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Studying the Flypaper Effect in the Provinces of Iran (2000-2013)[1]

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Abstract

The present study attempted to experimentally analyze the effect of fiscal illusion in the form of Flypaper effect on spending demand levels of provincial governments in Iran. To this aim, theoretical foundations and literature review were presented, and then the model used for investigation was specified. Finally, using time series data for provinces of Iran during 2000-2013 estimation and experimental analysis were performed. In Iran's economy, the central government award grants to the provincial government which are mainly from oil revenues, so that this type of dedicated revenues to provincial governments were considered as the intergovernmental grant (from central government to the provincial government). The results show that in Iran, flypaper effect will be accepted in the provinces of Iran.

Keywords: Fiscal Illusion, Flypaper Effect, Public Expenditure.

1. Introduction

The evaluation of the public expenditure has become an area of increasing interest since the seminal work of Samuelson, 1954 (Mendes & De Sousa, 2006: 239). Variety of theories has been proposed to explain the long-standing tendency of public sector growth. A set of theories based on Wagner's Law are variants of the argument that the income elasticity of demand for government output is greater than unity. Alternative theories argue that shocks cause sudden increases in the size of governments, which never falls back to

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the previous level. Another explanation for growth of government is the relative price effect that prices of public sector goods raise relative to private goods.

Alternative approaches have been developed within public choice theory, assuming that the level of government spending should reflect voter-taxpayer's demand for public goods. On the other hand, the supply side of government (politics, bureaucracy, etc.) has been argued to have its own agenda, which may not necessarily follow voter-taxpayers' demand. It has also been argued that certain features of tax structure may distort voters' tax perceptions, and government agents may behave with self-interest: both cases may produce an actual government output which differs from the optimum level (Pinar, 1998: 11). Fiscal illusion refers to a systematic misperception of the cost of government by taxpayers, and the fiscal illusion hypothesis to the impact of this misperception on the size of government in a democratic society (Misiolek & Elder, 1988: 234). In presence fiscal illusion, voter-taxpayers do not know how much they receive from the state or how much they pay to it. (Mourao, 2010a: 267).

The present study attempted to experimentally analyze the effect of fiscal illusion in the form of Flypaper effect on spending demand levels of provincial governments in Iran. To this aim, theoretical foundations and literature review were presented, and then the model used for investigation was specified. Finally, using time series data for provinces of Iran during 2001-2014 estimation and experimental analysis were performed.

Theoretical Foundations

When fiscal illusion is present, the true cost of government may be obscured by the nature of a state or local tax structure. Failure to recognize these costs can lead taxpayers to accept a larger government than they would choose under perfect information. The greater the perception error, the larger and more inefficient the government sector will become (Misiolek & Elder, 1988: 234).

Although the intellectual genesis of this proposition goes back at least as far as J. R. McCulloch (1845) in “Treatise on the Practical Influence of Taxation and the Funding System”, Puviani (1903) has

dominated the traditional approach to fiscal illusion, which has been developed further by other scholars, most notably Buchanan (1967) and Wagner (1976), writing in the same tradition (Dell'Anno & Dollery, 2012: 3). Amilcare Puviani was the first one who writes about Fiscal Illusion in the early years of the 20th century. In 1903, Amilcare Puviani edited the book "Teoria della Illuzione Finanziaria". Amilcare Puviani believes that fiscal illusion is not good for the citizens because it enables public expenditures to be obscured, it could be seen as an abuse by the State, and because it deteriorates the bilateral trust between each citizen and his government (Mourao, 2010b: 231).

The concept of fiscal illusion revolves around the proposition that the true costs and benefits of government may be consistently misconstrued by the citizenry of a given fiscal jurisdiction (Dollery & Worthington, 1996: 1).

Fiscal illusion is typically alleged to arise if certain features of the tax structure lead taxpayers to underestimate how much tax they truly pay, creating 'excess' demand for government-provided goods, i.e., more public expenditure is demanded than would be in the absence of fiscal illusion (Gemmell et al, 1999: 689). Fiscal Illusion, as a normative consideration, goes back to early scholars such as Mill (1848), and McCulloch (1851). However, the positive theory of fiscal illusion dates to the Italian economist Puviani (1903) (Pinar, 1998: 29). John Stuart Mill (1848) suggested that the burden of indirect taxes would be systematically underestimated because indirect taxes are less "visible" than direct taxes. (Sanandaji & Wallace, 2011: 238). Taxpayers may systematically underestimate the tax burden from indirect taxes as compared to direct taxes because indirect taxes are incorporated into (and therefore "hidden" in) the prices of goods. (Sausgruber & Tyran, 2005: 39-40). Italian economist Amilcare Puviani contributed to the field with more substantial work on fiscal illusion in 1903. (Sanandaji & Wallace, 2011: 238). McCulloch developed several of the principles underlying the modern analysis of fiscal illusion. Thus he contended that direct taxation involved less fiscal illusion than indirect taxation since direct taxation imposes a more obvious burden on taxpayers. (Dollery & Worthington, 1996: 1).

When Amilcare Puviani (1903) published *The Theory of Fiscal*

Illusion he was founding the economics of illusion – the study of public choices made by some agents characterized by imperfect knowledge. After more than a half of a century, James Buchanan (1967) gave new life to that obscure work and to the fiscal illusion theory. (Mourão, 2008: 82).

Imperfect information is not, however, synonymous with fiscal illusion. It is a necessary, but not a sufficient, condition for its existence. More specifically, fiscal illusion refers to a systematic misperception of fiscal parameters - a recurring propensity, for example, to underestimate one's tax liability associated with certain public programs. Imperfect information alone might well give rise to a random pattern of over- and underestimation of such tax liabilities. Fiscal illusion, in contrast, implies persistent .and consistent behavior. As such, it will give rise to recurring, and presumably predictable, biases in budgetary decisions. (Oates, 1979: 67).

The empirical analysis of fiscal illusion involves the examination of five distinct hypotheses of fiscal illusion, namely: (I) the revenue complexity, (II) revenue-elasticity, (III) renter illusion (IV) the debt illusion hypothesis and (V) the flypaper effect, respectively. Although distinct, a common theme of these hypotheses is their attempt to model a process in which fiscal illusion causes citizens to underestimate the tax-price of a public good (or services) and these results in unnecessary oversupply of that good/service. (Amusa, et al, 2008: 444).

(I) The revenue complexity: Misperception of the tax prices results from the complexity or fragmentation of the revenue system. (Haug, 2009: 7)

(II) The revenue-elasticity hypothesis has been stated succinctly by Buchanan (1967), who argues that: 'In a period of rapidly increasing national product, that tax institution characterized by the highest [income] elasticity will tend, other things equal, to generate the largest volume of public spending' (Oates, 1979: 73).

(III) Renter illusion: Renters are unaware of the property taxes or other local taxes or fees for local public goods embodied in their rents and might therefore support higher public spending than homeowners. The degree of fiscal illusion depends on the proportion of homeowners in a given jurisdiction. (Haug, 2009: 7)

(IV) The debt illusion hypothesis, where public awareness of the extent public expenditure depends more on current taxation than debt financing. These hypotheses essentially explore the mechanisms which can explain the existence of fiscal illusion. (Dell'Anno & Dollery, 2012: 4)

(V) The flypaper paper effect, where lump-sum intergovernmental grants have a stimulatory effect on public expenditure (Dell'Anno & Dollery, 2012: 4).

Recent public choice approaches to local government finance have emphasized that the combination of local taxes and central grants is likely to give rise to voter misperceptions of the tax-price of local public goods. The form of fiscal illusion caused by central grants is called the 'flypaper effect': lump-sum grants increase public expenditure more than an equivalent increase in income (Pinar, 1998: 39). The Oates (1979) and Courant, Gramlich, & Rubinfeld (1979) models admit that while voters using average instead of marginal prices can create an illusion that may lead to a flypaper effect, this may only explain part of that effect (Bailey & Connolly, 1998: 346). Oates (1979) fiscal illusion hypothesis states that individuals underestimate their marginal tax price due to the complicated budget process which leaves them unaware of intergovernmental grants, giving the government monopoly power to increase its size (Campbell, 2004: 306). Buchanan and Wagner (1977) strengthen the view that complex and indirect tax structures engender fiscal illusion that systematically stimulates higher levels of public expenditures than would be found under simple and direct tax structures. Oates (1979) also argues that taxpayers underestimate their marginal tax price because of the complicated budgeting procedure, leading them to be totally unaware of intergovernmental aids and increase the government monopoly power. His fiscal illusion hypothesis offers one potential explanation of the flypaper effect (Geon, 2005: 4).

Heins (1971) and Fisher (1979) argue that public expenditures can increase from lump-sum grants even if there is no resource increase in the subnational jurisdiction. It is argued that this phenomenon occurs because the different tax systems used by the different levels of government can create individual income effects (Dowell, 2000: 15). Explanations of the flypaper effect based on fiscal illusion include the

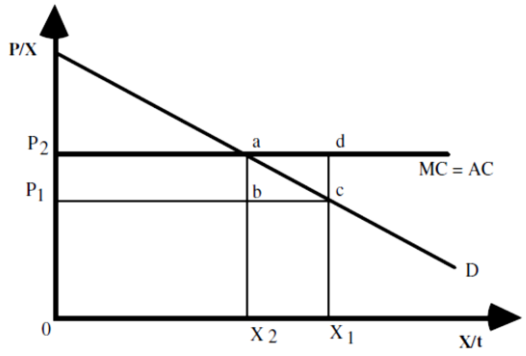
notion that voters make resource allocation decisions based on average, rather than marginal prices. Courant et al. (1979) and Oates (1979) applied this concept in models of recipient government spending. Logan (1986) and Hewitt (1986) extended this analysis to incorporate the effects of financing on the perceived cost of grantor government output. (Logan & O'brien, 1989: 221).

The observed tendency for lump-sum grants to stimulate higher public expenditures than equivalent increases in other revenue sources is mainly due to the behavior of budget maximizing bureaucrats and politicians (Amusa et al, 2008). Budget-maximizing public officials effectively conceal the lump-sum character of the grant revenues. What the electorate sees is a reduction in tax rates needed to finance local spending programs, and this reduction is erroneously viewed as a reduction at the margin in the 'tax-price' of these programs. The budgetary process thus transforms what is, in truth, a lump-sum inter-governmental grant into what is perceived by individuals as a reduction in the tax-price of local public goods. The result is a willingness on the part of the local electorate to support higher levels of spending than if they correctly perceived the relevant fiscal parameters (Oates, 1979: 77)

The empirical results showed that intergovernmental grants are an important determinant of the level of local public spending.

The five specific hypotheses underlying the empirical analysis of fiscal illusion can be illustrated in terms of a simple diagram developed by Wagner (1976) which is shown in Figure 1 below. Each of these hypotheses has attempted to model a process in which fiscal illusion causes citizens to underestimate the tax-price of a public good and so result in an oversupply of that good. In Figure 1, X2 and P2 represent the tax-price and desired output of the public good in the absence of fiscal illusion, and the area 0P2aX2 the public budget (expenditure or revenue). This is consistent with the socio-economic vector aX. With the introduction of fiscal illusion the perceived tax-price falls to P1, desired output expands to X1 and the perceived budget is OP1cX1. However, the actual budget is 0P2dX1 since the actual tax-price is still P2. Empirical tests of fiscal illusion aim to evaluate the significance of the area X2adX1, the excess budget/revenue/expenditure attributable to the illusion vector bF (Dollery & Worthington, 1996: 4).

Figure1: Modelling Fiscal Illusion



Behavior under illusion is not necessarily irrational. The individual who behaves irrationally makes inconsistent choices; he does not behave in such a way that an external observer can make predictions, even should his utility function remain unchanged. By contrast, the individual who behaves in the presence of an illusion will act consistently; given the same choice situation on two separate occasions he will tend to make the same decision, provided that "learning from experience" does not dispel the illusion and provided that his utility function does not shift in the interim. Conceptually, the external observer can make predictions here if he knows the external of illusion on choice behavior. This amounts to saying that "theorizing" about individual behavior under illusion is possible, whereas "theorizing" about individual behavior that is genuinely irrational is not possible (Buchanan, 1967: 126).

Literature Review

Paper of Maddah & 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, is 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.

Sausgruber & Tyran (2005) experimentally tested the Mill hypothesis and identify tax framing as a cause of fiscal illusion. They find that the tax burden associated with an indirect tax is underestimated, whereas this is not the case with an equivalent direct tax. In a referendum to tax and redistribute tax revenue, fiscal illusion is found to distort democratic decisions and to result in "excessive" redistribution. Yet, voters eventually learn to overcome fiscal illusion. Gemmell et al (1999) examined whether variables commonly used to test standard fiscal illusion arguments (that tax structure affects voters' demands for public goods) can help explain the time-series behavior of government expenditure in the UK during 1955–1994. They modify a standard median voter model to incorporate fiscal illusion via 'less visible' (indirect) taxes and deficit financing. While they find evidence that both are positively associated with increased government spending, this would appear to be consistent with both fiscal illusion and standard efficiency arguments.

Dollery & Worthington (1996) examined the empirical analysis of the five main hypotheses subsumed under the generic term fiscal illusion. After placing these hypotheses within a common theoretical framework, the paper attempts to evaluate empirical research into the revenue-complexity hypothesis, the revenue elasticity hypothesis, the flypaper effect, renter illusion, and debt illusion.

Amusa et al (2008) extended existing literature on fiscal illusion by using the fiscal year 2005/06 financial and expenditure data from 237 local government authorities in South Africa to evaluate the flypaper variant of the fiscal illusion hypothesis. Empirical results indicate that the marginal effects of municipal own-source revenues on local expenditure exceed those of intergovernmental transfers. No statistical evidence in support of the flypaper hypothesis within the context of municipal expenditures in South Africa is found.

Logan (1986) developed a more general model of illusion that incorporates the grantor government, thereby eliminating

inconsistencies encountered in previous models. The more general model implies that grant finance increases the perceived marginal cost of grantor government output. Thus grant-induced illusion should have two effects: an increase in recipient output and a decrease in grantor output. The empirical work sup-ports this hypothesis.

Mourão (2008) discussed the impact of fiscal illusion on economic growth. The main contribution of his work highlights the need for reducing the expected return from participating in fiscal illusion practices in order to prevent adverse effects on economic growth. Additionally, this model reinforces the advantages of productive public goods (not deviated for political unproductive rents) in order to mitigate the negative effects of fiscal illusion.

According to Worthington & Dollery (1999), It has been argued that evidence supporting the widely documented flypaper effect is a statistical artefact; more specifically that previous studies are compromised by the use of inappropriate functional forms and the endogeneity of intergovernmental grant programs. Whilst the first issue may be resolved with careful econometric testing, the second requires the incorporation of institutional constraints into governmental expenditure equations. Combining Australian local government expenditure equations and intergovernmental grant parameters, for the period 1992–1993, the flypaper controversy is analyzed. Empirical results confirm the sensitivity of the flypaper effect to specification, and tests of fit unambiguously favor one functional form. That specification yields no evidence of a flypaper effect in the Australian institutional milieu.

Utilizing data for Norwegian local governments in the 1930s, Tovmo & Falch (2002) found that political strength reduces the size of the flypaper effect. When the local council consists of only one political party, one cannot reject absence of a flypaper effect, while the flypaper effect is large in fragmented local councils.

Campbell (2004) integrated two models of local government behavior, leviathan and fiscal illusion, into the framework of overlapping jurisdictions. Estimation of the leviathan and fiscal illusion variables without accounting for vertical effects between overlapping jurisdictions resulted in overestimation of the horizontal effects. He found that municipal per capita expenditures and county per capita

expenditures are symmetrically complementary.

A Model for Examining Flypaper Effect

The model used in this study was derived from Pinar (1998) based on the structure of Iran economy.

The voter-taxpayer i's demand for local government provided goods is hypothesized to depend on i's income, i's tax-price, as follows:

$$G_i = \alpha\, Y_i^{\alpha}\, P_{gi}^{\beta}, \quad i = 1,2,\dots,N \qquad (1)$$

where G_i is i's consumption of government-provided goods, Y_i is i's income, P_{gi} is i's (true) tax-price for G_i. The price of private goods is assumed to be similar across localities and is normalized at unity. Multiplying both sides by P_{gi}, the following specification is obtained:

$$E_i = \alpha\, Y_i^{\alpha}\, P_{gi}^{\beta+1} \qquad (2)$$

where E_i (= P_{gi} G_i) is i's demand for local government expenditures.

The tax-price is defined by Borcherding & Deacon (1972) and Bergstrom and Goodman (1973) as $P_{gi} = T_i C N^{\eta}$, where T_i is i's tax share, C is the unit cost of G, and N is population with the degree of publicness measured by η. Substituting for P_{gi} in (2), yields:

$$E_i = \alpha\, Y_i^{\alpha}\, (T_i\, C)^{\beta+1}\, N^{\eta(\beta+1)} \qquad (3)$$

An important issue is the measurement of the tax-price. Due to an absence of data on C, Bergstrom and Goodman (1973) were forced to assume that the ratio of prices of public to private goods differs little between local governments. Thus, implicitly C= 1, and the tax-price becomes:

$$P_{gi} = T_i N^{\eta}$$

If voter-taxpayers are subject to fiscal illusion due to some characteristics of the local taxation, their demand for local public spending will depend on the perceived tax-price rather than the "true" tax price. The perceived tax-price may be define $\hat{P}_{gi} = \Pi P_{gi}$ where Π_i is a 'perception parameter' for individual i, which is hypothesized to be a function of the local fiscal structure. In this paper, a relevant feature is considered: the flypaper effect. Let Π_i be a function of this feature

as follows:

$$\Pi_i = FLY_i^{\pi_1} \quad (4)$$

where FLY_i is the per capita central grants. Substituting the perceived tax-price ($\hat{P}_{gi}$) for the tax-price (P_{gi}) in equation (2), the model to be estimated becomes:

$$lnE_i = lna + \alpha lnY_i + (\beta + 1)\, ln(T_i\, C) + \eta(\beta + 1)lnN + \delta_1 lnFLY_i + u \quad (5)$$

where $\delta_1 = \pi_1(\beta + 1)$, $\delta_2 = \pi_2(\beta + 1)$, and $\delta_3 = \pi_3(\beta + 1)$.

Of course, we will estimate the model as a whole and we also consider the province's revenue from oil revenues as an indicator of the intergovernmental grant (from central government to the provincial government).

$$lnE = lna + \theta_1 lnY + \theta_2 lnT + \theta_3 lnN + \theta_4 lnFLY + u \quad (5)$$

The sign predictions for our variables are as follows: Income (Y_i) is expected to have a positive effect on the demand for local public spending, while a combination of the coefficients for tax (T_i) and population (N) will provide some measure of the degree of publicness. FLY_i is expected to has positive effect if the alleged fiscal illusion operates.

Data and Variables

To fit the model specified in the previous section, data of 28 provinces of Iran during 2000 -2013 were used. provincial spending as the dependent variable and explanatory variables including provincial gross domestic product (non-oil), the ratio of the province tax revenues, the province population, and the province revenues from oil revenues were considered as Intergovernmental Grant index (from central government to the provincial government). Data statistics were collected form Statistics Center of Iran and Budget Departments of some provinces. All variables were used in the model in the logarithmic form.

Stationary Test

The null hypothesis was based on the unit root and the alternative hypothesis was based on the absence of the unit root. According to Table 2, some variables are stationary and some of them are

nonstationary. Nonstationary variables become stationary by differencing once.

First, to ensure that the regression is non-false, it is necessary to test the Stationary of variables. There are different methods to test the Stationary of the variables and Im, Pesaran and Shin's (2003) test was used to do it. The null hypothesis is that there is a unit root test and the alternative hypothesis is that there is no unit root.

Table1: Stationary Test in Level

Level			Variable
Result	Prob.	Statistic	
stationary	0.0094	-2.35*	LnE
nonstationary	1.0000	9.74	LnY
nonstationary	1.0000	4.07	LnT
nonstationary	1.0000	4.418	LnN
nonstationary	0.5297	0.0745	LnFLY

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

All variables, except the variables of population, were not Stationary which become Stationary by differencing for once. The results are presented in Table2.

Table2: Stationary Test with Differencing for one Time

With one difference			Variable
Result	Prob.	Statistic	
stationary	-	-	LnE
stationary	0.0014	-2.985*	LnY
stationary	0.0002	-3.539*	LnT
nonstationary	0.4164	-0.211	LnN
stationary	0.0677	-1.493***	LnFLY

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

Since two variables are stationary and the other ones are nonstationary, cointegration test must be applied to see if there is cointegration relationship between variables (long-term relationship). According to the results presented in Tables 3 and 4 and based on the Pedroni and Kao cointegration test, there is a long-term relationship between variables. The Panel cointegration test analyses examine long-term economic relationships. The main idea of cointegration analysis is that although many time series are nonstationary, but the long-term linear combination of these variables may be stationary. Cointegration analyses

show that we can test and evaluate this long-term equilibrium relationship. If an economic theory is correct, the particular set of variables specified by the theory are correlated with each other in long-term. Moreover, the economic theory specifies relationships only in long-term and does not provide information about short-term dynamics between variables.

If the theory is valid, it is expected that despite nonstationary variables, linear combination of the variables is stationary. Otherwise, validity of the theory is questioned. So, cointegration is widely used to test economic theories and estimate long-term parameters (Enders, 2004). According to cointegration tests, if the variables are cointegrated, then their residuals should be I (0) or zero-degree cointegrated. On the other hand, if the variables are not cointegrated, then their residuals will be I (1).

Cointegration test results using Pedroni method (with the null hypothesis of no cointegration for this test) are shown in Table 2. Pedroni cointegration results include 7 statistics identified in two groups. The first group is Within Dimension including Panel statistics v and rho similar to Phillips & Perron (1988), Panel statistics PP (non-parametric Panel) and ADF (parametric Panel) similar to ADF single equation test. The second group is Between Dimensions which is comparable with average panel tests proposed by Im et al. (1997). This group includes three test groups including rho, PP, and ADF (Pham & Nguyen, 2010). As seen, based on the results presented in the table, cointegration or long-term equilibrium relationship between the variables in two statistic groups of PP and ADF, as well as two test Panel statistics of PP and ADF at 1% level and Panel statistic of v at 5% level are accepted. These results indicate that there is a long-term relationship between the variables in the provinces of Iran.

Table3: Pedroni Residual Cointegration Test

Pedroni Cointegration	No intercept or trend	
	Statistic	Prob.
Panel v-Statistic	-1.2975	0.9028
Panel rho-Statistic	1.6979	0.9552
Panel PP-Statistic	-3.6376*	0.0001
Panel ADF-Statistic	-2.6205*	0.0044
Group rho-Statistic	3.4782	0.9997
Group PP-Statistic	-7.9548*	0.0000
Group ADF-Statistic	-4.9314*	0.0000

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

In addition to Pedroni co-integration test, Kao co-integration test was used. The results are presented as follows:

Table 4: Kao Residual Cointegration Test

Type of statistic	Value	Prob.	Result
ADF	1.4148***	0.0786	Null hypothesis is rejected; it means that the variables are co-integrated.

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

Estimation and Results

One of the econometrics methods to solve or reduce the problem of endogenous explanatory variables is the GMM method.

Using GMM dynamic panel data method has some advantages such as taking into account the individual heterogeneity and more information, and removing existing bias in cross-sectional regressions, and its result is more accurate estimates with higher performance and less co-linearity in the GMM. GMM dynamic panel data method is used when the number of cross-cutting variables (N) is greater than the number of time and years (T) (N> T) and this is also in study discussion; that means the number of sections (provinces) is greater than the number of times (Bond, 2002; Baltagi, 2008). In general, dynamic GMM method has advantages over other methods as follow:

1. Solving the problem of endogenous: The main advantage of dynamic GMM estimate is that all regression variables that do not have a correlation with interfere component (including lagged variables and differential variables) can potentially be instrumental variable (Green, 2008).
2. Reducing or eliminating co-linearity in the model: Use of lagged dependent variables eliminate co-linearity in the model.
3. Removing constant variables over time: Application of this method eliminates many variables that are stable over time and are strong effective factors in the dependent variable and can be correlated with the explanatory variables. These omitted variables cause a bias in model estimation. In this way it is possible that the effect of these factors be removed by subtracting the statistics (Baltagi, 2008).
4. Increasing the time dimension of variables: Although it is possible

that cross-cutting estimation can achieve the long-term relationship between variables, these kinds of estimations do not have the advantages of time series of statistics which increase the effectiveness of estimations. By using of time dimension of time series it is possible to see the impact of all time stable unseen factors that shows intersection differences in dependent variable (Hsiao, 2003).

The estimation method in this research is GMM method. For ensuring the appropriateness of using this method two tests are used to estimate the model. One of these tests is Sargent test which is used to prove valid over identifying restrictions, that means accuracy and reliability of instrumental variables. The second test is the first-order correlation coefficient AR(1) and the second order correlation coefficient AR(2) test. This test is also used to check the validity and accuracy of instrumental variables. Arrelano & Bond (1991) maintain that in the estimation of GMM, residuals should have a first order correlation coefficient AR(1) but not a second-order correlation coefficient AR(2). The results of Eviews 9 are presented in table below.

Table 4: Results of Estimating GMM Model

Variable	Coefficient	t-Statistic	Prob.
LnE(-1)	0.04	0.64	0.5194
LnY	0.22	10.546*	0.0000
LnT	0.05	3.58*	0.0005
LnN	-1.13	-2.256**	0.0262
LnFLY	0.45	20.00*	0.0000
Sargent test		0.529	
AR(1)		0.981	
AR(2)		0.969	

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

Results of the t-statistic indicate that coefficients of non-oil gross domestic product in province, tax income and revenue from oil is significant at 1% level and the population of province is significant at 5% level. The coefficient of tax contribution is very small and it is because of the weak tax capacities in the province. Provincial spending lags are not statistically significant. Considering the significant coefficient of income from oil (grant), Flypaper effect on Iran's

provinces will be accepted.

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