease the level of employment.

Thompson and Rohlin (2012) studied the effects of sales tax on employment using the panel data method during the years 2004-2009 in 16 states of the US and they have shown that the effect of tax on employment has been negative.

In a research, Bahaghel *et al.* (2012) studied the effect of tax breaks on employment and urban development during the years 1995-2009 using the 2SLS method. The results obtained from this research show that there is no meaningful relationship between tax breaks and employment and urban development in France.

Lora and Fajardo (2012) analyzed the relationship between taxes and employment using the panel data model in 15 states of the US during the years 1990-2009. The results show that payroll tax has a negative effect on employment in studied states.

Forchtgott and Furchtgott (2011) studied the effects of sales tax in medical industry on employment in the US during the years 2009-2010. The results reveal that sales tax increase can reduce employment in this industry.

Alonso and Rogerson (2010) analyzed the effect of taxes on employment in incomplete markets model. The results obtained from this analysis shows that tax and transfer policies can have great impacts on average labor productivity through employment.

Lorenceau (2010) has studied the effect of tax breaks on employment in France. The results have shown that there is no relationship between tax breaks and employment.

Seward (2008) studies the effect of taxes on employment and economic growth in developed countries during years 1965-1995 using the panel data model. The results show that 10 percent increase in income tax causes 5.3 percent increase in unemployment and 2.1 percent reduction in growth.

Tine and Freddy (2005) analyzed the effect of variables such as tax and government expenditures on GDP, growth and employment and showed that by raising taxes, employment falls and government expenditures increase employment.

Materials and methods

In this study, the effect of tax and GDP on employment in Iran's economy during the years 1976-2007 is analyzed using Microfit software and the data were gathered from resources and reports of central bank.

Autoregressive distribution lags modeling (ARDL)
The method used in the present study is ARDL which is presented by Pesaran and Pesaran and Shin:

$$\alpha\left(L,P\right)y_t = \alpha_0 \sum_{i=0}^{k}\beta_i\left(L,q_i\right)x_{it} + u_t \quad i=1,2,\ldots,k \quad (1)$$

In which L is interruption, is intercept, is dependent variable, and for L we can write:

$$L^j y_t = y_{t-j} \tag{2}$$

So:

$$\alpha\left(L,P\right) = 1 - \alpha_1 L^1 - \ldots - \alpha_p L^p \tag{3}$$

$$\beta_i\left(L,q_i\right) = \beta_{i0} + \beta_{i1}L + \beta_{i2}L^2 + \ldots + \beta_{iqi}L_i^q$$

In order to use the model approach of ARDL, Microfit estimates the formulas above for all possible compounds. The method of formula selection is determined by Hannan-Quinn (HQ), Schwartz Bayesian (SBC), Akaike Information criterion (AIC). The long-term coefficients of explanatory variables are estimated by:

$$\hat{\theta}_i = \frac{\hat{\beta}_{i0} + \hat{\beta}_{i2} + \ldots + \hat{\beta}_{iq}}{1 - \hat{\alpha}_1 - \hat{\alpha}_2 - \ldots - \hat{\alpha}_p} \tag{4}$$

If the sum of the coefficient of the variables with the intruption related to the variable is smaller than one, the dynamic model will be oriented towards the long-term equillbrium pattern. So for the co-integration, the following hypothesis testing must be done:

$$\begin{aligned} H_0 &: \sum \alpha_i - 1 < 0 \\ H_1 &: \sum \alpha_i - 1 < 0 \end{aligned} \tag{5}$$

For the hypothesis testing, the following statistics are measured:

$$t = \frac{\sum \tilde{\alpha}_i - 1}{\sum \sigma_{\tilde{\alpha}_i}} \tag{6}$$

If the absolute vaue of t is greater than the absolute critical presented by Banerjee, Dolado and Master, the null hypothesis is rejected and the existance of a long-term relationship is accepted.

Error correction model
If x and y are co-integrated, they are in balance. There may be some imbalance in short-term. In this case, the following sentence can be considered as Equilibrium error:

$$y_t = \beta x_t + u_t \tag{7}$$

Now this error can be used to relate the short-term behaviour of y to the long-term equilibrium. For this porpuse, a model can be designed as:

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta x_t + \alpha_2 \tilde{u}_{t-1} + \varepsilon_t \tag{8}$$

In this formula, is the roor estimation for the previous regression with a lag time (Shahverdi, 1386). The introduced model in this study is inspired by Lora and Fajado (2012) and is:

$$LEMP = \beta_0 + \beta_1 LT + \beta_2 LGDP + \beta_3 LE + \beta_4 LW \tag{9}$$

LEMP: logarithm of total employment in Iran's economy

LT: Logarithm of tax

LGDP: logarithm of gross domestic production

LE: logarithm of the exchange rate

LW: logarithm of wages

Results

Generalized Dickey Fuller unit root test (ADF)

In the estimation of regression models as time series, the analysis of static series is of great importance. According to the values of ADF statistics, and the comparison between that and the critical values, the null hypothesis of unit roots for all the variables is not rejected. According to the results obtained the variables of the exchange rate and GDP were accumulated from zero. The variables of tax and wage were also static after making the first difference. Then to explore the existence of a long-term relationship for the variables the t testing method was used and the existence of such relationship was ensured.

Table 1. the static test of ADF for the model variables

Critical value	Testing	Variable
-2.97	-3.20	LT
-2.97	-8.35	LGDP
-2.97	-5.13	LE
-2.97	-6.46	WL

Source: Results of the study

The values from the generalized unit root test of Dickey Fuller were at 5% level, and the values for the exchange rate and GDP were at level and tax and wage were reported after one difference-making.

The analysis of the short-term ARDL model and the results

According to the studies of Pesaran and associates (2001), using the ARDL method and by considering the proper interruptions, the long-term variables of compatibility among variables can be estimated. The huge difference between the ARDL method and the Johansson method is that in the ARDL method, there is an optimal lag estimated for each and every variable using the criteria such as HQ, SBC, and AIC, while in the Johansson method, there is one optimal lag selected for all the variables. Also, the advantage of the ARDL method over other co-integration methods is that it can estimate the long-term and short-term relationships, even if the variables are not static from zero and are static from 1, and the estimations are more compatible and useful. The results of the short-term estimation are presented in Table 2.

Table 2. The results of the short-term estimation of ARDL (1.1.0.1.0)

Regressor	Coefficient	Standard Error	T-Ratio (Prob)
LEMP(-1)	0.9892	0.0021	641.60[0.000]
LT	0.0016	0.0113	0.14[0.884]
LT(-1)	-0.0268	0.0093	-2.88[0.009]
LGDP	0.0438	0.0096	4.55[0.000]
LE	-0.0078	0.0028	-2.72[0.013]
LE(-1)	-0.0065	0.0028	-2.32[0.031]
LW	0.0255	0.0116	2.19[0.029]
R^2=0.9988	R^2=0.9985		D-W=1.92

Source: Results of the study

As shown, tax has a negative effect on employment. In other words, by raising the taxes with a lag period, employment falls. By raising the taxes, the efficiency of production factors, labor, and investments fall which leads to reduction in employment and production in society. Also, raising the taxes and using the tax progressivity can reduce the firm income which will result in a fall in production firms, layoffs, and unemployment. But as you can see, GDP has a positive effect on employment as by increasing GDP there will be an increase in employment. The effect of the exchange rate on employment is negative. This is due to the fact that the Marshal Lerner condition is not present in developing countries such as Iran. When domestic currency falls or in other words when the exchange rate raises, according to the Marshal Lerner condition, the balance of payments is improved. This condition, relying on the condition of market stability, suggests that if the absolute value of demands of import and export in accordance to the exchange rate, were greater than one, the exchange market is stable and the falling of domestic currency can improve trade. In this situation, the value of exports increases and the value of imports falls. But developing countries cannot take use of such conditions and therefore the exchange rate affects employment negatively. The amount of wage affects employment positively as by raising the wages, the employment level raises. The results of the estimations suggest that there are short-term, meaningful and dynamic

relationships in the model as the estimated model has a great R^2 which is interpreted as high power of explanatory variables. The existence of D-W of 1.92 suggests that there is no autocorrelation in the model. Also, to show the existence or non-existence of long-term relationship the t test is implemented. The estimated t was 5.35 whose absolute value is greater than the Master ta- ble values in 90% level which suggests 3.63. This rejects the null hypothesis of non-existence and proves the existence of the long-term relationship. Table 3 shows the results of the cognitive test. According to the results obtained, the issues of dissonance, normality and consequential form are not present in this model and the stipulation of the model has been correct.

Table 3. Cognitive rest results

Test statistics	LM Version	F.Version
Serial Correlation	CHSQ(1)=0.0399[0.842]	F(1.19)=0.0292[0.866]
Functional form	CHSQ(1)=2.7565[0.097]	F)1.19)=2.2533[0.150]
Hetoroscedasticity	CHSQ(1)=0.5078[0.476]	F(1.25)=0.4781[0.496]

Source: Results of the study

Analysis of the long-term estimation of the model ARDL

The results of this analysis are presented in table 4. Since the model used in this study is logarithmic, the coefficients of the variables represent traction.

According to table 4, the long-term traction of tax toward employment is -2.3. This means that by rising (reducing) the taxes in long-term by one percent, employment will fall (rise) by 2.3 percent which is in agreement which economic theories and is meaningful statistically. It can be concluded that tax affects employment in long-term. The long-term traction of employment in accordance with GDP is 4.08 which suggest that a 4.08 percent raise in GDP causes a 4.08 percent raise in employment. Also, the traction of the exchange rate is negative, which suggests that by raising (reducing) the exchange rate by one percent, employment will fall (raise) by -1.33 percent. This proves that the Marshal Lerner condition is not present in Iran's economy; therefore an increase in the exchange rate results in a fall in employment. The long-term traction of wage over employment is 1.20 which suggests that the effect of wage on employment is positive which is proven in economic theories and meaningful statistically. Therefore the long-term effect of wage on employment is positive.

Table 4. The results of the long-term estimation of the model ARDL

Regressor	Coefficient	Standard Error	T-Ratio(Prob)
LT	-2.3416	0.432	2.693[0.014]
LGDP	4.080	0.002	-5.359[0.000]
LE	-1.337	0.655	3.480[0.002]
LW	1.206	0.153	7.837[0.000]

Source: Results of the study

The results of the ECM Test

The results of the error correction model are as follows. The coefficients related to this model which suggests the relationship between the variables of employment and independent short-term variables are presented in table 5.

According to the results obtained from this estimation, the ECM coefficient obtained is -5.033 which is statistically meaningful. This number suggests the adjustment speed of short-term into long-term. In other words, 53 percent of employment deviations are amended by the model variables over the next period.

Table 5. ECM results

Regressor	Coefficient	Standard Error	T-Ratio(Prob)
dLT	0.001	0.011	0.147[0.084]
dLGDP	0.043	0.009	4.551[0.000]
dLE	-0.007	0.012	-2.725[0.012]
dLW	0.010	0.002	5.014[0.000]
ecm(-1)	-0.533	0.008	-6.525[0.000]

Source: results of the study

Stability and diagnostic testing

Diagnostic testing is used to determine the stability of the model and structural stability. In this study the stability of the model is demonstrated using the CUSUM and CUSUM Q diagrams. If the statistical diagram traverses any of the side lines in 5% level, the model is not stable. In diagrams one and two, CUSUM and CUSUM Q, the middle diagram has not traversed any of the side lines; therefore the constant stability of the long-term model is acceptable.
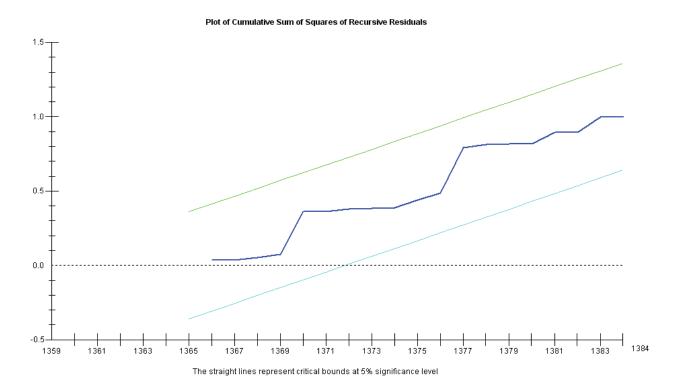

Figure 1.CUSUM

Conclusion

Tax, as considered to be an effective means in implementation of economic policies, such as distributive and fiscal, and even in directing the economy towards macroeconomic objectives such as economic stability, employment, economic growth, and social welfare. Therefore, according to economists, the effects of an efficient tax system on the continuity of major activities of a government such as employment are of great importance and significance. In this research, the effect of tax and GDP on employment was analyzed using the autoregressive Distribution model (ARDL). The results obtained reveal that the total employment traction over tax in Iran's economy during the years 1355-1386 has been meaningful, though negative. This

shows that by raising taxes, job opportunities diminish and therefore employment level falls. The effect of GDP on employment is positive, because through increasing the GDP, investment in various sectors raises and therefore employment level increases. The traction of employment over the exchange rate is mean- ingful and negative which suggests that by increasing the exchange rate, employments falls and by reducing the exchange rate, employment is enhanced. The effect of wage on employment is meaningful and positive therefore to increase employment level in the country, the following is suggested:
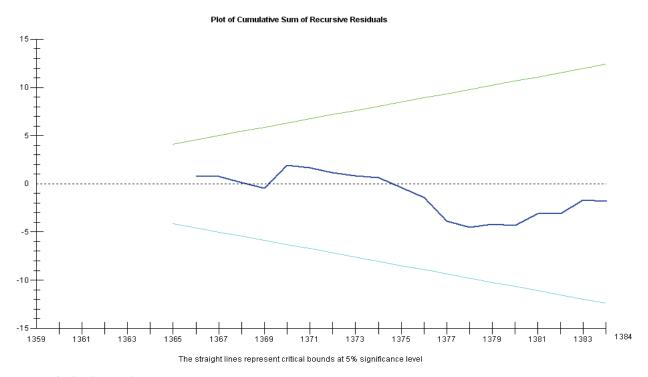

Figure 2.CUSUM Q

1. Providing incentive plans and tax breaks for manufacturers who increase employment level.

2. Increasing the GDP which leads to an increase in the employment level.

3. Increasing the wage levels and creating a proper environment in workplace.

4. Proper management of the exchange rate in line with increasing the production and employment levels.

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