2528-9705

Örgütsel Davranış Araştırmaları Dergisi
Journal Of Organizational Behavior Research
Cilt / Vol.: 3, Sayı / Is.: S2, Yıl/Year: 2018, Kod/ID: 81S217

REVIEWING THE EFFECTIVE FACTORS ON PROVINCIAL EXPENDITURES BASED ON THE THEORY OF FISCAL ILLUSION

Majid MADDAH[1], Fozieh JEYHOON TABAR[۲*]

[1]Associate Professor in Economic, Department of Economics, Semnan University, Semnan, Iran,
[۲] Lecturer in Baft Higher Education Center, Shahid Bahonar University of Kerman, Iran,

*Corresponding Author:
E_mail: Jeyhoontabar@uk.ac.ir

ABSTRACT

The present study has aimed to review the effective factors on the provincial expenditures based on the theory of fiscal illusion. To this end, time series data of the provinces in the time period from 2000 to 2013 was reviewed and the GMM method has been used to estimate the specified model. According to the results, the fiscal illusion resulted from indirect taxes has an influence on the provincial expenditures, but the fiscal illusion of the complexity of the structure of taxes in Iran's provinces is not accepted. Also, research results have shown that oil revenues of the province, as the intergovernmental grant index (from the central government to provincial government), has a greater impact on the public spending of the provinces than the tax revenues of the provinces and the presence of the flypaper effect is accepted about Iran's provinces.

Keywords: *Government Expenditures, Fiscal Illusion, GMM.*

INTRODUCTION

Local government is the lowest level of government in the framework of the administrative system of a country. Performance of the local government is formed based on the legal framework or through submission of the power of higher levels of governments. In many cases, it is necessary to consider different functions for various levels of the government; in such a way that higher levels of the government are responsible for policy making and setting rules and regulations and lower levels of the government are responsible for providing services. It can be argued that economic responsibilities of the government regarding the economy of the public sector can be assigned to local and state governments. To put it simply, the power of decision making regarding the activities of the public sector must not be concentrated in just one system; because the central government does not have information about the occurrences of a state or a city and it cannot accurately monitor the economic activities in these levels of government due to its extensive activities. On the other hand, local and state governments can utilize analyses of the expenditures and their advantages, by taking the participation of different individuals into consideration, to improve their performance regarding their economic responsibilities. In this regard, perceiving the fiscal behavior of the governments of lower levels (local and state governments) has become considerably significant and fiscal responsibilities have been developed in these levels. The subject of fiscal illusion of voters has attracted a great deal of attention from numerous researchers. The first time this subject was mentioned can be traced

Geliş tarihi/Recieved: 29.11.2017 – Kabul tarihi/Accepted: 07.02.2018 – Yayın tarihi/Published: 21.08.2018

back to almost one and a half century ago and over the past few decades, many empirical studies have focused on this issue. According to the concept, voters are not well and systematically aware of the fiscal parameters and therefore, public choices become biased. Lack of transparency in the fiscal systems makes real expenditures of public programs vague and ambiguous for citizens. In order to present a clear image of the behavior of local (provincial) governments in Iran's economy, data of local governments can be used for doing some tests according to this. In the present study, based on the research literature, the effect of fiscal illusion on the fiscal behavior of local authorities (public spending of the local governments). The structure of the research will be explained as follows. The section of theoretical principles contains the theoretical literature of fiscal illusion. In the second section, previous studies in this regard, which have been conducted inside and outside of Iran, will be reviewed. In the third section, data and methodology will be expressed and in the final section, the results obtained from the research will be presented.

THEORETICAL PRINCIPLES

The concept of fiscal illusion was firstly presented by Puviani (1930) and it means systematic misperception of the key fiscal parameters which can deviate the fiscal choices of voters (Oates 1988, p. 65). According to the studies of Puviani (1930) and Buchanan and Wagner (1977), characteristics of the fiscal systems of the government creates an ambiguity in the estimation of true benefits and expenditures of the plans of governments. Because of these characteristics, true expenditures of public services are underestimated compared to the time when more accurate information is available and voters demand higher level of governmental expenditures (Baker, 1983; Dollery & Worthington, 1996; Gemmell, 2004; Oates, 1988; Suyderhoud, 1994). In other researches that have studied fiscal illusion, it has been assumed that the source of misperception of citizens is the result of complexity of the tax system, in such a way according to the hypothesis of complexity of revenues, taxes contain such sources of income. Based on the hypothesis of complexity of income, presence of more tax sources makes being informed of extent of tax obligations more difficult for taxpayers (Gemmell et al. 1999). Because of income variation, it becomes more likely for citizens to underestimate the tax they truly pay; thus, they will demand more public services and goods and therefore excess demand will be created for governmental goods (Clotfelter, 1976; Dickson & Yu, 2000; DiLorenzo, 1982; Pommerehne & Schneider, 1978; Wagner, 1976).

Richard Wagner (1976) argues that the basic methods of financing public spending make the expenditures of governmental plans ambiguous and therefore taxpayers will have a more positive view about the increase of governmental expenditures compared to when governmental expenditures are perfectly perceived. According to Wagner's argument, the more complex the structure of the revenue is, the more individuals will underestimate the observed cost of public goods. Based on his argument, fiscal system is determined based on the combination and preference of tools of fiscal acquisition. According to Wagner, when there is a variety of tools, the complexity of the income of the system will be increased. The logic behind such a behavior is hiding the revenues transferred to the fiscal system by taxpayers. Wagner argues that in stable conditions, an increase in the complexity of income leads to an increase in public spending. Wagner's study (1976) and Herfindahl concentration index, or the Herfinfahl index, were useful for the following studies as the most important empirical tool for measuring the

complexity of income. Wagner (1976) tested the fiscal illusion hypothesis by regressing total current expenditures on socioeconomic variables demand and revenue simplicity criterion (Herfindahl concentration index or HER). On the condition of stability of other factors, higher values of HER are indicative of simpler revenue structures and therefore more accurate perceived fiscal burden and lower public spending. In the empirical study of Wagner, the assumed negative relationship between HER and total expenditure of the government was statistically significant. Herfindahl concentration index is calculated as follows:

$$HER = \sum_{i=1}^{n} (REV_i)^2$$

In which, REV_i is indicative of the share of ith tax base of total taxes. In addition, this index has a value between 0 and 1 ($0 < HER < 1$). A complex revenue system is related to a relatively low value of HER (close to zero); whereas, in a simple revenue system, the HER index is close to one. Ultimately, a fiscal system, which is specified through four equal tools of fiscal acquisition, will have an index equal to 0.25; while with one tool of fiscal acquisition, this index will be increased to one. Whenever the total taxes imposed on taxpayers can be separated, in such a way that the taxpayer is faced with a high number of tax bases with low values instead of low number of tax bases with high values; and therefore fiscal illusion is created. For instance, if total taxes are only obtained from taxes for personal revenue, taxpayers will be more aware of the expense they pay for receiving public services and goods (Buchanan, 1967). Selecting the Herfindahl index as the revenue complexity criterion plays the most important role in the field of illusion of revenue complexity. Since almost all of the following studies on revenue complexity have used this index as the index for measuring the illusion variable, it can be argued that selection of the Herfindahl index, as the revenue complexity criterion, has become the most important role of Wagner in the field of revenue complexity illusion. Wagner's analyses of the expenditures of local governments turned into tools for the following studies on local public goods.

Selecting the Herfindahl index as the revenue simplicity (complexity) criterion became one of the most effective roles of Wagner in the literature of fiscal illusion; because all of the following studies have used the revenue complexity model of this index as one of the variables of fiscal illusion (Oates, 1988). Following Wagner's configuration (1976) of the revenue complexity hypothesis, a number of studies have discussed that the inherent and negative consequences of complexity of income will contain a higher level of fiscal illusion. For instance, Pommerehne and Schneider (1987) developed two different criteria in dealing with the tangibility of taxes. The first criterion is a concentration criterion which is calculated from combining two tangible source of income, i.e. personal revenue taxes and wealth taxes and for the second criterion, non-fiscal revenues will be added to it. McCulloch argues that indirect taxes can create fiscal illusion; while it seems that it is not the case for direct taxes; because burden of direct taxes are explicitly imposed on taxpayers, but the burden of indirect taxes are less tangible and visible. Therefore, this type of fiscal illusion increases public spending (Dollery and Worthington, 1999). According to the argument made by John Stuart Mill (1973), burden of indirect taxes is systematically underestimated relative to the true burden of taxes. According to Mill's study, fiscal illusion is mainly because indirect taxes are not visible in comparison with visible taxes (direct taxes). Mill's hypothesis predicts that an increase in the expenditures of the public sector

is the result of underestimating the true burden of taxes. Italian economist, Amilcare Puviani (1903) argues that legislators attempt to create fiscal illusion by using different fiscal tools so that the true burden of taxes would be misperceived (Sanandaji and Wallace, 2011, 238).

According to the studies of Buchanan (1967), since indirect taxes in the payments of citizens are attracted for private services and goods, thus fiscal illusion is created. According to the studies of Pommerehne & Schneider (1978), Dollery & Worthington (1996) and Dell'Anno and Mourao (2012), evidence shows that public spending will be higher if the government puts emphasis on the indirect taxes. Pommerehne & Schneider (1978), in their study, assume that the effect of complexity of the structure of taxes is statistically correlated not only with the tangibility of individual taxes, but with different types of institutional mechanisms. Pommerehne & Schneider (1978), in their review, also concluded that weighing the revenue complexity index with the tangibility of taxes improves the statistical credibility of the explanatory power of Wagner's basic model. In addition, Heyndels and Smolders (1994) found out that complexity of the revenue system has a significant and positive effect on the level of public spending. Studies conducted by Breeden and Hunter (1985) and Baker (1983) confirmed this hypothesis of fiscal illusion (revenue structure complexity). Baker (1983) has stated that according to America's state data and per capita, the revenue structure complexity hypothesis is negative and significant based on the fiscal changes. Breeden and Hunter (1985) concluded that relatively limited tax systems obtain less income than relatively wide tax systems. The importance of the concept of fiscal illusion is because it targets the perception of local public choice and the process of public spending in this space. Recent modifications of the management and tax systems of local governments has increased the demand for the services provided by the local government and have emerged some issues about the capacity of the local governments so that efforts would be made for presenting public services. This not only retests the fiscal relationship between the spaces of the central, state and local governments, but it also increases the need to assigning the intergovernmental grants with the true expenditures of presenting local public services and goods (AMUSA, 2008).

Another type of fiscal illusion that reviews the effect of intergovernmental grants on the public spending of local governments is known as the flypaper effect. The flypaper effect suggests that governmental grants have a stimulating impact on the public spending of local governments (Dell'Anno & Dollery, 2012, P. 4). With the presence of the flypaper effect, the effect of grants on the spending of local governments is more significant than the effect of an increase in taxes on government's spending (Haug, 2009). Heins (1971) and Fisher (1979) argue that if there is no source of increase in the field of local choices, pubic expenditures can be increased from the location of intergovernmental grants (from state to central governments). It can be argued that this phenomenon occurs because different tax systems at various levels of the government create individual tax effects (Dowell, 2000, p. 15). To explain the flypaper effect based on fiscal illusion, this concept must be mentioned that citizens (voters) make their source allocation decisions based on the average price rather than the final price. Courant et al. (1979) and Oates (1979) have utilized this concept in the models of the spending of the receptor government. Logan (1986) and Hewitt (1986) have developed this analysis by taking the effects of financing on the observed cost of the productions of the grantor government into account (LOGAN and O'BRIEN, 1989, p. 221). According to the arguments made by Bradford and Oates (1979), there is no reason for logical and informed individuals in a specific constituency to consider an

increase in the income resulted from grants different than the increase in the income of other sources. From this point of view, intergovernmental grants (between the central and the local government) is a cover for the direct transfers to individuals. Cournat, Gramlich and Rubinfeld (1979) and Oates (1979) have proposed a form of fiscal illusion that explains the flypaper phenomenon in details. In their model, political agents (politicians and bureaucrats), that are maximizers of budget, hide the nature of grants and the grant income wouldn't be returned to the taxpayers directly through rebate or indirectly through reducing the tax share, and instead they increase public spending. In fact, voters will be faced with the illusion of a reduction in the average true rates of taxes and reduction in the tax prices of public goods (Pinar, 1998). In Iran's economy, grants that are given to state governments by the central governments is from oil revenues, that is why this type of revenue that is allocated to the state governments can be regarded as the intergovernmental grant index (from the central government to the state government). In the following section, studies will be overviewed.

An overview of previous studies

Paper of Maddah and Jeyhoon Tabar (2016) analyzes the effect of fiscal illusion in the form of flypaper effect on spending demand levels of provincial governments in Iran. Using time series data for provinces of Iran during 2000-2013 estimation and experimental analysis were performed. The results show that in Iran, flypaper effect will be accepted in the provinces of Iran.

Paper of Maddah and frahati (2014) investigates fiscal illusion in Iran Using quarterly data for the period 2001-2012. This in order to achieve this goal, two symmetric and asymmetric error correction models, are estimated. According to results from Wald test in symmetric model, there is a negative causal relationship between real tax revenues, and real government expenditures. This result hence, confirms the presence of fiscal illusion in Iranian economy. Moreover, the results obtained from the asymmetric model show that there is merely fiscal illusion in the case of tax revenues reduction and there is no Granger causal relationship for the positive changes of tax revenues. Therefore, by a decline in tax revenues, government expenditures increase after a year due to fiscal illusion. Thus, it seems that in the state of government's budget deficit, raising the taxes is an efficient instrument.

Clotfelter (1976) studied the expenditures of higher education at the level of the state government of the United States and didn't find a significant relationship between the level of expenditures and the Herfindahl index of tax sources. Clotfelter (1976) reported a significant relationship between simplicity of the structure of taxes and level of government's spending. He also studied the relationship between the spending and reliance of the state government to tangible taxes (i.e. direct taxes). His findings are the exact opposite of the fiscal illusion hypothesis, in the sense that more reliance on tangible taxes won't reduce the expenditures. Similar results were obtained from the reviews of Misiolek and Elder (1988). They studied causality and made the argument that the contrast between income diversification is the result of inaccurate and incomplete information and the need for stability of government incomes. They also took the income simplicity criterion into consideration and used previous studies on fiscal illusion as a risk-reducing income diversification.

Baker (1983) empirically tested the determinative factors of state and local tax obligations based on a median voter model and based on data obtained from 50 states of America (cross-sectional, 1975) and by using the OLS method. According to the research results, by assuming that the

effect of other factors remains constant and stable, a one percent increase in the income of median voter causes a 1.4-percent increase in the tax obligation of the median voter. Also, the fiscal illusion hypothesis is confirmed, in the sense that level of taxes increases with the changes in the structure of taxes. The higher the number of income sources of the government is, the more complex the structure of the income will be and income structure complexity has a negative and significant effect on government's spending.

Breeden and Hunter (1985), in their study, reviewed the relationship between selecting tax tools and the size of public budgets. They used the data obtained from 37 of the large cities in America and developed a model and tested an alternative for the conventional fiscal illusion model. In the aforementioned model, this hypothesis is tested that the budget maximizing government prefers tax systems with more bases which consists of a number of non-deductible. They used the cross-sectional data of 37 cities in America with a population of over 200 thousand people for the year 1975. According to their results, income structure complexity is negative and significant.

Heyndels and Smolders (1994), in their research, empirically estimated four main sources of fiscal illusion including the flypaper effect, illusion rentals, income complexity illusion, deduction of tax systems based on the data of 302 Flemish municipalities. The obtained results were indicative of the presence of the effects of fiscal illusion. Complexity of income systems and also the share of grants of the total income of municipalities have positive and significant effects on local spending. Their results also show that income deduction and illusion rental hypotheses cannot be empirically confirmed.

Dollery and Worthington (1999) developed the income complexity approach developed by Heyndels and Smolders (1994) and again empirically confirmed fiscal illusion while empirically reviewing the cross-sectional data of 46 local governments in Australia. Of course, in a number of studies, the relationship between income complexity and fiscal illusion in the form of an increase in the demand for public spending has not been empirically confirmed.

Mendes and Sampiano (2006) estimated the demand for local public expenditures for 3426 municipalities among 5562 municipalities in Brazil in 2000 in the framework of the median voter model. The results of their studies suggest that preference of voters determine the level of local public goods and services and the variables price, income and population have significant effects on the expenditures of local governments. Mattos (2009) has used annual data (1999-2000) about different states of America and has shown that the inequality of most factors based on income increases the size of the state government in the form of per capita spending.

Narayan et al. (2008) reviewed the empirical test of Wagner's rule (the effect of changes in income on public spending) for Chinese state governments. According to their results, the aforementioned rule is confirmed for central and western states, but it cannot be confirmed for the eastern states of China. Amusa et al. (2008) used spending and fiscal data of 237 local governments (municipalities) in South Africa in the fiscal year of 2005-2006 and reviewed the factors affecting local public spending. The results of the aforementioned research show that income of different sources of municipality and intergovernmental payments affect local spending and the impact of former on the increase of expenditures is more significant than that of the latter.

Haug (2009) reviewed the presence of fiscal illusion in German municipalities based on the income of local public companies. According to their results, an increase in the relative share of local public companies increases the per capita spending of municipalities.
Wu and Lin (2012) reviewed the determinative factors of government size in different states of China and concluded that Wagner's rule cannot be empirically confirmed for states of China. On the other hand, liberalization of business and foreign investment reduces the size of local government and fiscal decentralization increases the size of local government.
Borcherding and Deacon (1972), in their study, reviewed the demand for public services provided by non-federal governments in America. Niskanen (1978) reviewed the empirical application of a developed model which was similar to testing the relationship between the government budget deficit and inflation in the economy of USA. In the study of Dilorenzo (1982) studied a sample composed of 116 municipalities in New York, domestic subsidy is an important factor that increases the spending of local governments which of course leads to an increase in the local tax burden as well. According to the research conducted by Becker (1996), grants given by the federal government to the local and state governments, unlike the theory, has not led to an increase in the spending of state and local governments in comparison with tax sources. Islam (1988), in his study, reviewed the reaction of local expenditures to the grants given by the central government in 39 municipalities in Ontario and Canada over the period from 1977 to 1991. The obtained results suggest that there is a positive relationship between the aforementioned variables in 9 cases. Misiolek and Elder (1998) used the data of Alaska and Wyoming in 1984 and used the causes of the increase of the size of local and state governments. The results obtained from their research suggest that fiscal stress and fiscal illusion explain the increase in the size of state and local governments.
In the following section, the effect of fiscal illusion on the demand for the expenditures of the state governments of Iran will be empirically reviewed and analyzed. In this respect, the research model will be expressed and accordingly, time series data of Iran's provinces over the period from 2000 to 2013 will be empirically analyzed.

PROPOSAL AND ESTIMATION OF THE MODEL

In many empirical studies on local governments, the median voter model has been used (Wyckoff, 1988, 1991; Heyndels and Smolders, 1994). In this model, individuals maximize a quasiconcave function subject to a budget constraint. The price of public goods (x) is normalized. It is assumed that all of the individuals in a constituency use a similar level of public services which is shown by z and its price is shown by p_z. Other variables include the mean voter income (y_m), tax share (t_i) and level of local taxes or total tax income (T). The supplied value of a public goods is equal to the value demanded by citizens with median income. Therefore, the individual includes maximization of the utility function:

$$u(x_i, z) \qquad (1)$$

Subject to budget constraint:

$$y_m = x + t_i b_m \qquad (2)$$

In which, y_m is the median voter income, b_m is the tax base, and t is the tax rate. Individual demand function also depends on government's budget constraint which is determined by the following criterion:

$$cZ = G + tB \qquad (3)$$

in which, c is the final constant and the average cost of production of public services. tB is the total tax income and G is the intergovernmental grants received by the local government (from the central government). Equation 2 can be rewritten as equation 4:

$$t = \frac{[cZ - G]}{\mathrm{B}} \qquad (4)$$

Due to overconsumption, the quality of public services depends on the size of population of the society (N). The congestion function can be rewritten as equation (5) by using the proportional tools recommended by Borcherding and Deacon (1972):

$$\mathrm{Z} = N^{\gamma} z \qquad (5)$$

γ measures the swarm effect. If γ is equal to 1, public goods is regarded as a private goods and scaled goods have no benefit: consumption of an individual is equal to $1/N$. On the other hand, if γ is equal to zero, the goods is a purely public goods. It is important to know that if γ is higher than 1, the goods is ultimately over-swarmed (Reiter and Weichenrieder, 1999). Each additional consumer makes an increase in supplying z necessary; in such a way that z remains the same. When the values of γ is between zero and one, it becomes possible for the goods to be both public and private; in such a way that there is still the swarm effects, but there are also scaled spending in consumption.

By using the equations 3 and 5 subject to the median voter budget, equation 6 will be obtained:

$$y_a = y_m + g(b_m/b) = x + (b_m/b)cN^{\gamma-1}z \qquad (6)$$

y_a is equal to the median income increased with the share of per capita intergovernmental grants $g = G/N$ and $b = b/N$, in which B is the total tax base. The median voter's income plus its share of the per capita intergovernmental transfer must finance its private expenses as well as its cost share on the public goods ($(b_m/b)N_i^{\gamma-1}z$).

By rewriting the equation 6, equation 7 can be obtained:

$$x = y_m + (b_m/b)[g - cN^{\gamma-1}z] \qquad (7)$$

By placing equation 7 in equation 1, the following maximizing is obtained:

$$\max u = u[(y_m + (b_m/b)[g - cN^{\gamma-1}z]), z] \qquad (8)$$

Assume that by maximizing equation 8, the median voter demand function would be obtained for local public goods:

$$= z[y_a, (b_m/b), N] \qquad (9)$$

By defining the tax prices of public services as the individual cost of purchasing an additional monetary unit of local public services, it can be obtained by differentiating y_a relative to z. Therefore, tax price is obtained as follows:

$$\partial y/\partial z = p = (b_m/b)cN^{\gamma-1} \qquad (10)$$

Each consumer is aware of his/her tax price and can determine his/her local public goods of choice. Assume that the demand function, which has been defined as equation 9 ($z = f(p_i, y_a)$), is specified with constant income and price deduction, this demand can be written as equation 11:

$$Z=\alpha p^{\beta 1} y^{\beta 2} \qquad (11)$$

By using equation 10, by rearranging the sentences and rewriting it as a logarithm, the following demand model will be obtained:

$$z = \alpha\,[(b_m/b)cN^{\gamma-1}]^{\beta 1} y_a^{\beta 2} \qquad (12)$$

Equation 10 can be written using equation 5 based on Z:

$$Z = zN^{\gamma} = \alpha\,[(b_m/b)cN^{\gamma-1}]^{\beta 1} y_a^{\beta 2} N^{\gamma} \qquad (13)$$

Finally, a vector of socioeconomic characteristics Ω is added which is expected to affect demand and by multiplying equation 13 by p, a function called E which can be estimated will be obtained:

$$E = pZ = pzN^{\gamma} = \alpha\,[(b_m/b)cN^{\gamma-1}]^{1+\beta 1} y_a^{\beta 2} N^{\gamma} \Omega^{\beta 3} \qquad (14)$$

Equation 15 presents a standard estimation equation for reviewing the demand for locally supplied public goods:

$$nE = k + (1+\beta_1)[\ln(b_m/b)] + \beta_2(\ln y_a) + \beta_3(\ln\Omega) + \beta_4(\ln N_i) + \varepsilon_i \qquad (15)$$

Where $k = \ln\alpha + (1+\beta_1)\ln c$

The model that is used in this research has been adopted from the study of Richard Wagner (1976) which is proposed based on the structure of Iran's economy. In this equation, variables have been considered as wholes. The public form of the model used in this research is as follows:

G = F (Y, T, OIL, H, ID)

The public form of this model can also be written as follows:

$$G_{it} = \alpha_0 + \alpha_1 Y_{it} + \alpha_2 T_{it} + \alpha_3 OIL_{it} + \alpha_4 H_{it} + \alpha_5 ID_{it} + \varepsilon_{it} \qquad (16)$$

For the specified model fitting, the time series data over the period from 2000 to 2013 for 28 provinces in Iran[1] has been used. The variables state government spending (G) has entered the model as the dependent variable and the explanatory variables of the model are: state gross

[1]Alborz province has been embedded in Tehran province and the three provinces Northern Khorasan, Razavi province and Southern Khorasan have been combined into only Khorasan province.

domestic production (non-oil) (Y), tax income (T), the province revenues from oil revenues were considered as Intergovernmental Grant index (from central government to the provincial government) (OIL), Herfindahl index (H), ratio of the indirect tax income of the province to the direct tax income of the province (ID), provincial income resulted from oil revenues (from central governments to state governments), respectively; which have entered the model as control variables.

Statistics and information associated with data have been collected from the center for statistics and budget committee of provinces and the logarithm of all variables except for the Herfindahl index has been taken and then they have been used in the model. The oil revenues of the province (OIL) index, Herfindahl index (H) and the ratio of indirect tax revenue of the province to the direct tax revenue of the province (ID) are three indexes used for testing fiscal illusion. The first criterion is regarded as the index of intergovernmental grants from the central government to the state governments and with the presence of the flypaper effect, it is expected that the coefficient of this variable is positive. The smaller the value of second index (criterion) is, i.e. the Herfindahl index (tax structure complexity index), the tax structure will be more complex and fiscal illusion will be increased. As it was already mentioned, the Herfindahl index is obtained from calculating the sum of squares of the share of each tax base of total taxes. In this study, the tax bases in Iran's economy are calculated including: tax on legal persons (entities), income taxes, wealth taxes, taxes on importations and consumption and sales taxes. The third criterion of the structure of income is the visibility (tangibility) of taxes. It is assumed that tax collectors might not be aware of the true income of governments; because public income is not completely visible (tangible). In addition, all of the different types of income sources are not equally visible (tangible). Therefore, this criterion has been defined as the ratio of invisible taxes (indirect taxes) to visible taxes (direct taxes). According to the fiscal illusion theory, the structure of invisible taxes has a direct relationship with public spending.

GENERALIZED MOMENT METHOD (GMM)

Generalized moment method (GMM) is the method of moments in statistics in which moments are used optimally. This method can solve many of the problems with classical assumptions and also other defects of the model. That is why GMM is one of the reliable methods in researches. This method can also solve problems such as heterogeneity variance and/or unknown autocorrelation. And in cases when distribution of error is not normal, this method will be able to estimate the parameters well. It can be simply shown that all of the common methods of estimation such as OLS, GLS, MLE and 2SLS are certain forms of GMM which are obtained from a more limited selection of tools for moments. The GMM method indicates that a sample has moments which can estimate the parameters of the population. The statistical theorem of the law of large numbers for solving the convergence in probability and the central limit theorem makes inferring the moment of the sample to the society possible. The strength of the GMM method is that it is not dependent on total error distribution. If the total symbol $\overline{m}_k(y)$ is used for showing sample moments, the probability of the sample will be equal to the moment of the population and therefore, the sample moment is used as the estimator of moment. In fact, the probability of sample moments is equal to constants such as μ, which is shown based on the method. This

method in fact seeks to minimize the following phrase: i is the square of moments and if the number of moment is shown by

$$\sum_{i=1}^{l} \overline{m_i^2}(\beta)$$

L is the number of moments. If variance of moments is not heterogeneous, in this case instead of the phrase above, the following will be minimized:

$$\sum_{i=1}^{l} \frac{\overline{m_i^2}}{\overline{\phi_u}}$$

ϕ_u shows i[th] moment. It can be said that we are faced with the following formula in the form of matrices:

$$q = [\overline{m_1} \dots \overline{m_l}] \left[\begin{pmatrix} \phi_{11}^{-1} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ \vdots & \cdots & \phi_{ll}^{-1} \end{pmatrix} \right] \begin{bmatrix} \overline{m_1} \\ \vdots \\ \overline{m_1} \end{bmatrix}$$

Matrix gives moments an inverse weight compared to their distribution, thus:

$$q = \overline{m'(y)} W \overline{m(\beta)}$$

Thus, by differentiating this equation (β parameters), this equation can be minimized.

Stationary Test

When traditional econometric methods are used for estimating coefficients of the econometric model, it is assumed that variables are stationary. What is meant by stationary of variables is that over time, the mean, variance and autocorrelation coefficients of that time series remain the same over time. Stationary of the variables under study in time series must be reviewed. Most macroeconomic time series move alongside one another. This is because of the presence of a process in which all of these are similar. If the variables that are used for estimating the coefficients of the used model are not stationary, it is possible that there would be no significant relationship between the variables of the model and it is possible to obtain a high determination coefficient (R^2) for it and to come to inaccurate inferences about the significance of the relationship between variables; because the variables with such processes have the tendency to show a significant correlation even in cases where there is no significant relationship between them. Therefore, this will lead to estimation of a false regression. At first, in order to make sure that a regression is not false, it is essential to test the stationary of the variables. There are numerous methods for testing the stationary of variables and here Levin, Lin and Chu tests have been used. H_0 is based on the unit root test or in other words non-stationary of data and the opposing hypothesis is absence of unit root or stationary of data.

Table 2 shows that H_0, indicative of the presence of unit root for the variable of interest, is rejected; therefore, all of the variables are stationary.

Table 1: stationary test in level

Variable	Level		
	Calculated statistic	prob	Result
G	-5.2917*	0.0000	stationary
Y	5.19	1.0000	nonstationary
T	-7.6531*	0.0000	stationary
OIL	-5.6817*	0.0000	stationary
H	-6.0718*	0.0000	stationary
ID	-1.7068**	0.0439	nonstationary

Source: research findings, Asterisks (*) denote level of significance: *-99%, **-95%.

According to table 1, all of the variables are stationary except for non-oil gross domestic production and this variable becomes stationary with just one differentiation. Since not all of the variables are stationary, the cointegration test must also be done so that we would make sure that there is a cointegration relationship (long-term relationship). Given the results presented in tables 2 and 3 and based on Pedroni and Kao's cointegration test, there is a long-term relationship between the variables.

In analyses of panel cointegration test, the presence of long-term economic relationships is tested. The argument made in cointegration analyses is that although many economic time series are not stationary, but it is possible for their linear combination to become stationary in the long run. According to cointegration analyses, this long-term equilibrium relationship can be estimated and tested. If an economic theory is accurate, a series of variables specified by the aforementioned theory became related in the long-term. Also, an economic theory expresses relationships as long-term ones and it doesn't present any information about the short-term dynamics between the variables. In the theory is creditable, it is expected that although variables are not stationary, a linear static combination of them would be stationary; otherwise, the creditability of the theory will be questioned. That is why the cointegration test is used for testing the economic theories and widely estimating long-term parameters (Enders, 2004). According to the cointegration tests, if variables are cointegrated, then their residuals would be I (0). On the other hand, if the variables are not cointegrated, their residuals would be I (1).

Results of the cointegration test by using Pedroni's method have been presented in table (2). H_0 of Pedroni's method is indicative of lack of cointegration. The results of Pedroni's cointegration test contains 7 statistics which have been divided into two categories. The first category is within dimension statistics including rho and v panel statistic similar to Philips and Peron's test (1988), PP panel test (nonparametric panel) and ADF (parametric panel) similar to unit root ADF test. The second category is called between dimensions and it can be compared to the panel mean tests group of Im et al. (1997). This group includes three test: ADF, PP and rho (Pham and Nguyan, 2010). As it can be seen, based on the results presented in the aforementioned table, the cointegration or presence of a long-term equilibrium relationship between variables in the two groups of PP and ADF statistics and ADF and PP panel statistics is accepted at the level of 1% and 10%. These results suggest that there is a long-term relationship between the variables in different provinces of the country.

Table 2: Pedroni's cointegration test

Pedroni Cointegration	No intercept or trend	
	Statistic	Prob.
Panel v-Statistic	-1.696234	0.9551
Panel rho-Statistic	2.678745	0.9963
Panel PP-Statistic	-2.012781	0.0221**
Panel ADF-Statistic	-1.410710	0.0792***
Group rho-Statistic	3.810224	0.9999
Group PP-Statistic	-12.11233	0.0000*
Group ADF-Statistic	-3.937853	0.0000*

Source: research findings, Asterisks (*) denote level of significance: *-99%, **-95% and *** 90%

In addition to Pedroni's cointegration test, Kao's cointegration test also shows a long-term relationship between the introduced variables. The results of the aforementioned test will be presented in table 3:

Table 3: Kao's cointegration test

Result	prob	Value of the calculated statistic	Type of the calculated statistic
H_0 is rejected which means that the variables are cointegrated	2.30	0.0107**	ADF

Source: research findings, Asterisks (*) denote level of significance: **-95%

RESULTS OF ESTIMATION

According to the results of cointegration between variables presented in the previous section and after confirming the presence of cointegration, without any concern about the occurrence of the problem of false regression, the model can be estimated. The results obtained from Eviews9 have been presented in table 4. As table 4 shows, calculated coefficients of the variables are expected based on the theoretical principles. According to the results associated with the t-statistics, the coefficients non-oil gross domestic production, tax revenue, oil revenue of the province and ratio of indirect tax to direct tax are significant at 1%. Interruption of provincial spending and Herfindahl index are not statistically significant. Given the significance of the ID coefficient, it can be said that fiscal illusion resulted from indirect taxes is accepted. In other words, the more indirect taxes are, because of their invisibility, fiscal illusion can increase the expenditures of the state government. About the Herfindahl index, the coefficient of the aforementioned variable is not statistically significant and fiscal illusion of the tax structure complexity is not accepted about Iranian provinces. The oil revenue coefficient is significant at the significance level of 1% and as table 4 shows, the obtained coefficient is equal to 0.41 which suggests that each 1% increase in the oil revenue coefficient leads to a 0.41% increase in the provincial expenditures and this coefficient is also larger than the tax coefficient; therefore, the flypaper effect is accepted about Iran's provinces.

Table 4: Results of estimation of the GMM model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G(-1)	-0.017396	0.024296	-0.715976	0.4758
Y	0.165767	0.007080	23.41496	0.0000*

T	0.051736	0.007917	6.534959	0.0000*
OIL	0.414579	0.007995	51.85421	0.0000*
H	-0.064681	0.043048	-1.502530	0.1363
ID	0.331485	0.047745	6.942795	0.0000*
Sargent test: 0.396 J-Statistic :11.57				
AR(1): 0.669				
AR(2): 0.830				

Source: research findings, Asterisks (*) denote level of significance: *-99%

CONCLUSION

The argument in the conventional view about fiscal illusion at a local level about the illusion of tax prices is that the value and complexity of the budget process of the public sector makes the true tax price of public spending ambiguous for citizens. In the empirical studies in the field of determining the range of fiscal illusion, attempts have been made in the respect of establishing a relationship between the size of the public sector and fiscal complexity criteria (revenue complexity hypothesis) according to which the taxpayers underestimate taxes in the fragmented tax systems. According to this theory, characteristics of the tax system influences the perception of voters of the tax burden; in such a way that they underestimate the cost they actually pay for public goods. This creates fiscal illusion and increases the demand for public spending. On the other hand, taxpayers do not observe the current of grants from high levels of government (central government) to their local governments directly and therefore they misperceive the cost of public services and therefore they systematically underestimate the tax price of local public spending. This systematic misperception has two wide specific effects. The first effect is the effect of excessive spending which creates fiscal illusion with too much information about the situation. The second effect is the flypaper effect in such a way that an increase in the intergovernmental received grants increases local public spending and this increase is more significant than the increase in the income of taxpayers. According to the fiscal illusion theory, fiscal illusion creates additional demand for public goods and therefore people demand more public expenditures compared to cases where there is no fiscal illusion. In the present study, the effect of fiscal illusion of the spending of provincial governments in Iran was reviewed. To this end, time series data of the provinces in the time period from 2000 to 2013 was reviewed and the GMM method has been used to estimate the specified model. According to the results, the fiscal illusion resulted from indirect taxes has an influence on the provincial expenditures, but the fiscal illusion of the complexity of the structure of taxes in Iran's provinces is not accepted. Also, research results have shown that oil revenues of the province, as the intergovernmental grant index (from the central government to provincial government), has a greater impact on the public spending of the provinces than the tax revenues of the provinces and the presence of the flypaper effect is accepted about Iran's provinces.

Reference

Amusa, H., Mabunda, R. & Mabugu, R. (2008). "Fiscal Illusion at the Local Sphere: An Empirical Test of the Flypaper Effect using South African Municipal Data", South African Journal of Economics, 76(3), 443-465.

Baker, S. H. (1983). The determinants of median voter tax liability: An empirical test of the fiscal illusion hypothesis. Public Finance Quarterly, 11, 95-108.

Becker, Elizabeth (1996). The illusion of fiscal illusion: Unsticking the flypaper effect, Public Choice, 86: 85-102.

Borcherding, T. E., Deacon, R. T. (1972). "The Demand for the Services of Non-Federal Governments", The American Economic Review, Vol. 62, No. 5, pp. 891-901.

Breeden, C. H., & Hunter, W. J. (1985). Tax revenue and tax structure. Public Finance Quarterly, 13, 216-224.

Buchanan, J.M. (1967). The Fiscal Illusion. Chapter in Public Finance in Democratic Process: Fiscal Institutions and Individual Choice. Chapel Hill: University of North Carolina Press.

Clotfelter, C. T. (1976). Public spending for higher education: An empirical test of two hypotheses. Public Finance, 31, 177-195.

Dell'Anno, R., Dollery, B. (2012). Comparative fiscal illusion: A fiscal illusion index for the European Union? MPRA Paper (42537).

Dickson V., & Yu, W. (2000). Revenue structures, the perceived price of government output, and public expenditures. Public Finance Review, 28, 48-65.

DiLorenzo, T. (1982). Tax elasticity and the growth of local public expenditure. Public Finance Quarterly, 10, 385-392.

Dilorenzo, THOMAS J. (1982). Utility profits, fiscal illusion, and local public expenditures, Public Choice 38:243-252.

Dollery, B., & Worthington, A. (1996). The empirical analysis of fiscal illusion. Journal of Economic Surveys, 10, 261-297.

Dollery, B., Worthington, A. (1999) Fiscal Illusion at the Local Level: An Empirical Test Using Australian Municipal Data, The Economic Record 75(228) 37-48.

Dowell, Paula (2000). Electric Utilities, Fiscal Illusion and The Provision of Local Public Services, Thesis the degree of Doctor of Philosophy, the University of Tennessee.

Enders W., (2004), "Applied Econometric Time Series", New York: Wiley Press.

Gemmell, N. (2004). Tax perceptions and preferences over tax structure in the United Kingdom. The Economic Journal, 114, 117-138.

Gemmell, N., Morrissey, O. & Pinar, A. (1999). Fiscal illusion and the demand for government expenditures in the UK, European Journal of Political Economy, 15, 687–704.

Haug, P. (2009). "Shadow Budgets, Fiscal Illusion and Municipal Spending: The Case of Germany", Halle Institute for Economic Research, IWH-Discussion Papers.

Heyndels, B., & Smolders, C. (1994). Fiscal illusion at the local level: Empirical evidence for the Flemish municipalities. Public Choice, 80, 325-338.

Islam, Muhammed N. (1998) Fiscal Illusion, Intergovernmental Grants and Local Spending, Regional Studies, 32:1, 63-71.

Kao, C. (1999). Spurious Regression and Residual-Based Tests for Cointegration in Panel Data. Journal of Econometrics, 90, 1- 44.

Logan, Robert R., O'brien, J. Patrick (1989). Fiscal illusion, budget maximizers, and dynamic equilibrium, Public Choice 63: 221-235.

Maddah, Majid, frahati, Mahboobeh, (2014). The Asymmetric Effects of Tax Revenues on Government Expenditures in Iran, Iranian Journal of Economic Studies, Vol. 3, No. 2, Fall 2014, pp. 43-62.

Maddah, Majid, Jeyhoon-Tabar, Fozieh (2016). Studying the Flypaper Effect in the Provinces of Iran (2000-2013), Iran. Econ. Rev. Vol. 20, No. 3, pp. 339-354.

Maddah, Majid, Jeyhoon-Tabar, Fozieh, Studying the Flypaper Effect in the Provinces of Iran (2000-2013), Iran. Econ. Rev. Vol. 20, No. 3, 2016. pp. 339-354.

Mattos, Enlinson (2009). Median-voter, size of the government and budget spillover: evidence for US states, Applied Economics Letters, 16:14, 1387-1392.

Mendes, Constantino Cronemberger, Sampaio de Sousa, Maria da Conceição (2006) Demand for locally provided public services within the median voter's framework: the case of the Brazilian municipalities, Applied Economics, 38:3, 239-251.

Mill, J.S. (1973). Principles of Political Economy. Longman, Green and Co. Original Edition 1848, New Edition 1909, Reprint New Jersey: Augustus M. Kelley, Clifton.

Misiolek, W., & Elder, H. W. (1988). Tax structure and the size of government: An empirical analysis of the fiscal illusion and fiscal stress arguments. Public Choice, 57, 233-245.

Narayan, P.K, Inielsen, N., And Smyth, R (2008). Panel data, cointegration, causality and Wagner's law: Empirical evidence from Chinese provinces. China Economic Review 19, 297 – 307.

Oates, Wallace (1988). On the Nature and Measurement of Fiscal Illusion: A Survey, In G. Brennan et al., eds., Taxation and Fiscal Federalism: Essays in Honour of Russell Mathews (Sydney: Australian National University Press, 1988), 65-82.

Pedroni, P. (2004). Panel Cointegration, Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis. Econometric Theory, 3, 597-625.

Pham, T. and Nguyen, D., (2010), "Does Exchange Rate Policy Matter for Economic Growth? Vietnam evidence from a co-integration approach ", Economics Bulletin, Vol. 30 no.1 pp. 169-181.

Pinar, A. (1998). ESSAYS ON FISCAL ILLUSION, Thesis the degree of Doctor of Philosophy, the University of Nottingham.

Pommerehne, W., & Schneider, F. (1978). Fiscal illusion, political institutions, and local public spending. Kyklos, 31, 381-408.

Reiter, M. and Weichenrieder, A. (1999) Public goods, club goods and the measurement of crowding, Journal of Urban Economics, 46, 69–79.

Sanandaji, T., Wallace, B. (2011). Fiscal Illusion and Fiscal Obfuscation Tax Perception in Sweden, The Independent Review, 16(2), 237–246.

Suyderhoud, J. P. (1994). State-local revenue diversification, balance, and fiscal performance. Public Finance Quarterly, 22, 168-195.

Wagner, R. E. (1976). Revenue structure, fiscal illusion and budgetary choice. Public Choice, 25, 45-61.

Wu, Alfred M. and Lin, Mi (2012). Determinants of government size: evidence from China. Public Choice. 151: 255-270.

Wyckoff, P. (1988). A bureaucratic theory of flypaper effects. Journal of Urban Economics, 23: 115-129.

Wyckoff, P. (1991). The elusive flypaper effect. Journal of Urban Economics, 30: 310-328.