

Review of the Validity of Wagner's Law in Iranian Provinces

Gholamali Haji ^a, Akbar Komijani^{b*} and Kambiz Hozhbar Kiani^c

^a Department of Economics, College of Management and Economics, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran.

^{b*} Department of Economics, College of Economics, University of Tehran , Tehran, Iran.

* Akbar Komijani (Corresponding author)

^c Department of Economics, College of Management and Economics, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran.

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Abstract: The determination of factors affecting government expenditure has been raised in the economy of public sector from the long ago. Adolf Wagner (1967), the German economist has studied the growth of public sector of some European countries, the United States and Japan, and his theory is based on these experiences. Based on the theory, by increasing income in these countries, the government expenditure has increased more. Most of the studies conducted on the Wagner theory have been at the macro-level for Iran or between country, and only one study (Mehnatfar and Jafari Samimi, 1999) has been done in provinces of the country by cross section data for 1994.

In this study, it is tried the impact of the economy size (income and per capita income) on the size of the government (government expenditure) in the form of two Alternative Specification of the Wagner's hypothesis for the provinces of Iran in 2001-2012 are to taken into account using the panel data. For this purpose, the effect of income, population density, the urbanization rate and the unemployment rate are examined on the size of the government. The results indicate the acceptance of Wagner's law in provinces of Iran.

JEL classification: H11, H61

Keywords: government size, Wagner's law, urbanization rate, unemployment rate, population density.

1- Introduction

Adolf Wagner is the German 19th century economist who paid special attention to the issues of state economy and public expenditure. His theory is as follows: by increasing per capita incomes in an economy, the relative size of the public sector will also increase. If national gross income and per capita income increase, the government expenditure will also increase, and the rate of increase in the government expenditure will be more than the rate of increase in national income. Wagner studied the growth of public sector of some European countries, the United States and Japan, and his theory is based on these experiences.

Wagner believes that with the growth of industries, the need to create new rules and contracts will increase. As a result, some kind of administrative system (Executive) and arbitration (the judiciary) to handle the above issues are needed. On the other hand, the process of industrialization itself will lead to urbanization and urban development. And therefore, the need for more urban services is felt. So, the government should take actions to provide these needs.

Wagner also believes when real incomes of a society increase, public expenditure of social services such as education, health and culture, etc. will increase due to increased demand and since the income elasticity of demand for these goods and services is too much (for example, if the income increases one percent, the demand for this goods will be more than one percent), so, by increasing the income, these costs will increase more relatively (Musgrave and Musgrave, 1994, 186-217).

Reviews in the period of 2001-2012 for the provinces of the country show the province of Tehran with the measure of 26.51%, Khuzestan with the measure of 14.24% and Isfahan with the measure of 6.28% have allocated the highest share of the country's gross domestic product to them, and the provinces of Zanjan with the

measure of 0.86%, Semnan with the measure of 0.84% and, and Chaharmahal and Bakhtiari with the measure of 0.62% have allocated the lowest share of gross domestic product of the country to them. Measure

During the studying period, provinces of Tehran, with the measure of 18.97%, Khorasan with the measure of 10% and Isfahan with the measure of 6.48% on average have the highest share of the country's population and the provinces of Kohgiluyeh and Boyer-Ahmad with the measure of 0.89%, Semnan with the measure of 0.84%, and Ilam with the measure of 0.77% have on average the lowest share of the country's population.

In this period, the provinces of Tehran with the measure of 25.98%, Khuzestan with the measure of 14.08% and Khorasan with the measure of 6.57% have on average the highest share of the government expenditure. Also, in this period, the provinces of Zanjan with the measure of 0.97%, Semnan with the measure of 0.91% and Chaharmahal and Bakhtiari with the measure of 0.74% have on average the lowest share of the government expenditure.

The average ratio of the government expenditure to GDP based on constant prices in 2004 has been calculated separately in provinces of the country. This ratio was the highest amount in the country in the reviewed period for the provinces of Sistan and Baluchestan 0.71, Kurdistan 0.67 and Chaharmahal and Bakhtiari 0.66. In other words, the public sector has been relatively larger in these provinces and the private sector has been relatively smaller in these provinces.

The average rate of unemployment was 11.93% in the country. Among the country's provinces, the provinces of Lorestan with the unemployment rate of 19.11%, Sistan and Baluchestan with the rate of 15.42% and Kermanshah with the rate of 15.23% had the highest rate of unemployment. In addition, among the country's provinces, the provinces of

Khorasan with the unemployment rate of 9.36%, Mazandaran with the rate of 9.13% and East Azerbaijan with the rate of 7.58% had the lowest rate of unemployment. The unemployment rate in Tehran province was 12.03% in the reviewed period.

Regarding the review of Wagner's law at the macro and national level in Iran, relatively little research has been done that a few of them can be referred to. Mehnatfar (2004) examined factors affecting the increase of current government expenditure during the years of 1959 to 2001. Dadgar and Nazari (2008) examined the impact of globalization of trade on the size of the government in Iran for the period of 1967-2007. Haji and Fotros (2011) reviewed the validity of the Wagner's hypothesis using annual data of the Iranian economy for the time period of 1967-2007. Khodaparast Mashhadi et al (2012) examined the validity of Wagner's law and Keynes's viewpoint about the relationship between non-oil gross domestic product and the size of the public sector for Iran's economy in the period of 1967-2007. Alavi (2001) also explained the reasons for the growth of government expenditure in the form of Wagner's law for the period of 1966-1999. The only research conducted at the provincial level is the one related to Mehnatfar and Jafari Samimi (1999) that examined the factors affecting the current government expenditure in the country's provinces, and for this purpose, information of cross-sectional data for the country's provinces in 1994, and used the method of least squares.

As it is observed, most of the research conducted on the review of Wagner's law is at the macro and national level in Iran using the time series data for a period of time, and the only research conducted at the provincial level is the last research related to Mehnatfar and Jafari Samimi (1999) that this research was conducted using the cross-sectional data at the provincial level in 1994, and between variables of the mentioned research with the present research,

there is a considerable difference. It is worth noting that the method used in the present research is the panel data method, and hence, the present study is quite different with other conducted research in the country and it is regarded as a new work.

On the other hand, due to the West's sanctions against Iran, problems created during oil sales, acquisition of oil revenues in the recent years, and the reduction of government's budget dependence on oil revenues, it is necessary to review how to allocate limited budget of the country to the provinces, and results of such research in this field can help the government and parliament to do it better and more accurately based on the factors influencing the government expenditure in provinces of the country. Hence, lack of doing such research is completely sensible. With the help of this research, the factors affecting the size of the government in provinces of the country can be identified, and the extent of the impact of each of them on the size of the government can be determined in provinces. Also, the effect of different rates of production or income growth on the government expenditure can be determined.

In the following, first, literature Review of Wagner's law and other studies about government expenditure and then Material and Methods and alternative forms of Wagner's law introduced. after introducing alternative specification, the results of estimation will be analyzed. In the end, conclusion and suggestions are discussed.

2- literature Review

Macro models examined in this regard are assumed with short-run models of macroeconomics in which they are cost and are different in examining the costs of the public sector. The purpose of the macro models of public expenditure is to show the process of public expenditure over a long period. In other

words, the time trend of public expenditure is desired; in fact, in these models, the study of public expenditure growth is desired in a period. These models include development models of public expenditure growth, Wagner's law and Peacock and Wiseman's analysis.

Based on the models of "the development of public expenditure growth", in the early stages of economic growth and development, the public sector investment is high as a proportion of the total investment in the economy; therefore, it is seen that the public sector provides the underlying costs of economy, such as road, transportation systems, health systems, rules and regulations, education and other investments in human capital. It is said that these costs are required to go to "skip stage". In the mid-stages of development, the government continues the supply and investment of capital goods, but this time, the government investment is supplementary to private investment growth. Of course, in all stages of development, there is also a market failure that can be a barrier to reach saturation; therefore, increased activity of the government is also essential to deal with the market failure (Pourmoghim, 1996, 305).

Musgrave (1969) believes that in during of development, the total ratio of investment to GDP increases, and the ratio of public sector investment to GDP decreases. Rostow(1960) believes that when the economy reached a maturity stage, the combination of public expenditure would change from underlying expenses to health, education and welfare services expenditure. At the stage of "mass production", the maintenance of the income level and redistribution programs increases compared to public expenditure for other items and also to GDP. The Musgrave and Rostow's model is an overall overview the development process. However, the data suggests that changes of the share of government expenditure and different combinations of public expenditure will change in during of development.

Wagner (1967), the economist of the nineteenth century tried to determine the share of public sector in GDP, and it is something known as Wagner's law. Of course, Wagner did not express his opinions as law, but economists after Wagner expressed Wagner's opinion under the title of Wagner's law. It is not clear whether Wagner's opinion of the relative growth of public expenditure meant the proportion of public expenditure to GDP or absolute growth of public expenditure. However, Wagner's law is expressed as: "with the growth of per capita income in the economy, the relative size of public sector increases as well."

The basis of Wagner's view and statement is experimental. He examined the public sector growth in several European countries, America and Japan in the nineteenth century; and expressed a determining factor of public expenditure proportion to GDP in terms of political and economic factors. Of course, it should be noted that Wagner lived in the nineteenth century, and in this century, the information related to the inability of market and external factors was very primitive. However, Wagner found that with economic system industrialization, the nature of the relationship between market expansion and constituent factors of the market became complicated and required to create business contracts and rules, and as a result of an administrative and judicial system for handling the previously-said cases, it should be created.

Also, urbanization and development of cities along with increasing congestion in urban areas result in the creation of external factors and the phenomenon of congestion that in all cases, it requires the involvement and regulations of government. Thus, Wagner explains that why the combination of public sector services such as legal, police and banking services are considered while these services are done by the government.

Wagner determines the public expenditure growth on education, culture, health and welfare

in terms of demand income sensitivity coefficient. According to Wagner, these services have high demand income sensitivity. So, with an increase in real income (GDP) in the economy public expenditure increases more relatively on these services and this, in turn, causes an increase in the ratio of public expenditure to GDP.

Peacock and Wiseman's analysis (1979) is perhaps one of the best analyses of the time trend of public expenditure. They focused their analysis on the theory of public expenditure of the government. This means that the government tends to spend more money and people of a society are willing to pay less tax, and the government is required to do people's requests. So, the government does public expenditure to influence public opinion.

Peacock and Wiseman (1979) know voters as the people who use benefits of public goods and services, but don't want to pay taxes. Hence, when the government attends to its public expenditure as a part of the budget, it pays special attention to voters' reaction to the applied tax system. They assume that a tolerable level of taxation exists that acts as a limit on the government's behavior.

Peacock and Wiseman (1979) know taxation as a limit for government expenditure. Hence with increasing income, tax income – with a fixed tax rate – increases. Likewise, the public expenditure increases with GDP; therefore, in normal times, public expenditure will have a gradual increasing trend though there may be a difference in the economy between what people think, the optimal level of public expenditure with what the tolerable level of taxes is. In unusual cases, in this gradual and increasing trend, a problem is created. In situations such as war, recession and famine public expenditure increases, and to provide increased public expenditure, the government is forced to increase the level of taxes. Anyway, this tax increase will

be acceptable by people during the unusual times.

This change in public expenditure is called displacement effect. In unusual conditions, public expenditure displaces private expenditure and consequently, a shift occurs to the top in public expenditure. War expenditure is not generally provided by tax. No country has such a tax capacity. Therefore, countries mainly resort to loan to provide the expenses.

Another case that may act is famous as the curiosity effect. This is caused by people's awareness of social issues in unusual conditions. Therefore, the government develops the scope of activities of its expenditure and services in order to improve social conditions since people's opinion does not return from the tolerable level of taxes to its previous level. Therefore, the government will be able to arrange its costs at a higher level and develop and expand the areas of public expenditure (Ibid, 307).

In a study, Abizadeh (1988) examined the economic development and income elasticity of demand for the government. He reviewed and tested Wagner's hypothesis experimentally using data for 53 countries in a seventeen-year period from 1963 to 1979. Results show that the income elasticity of demand for the size of government is larger than the unit in 52% of cases for the group of less developed countries. This measure has been 21% for the group of developing countries and 7% for the group of developed countries. Obviously, this is a sign of a relative reduction in the amount of income elasticity of demand for the size of government when countries move from the less developed to developing and developed stage (Abizadeh 1988, 15-43).

In an article, Ram (1987) examined Wagner's hypothesis in a time series and cross-sectional view. He evaluated the validity of Wagner's hypothesis using the internationally comparable data of government's income and cost for 115 countries during the period of 1950-

1980. The time series data of countries was reviewed individually, and several cross-country time series were examined. In addition to the wonderful diversity that exists in different countries' situation, the results indicate that while this hypothesis is supported in some time series data, such support does not exist in most cross-sectional estimates (Ram 1987, 194-204).

Yousefi and Abizadeh (1992) selected 30 states randomly in America and examined the validity of Wagner's law. In this study, the time series data of 1950-1985 is used for each state. Reviews show that in 21 of 30 states, the income elasticity for government expenditure is larger than one which is considered as an approval for Wagner's law (Yousefi and Abizadeh 1992, 322-339).

In an article, Alesina and Wacziarg (1998) considered the openness of the country and government's size. This article indicates smaller countries have larger share of public consumption in GDP and tend to free trade more. These experimental observations are compatible with recent theoretical models to explain the formation and breakdown of the country and may be considered positive for the observed experimental relationship between the openness of trade and the size of government (Alesina and Wacziarg 1998).

In a study, Rodrik (1998) deals with this issue why more open economy has bigger government? A positive correlation exists between the exposure of an economy to international trade and the size of its government. This correlation is established in samples with low and also high income considering a wide range of controls. One explanation is that government's expenses play a role in reducing the risk in economies which are subject to a considerable amount of external risk. In this paper, a wide range of evidence is presented in accordance with this hypothesis. In particular, a strong relationship is established between the openness and the size of

government when the risk of the terms of trade has highest value (Rodrik 1998, 997).

Hondroyannis and Papapetrou (2001) examined the validity of Buchanan-Wagner's hypothesis; that is the increased public expenditure as a result of large deductions for Greece in the period of 1961 to 1994. To perform the test, vector co-integration and correction vector are used. There is a long-run relationship between government expenditure, deficit, income, wages, adult population and short-term deviations. In addition, efficiency in the public sector is less than the private one and the growth of income is not considered as an important factor of increase in the relative size of the public sector (Hondroyannis and Papapetrou 2001, 169-182).

In an article, Christopoulos and Tsionas (2003) performed Buchanan-Wagner's hypothesis for European countries. They used new techniques of time series, unit root in panel data and panel co-integration tests. Their findings show, in the long run, there is a positive relationship between government expenditure and its deficits for each country individually; likewise, for the entire panel, Buchanan-Wagner's hypothesis is also confirmed (Christopoulos and Tsionas 2003, 439-453).

Legrenzi (2004) examines the displacement effect on the growth of government for Italy. Long-run analyses indicate that domestic production has a permanent impact on the growth of government; that is Wagner's law is confirmed. Short-run dynamics is more complicated and some evidence implies the displacement effects. Moreover, when deviation is more than equilibrium, the government expenditure is adjusted faster (Legrenzi 2004, 191-203).

Akitoby et al. (2005) conducted a research in International Monetary Fund and Washington DC for 51 developing countries. The evidence in these countries indicates that the business cycle and high tendency of government are available

to increase expenditure during the time. The main components of government expenditure in 40% of the countries have been in the direction of the business cycle. production and Government expenditure for at least 70% of these countries are also cointegrated which represent a long-run relationship between government expenditure and production and is consistent with Wagner's law. In contrast, previous studies only had weak support of the approval of Wagner's law for developing countries. However, for industrial countries, there has been some stronger support of Wagner's law (Akitoby et al. 2005, 908-924).

Huang (2006) reviewed and tested Wagner's law for China and Taiwan using the annual time series data of 1979 to 2002. To estimate the long-run relationship between government expenditure and production, bounds test is used. This test is done based on unrestricted error correction model estimation. Experimental results show that there isn't long-run relationship between government size and economy in china and Taiwan. In addition to it, results of the bounds test indicate that Wagner's law is established for China and Taiwan in the reviewed period (Huang 2006, 139-149).

Dogan and Tang (2006) considered the determination of direction of causality between national income and government expenditure in Indonesia, Malaysia, Philippines, Singapore and Thailand. Granger's causality tests are done to find the direction of causality between these two variables. In the study, time series of the years 1960 to 2002 are used. Results of the Granger's causality test indicate that Wagner's law is not approved in these five countries in the reviewed period, and this means that the direction of causality is not from the per capita national income to per capita expenditure of the government. The Granger's causality tests also show that in the period of review, the alternative hypothesis is only true for the Philippines; that is in the Philippine, the direction of causality is

from the per capita expenditure of government to the per capita national income. Findings of this research indicate that government expenditure does not play a decisive role in the increased economic growth in these four countries (except the Philippines). This subject seem surprising because everyone believes that the government plays an important role in the development of the countries (Dogan and Tang 2006, 49-58).

Mohammadi et al. (2007) examined new evidence of Wagner's law in Turkey. Based on this research, striking appearance of the Turkish economy in the past 50 years represents the rapid growth of the size of the public sector measured by the ratio of government expenditure to GNP. The government has emphasized more on the country's infrastructure that is shown in the investment of public sector in transportation, telecommunications and energy. Results of this research reconsidered the validity of Wagner's hypothesis using annual data of Turkey in 1951-2005 with six different hypotheses and autoregressive distributed lag method. The experimental results support the approved Wagner's law (Mohammadi et al. 2007, 94-106).

Narayan et al. (2008) made another review for provinces of China with panel data methods. This method is used in this paper for the first time in the literature of Wagner's law in which the unit root, co-integration, and Granger's causality test in panel data are applied. Altogether, there is evidence of the approval of Wagner's law in central and western provinces of China, but it is not approved for the full panel of provinces or eastern provinces of China (Narayan et al. 2008, 297-307).

Samudram et al. (2009) examined the theory of Keynes and Wagner's viewpoint in relation to the role of public expenditure on economic growth for Malaysia in the period 1970 to 2004. The results of their review using the autoregressive distributed lag model and bounds test indicate that there is a long-run

relationship between total expenditure (including defense, education, development and agriculture expenditure) and GNP. The results also show that considering a structural break in 1998, a two-way causality relationship exists for GNP and the spent administrative as well as health expenditure that approves both Keynes's and Wagner's viewpoint. For other expenditure groups, there is a long-run causality relationship towards expenditure implying the approval of Wagner's law (Samudram et al. 2009, 679-712).

In an article, Mahdavi (2011) follows to review the validity of Wagner's law using annual data (2006-1957) for the United States and for this purpose, the real costs of government and cost subgroups including (total cost, police and fire fighting, training, insurance and its benefits, consumer, unemployment insurance, workers' retirement, social services and income compensation, public welfare services, health and hospital, highways, financial management and public control, interest of public debts) are used in the local states of the United States. Johansen's co-integration tests and Bounds test of Pesaran et al (2001). are used to examine the existence of long-run equilibrium relationship between real per capita GDP and the ratio of the costs of each of these existing subgroups to real GDP. The direction of causality is tested in the framework of Toda-Yamamoto's error correction model that estimates the relations in the level values without pretest for the unit root. Error correction model results indicated that the total cost, insurance and its benefits, social services and income compensation were in accordance with Wagner's hypothesis. Toda-Yamamoto's approach, however, showed that in these cases and some other cases (the cost groups) the causality relationship has been in a two-way form. This article has provided a relatively comprehensive test of Wagner's law at the local level of the US government with an emphasis on the co-integration and causality

concepts about the relationship between the income and costs (Mahdavi 2011, 398-413).

In a paper, Wu and Lin (2012) reviewed determinants of the size of government at the provincial level of China. The results of their study included the following findings: Wagner's law is not established for China. Poor localities have larger government. The hypothesis of "the economy of scale" is true for China. The liberation of trade and foreign direct investment will facilitate downsizing government and improve the appropriation performance of public services. Fiscal decentralization in China has not limited the expansion of bureaucracy; instead, this system has increased the size of local government with share of income. Factors such as the ratio of minority population, the ratio of gross dependence and unemployment rate have not had significant impacts on the size of government (Wu and Lin 2012, 255-270).

3- Material and Methods

Wagner's law examines the long-run relationship between the size of government (usually referred to government expenditure) and the economy (usually referred to the production or income) experimentally. Since there are different criteria for the size of government (government expenditure) and income (income and per capita income), different experimental models of Wagner's law are available that most researchers use one or some of them as single-equation models. In this study, two various specification are used to prove Wagner's law in Iran that are cited abundantly in most famous scientific papers in the world. These two alternative Specification are as follows:

3-1 Peacock-Wiseman's Specification

In Peacock-Wiseman's Specification, government expenditure G_{it} in each province is expressed in terms of income Y_{it} in each province; that is, with the increase in revenue of each province, government expenditure increases

in that province. To approve Wagner's hypothesis, it is necessary that the parameter α_2 is larger than a unit. In other words, the elasticity of government expenditure in each province compared to the income of that province is larger than one.

$$\log G_{it} = \alpha_1 + \alpha_2 \log Y_{it} + u_{it} \quad (1)$$

3-2 Goffman's Specification

Goffman has presented another form of Wagner's Specification. In this Specification, government expenditure G_{it} in each province is expressed in terms of per capita income Y_{it}/N_{it} in that province; that is, with the increase in the per capita income of each province, government expenditure increases in that province. To approve Wagner's hypothesis, it is necessary that the parameter β_2 is larger than a unit. In other words, the elasticity of government expenditure in each province compare to per capita income of that province is larger than one.

$$\log G_{it} = \beta_1 + \beta_2 \log \frac{Y_{it}}{N_{it}} + u_{it} \quad (2)$$

According to studies carried out, in the texts of the economy of public sector, other factors other than income are available that affect the government expenditure. These factors are numerous and countless that among them with regard to the availability of statistical data: population density, urbanization rate, and unemployment rate are selected and considered in the models. How to affect each one of them is as follow:

Since large fixed costs are necessary to launch an administrative system, a region with a small population may experience higher public expenditure based on a per capita criterion. The evidence of a few countries indicates that public expenses as a percentage of GDP tend to increase in smaller countries (Alesina and Wacziarg, 1998), while some of experimental studies reveal a different model in individual

countries and show that the scale effects help to explain the growth of government. (Andrews and Boyne, 2009); since the major part of public services (such as education and health) is fairly homogeneous, a reverse relationship can be expected between local population density and the size of government. The local population density is measured to express the scale effects as the entire population of province divided by the number of cities in a province.

The purpose of urbanization rate is the ratio of urban population of province to total population in province. In the past decades, cities have expanded and on the contrary, villages have been emptied of population. Increasing urbanization is limited and it is to reach the least rural population, but the growth of city is not limited due to the natural increase of population and rural migration. Therefore, the city can grow without any change in the ratio of urbanization. What is certain, government expenditure has been more towards cities in Iran and villages have taken less advantage of public services based on the per capita criterion. Therefore, it can be assumed that by larger urban population, the size of government will get greater.

Another factor affecting the size of government is the demand for public services. The relative size of unemployed population (compared with employed one) may increase the level of public expenditure. Martin (1982) found a positive correlation between public expenditure and the ratio of student population as well as the elderly. Students demand for educational services while the elderly need more health care; therefore, our hypothesis is that the government will be bigger in regions where unemployed people constitute more percentage of a population. The unemployed may request local government to spend more expenditure to compensate for unemployment and job training. Cusack et al. (1989) and Esping - Anderson (1996) provided evidence supporting a positive relationship between the unemployment rate and

the size of government. In this study, our hypothesis is that more unemployment will be associated with more expenses of government.

4- Results and Discussions

To estimate models, the data of 28 provinces of the country is used based on divisions of the year 2006 for the period of 2001-2012. It should be noted that the data for North Khorasan, Razavi and South Khorasan provinces are applied and collected under the title of Khorasan Province. In these models G_{it} is the total real expenditure of government in each province, Y_{it} is the income and Y_{it}/N_{it} is the real per capita income in each province in million Rials. Information about government expenditure, GDP, population and urban population, number of counties, divisions of country, unemployment rate of provinces from regional reports and other reports of the Statistical Center of Iran; price index for transform nominal to real measures from the Central Bank; budget data of some years from the book of budget law in desired years has been collected.

At first, these models are estimated by the method of fixed effects; then, F statistics is used in order to test the equality of constant terms. According to Table (1), the F value calculated is greater than the F table or significant level is less than 5 percent. So, the null hypothesis has been rejected due to equal constant terms, and therefore, fixed effects model is accepted between the fixed effects model and common effects model. So, the constant terms should be considered different in the model.

Model Specifications	F statistics	d.f	Prob
Peacock-Wiseman	14.65	(27,34)	0.0000
Goffman	781.31	(27,34)	0.0000

In the following, these models were estimated by random effects method. The main assumption in the estimation of random effects is that the random effects are not related with explanatory variables. A common method for a test is to use Hausman test (1978) for comparing the estimation of fixed and random effects coefficients (Wooldridge 2002, 288; Baltagi 2005, 66). To perform the Hausman test, first, a specified model with random effects should be estimated. Eviews Software also estimates automatically specified fixed effects, calculates test statistics, and also displays results and auxiliary equations.

Model Specifications	Chi-Squared statistics	d.f	Prob
Peacock-Wiseman	199.33	4	0.0000
Goffman	5.61	4	0.2299

Considering table (2), the computational Chi-squared statistics for Peacock Wiseman model is larger than the Chi-squared value of the table; in other words, a significant level in the test is less than 5 percent. therefore, the fixed effects model in the Peacock Wiseman specification is accepted. In the table (2), the computational Chi-squared statistics for Goffman model is smaller than the Chi-squared value of the table; in other words, a significant level in the test is more than 5 percent. therefore, the random effects model in the Goffman specification is accepted.

independent Variable	Coefficients	S.E	Prob
C	-3.1826	0.4340	0.0000
$\log(Y_{it})$	1.1096	0.0293	0.0000

SEC _{it}	-0.00005	0.0002	0.7636
UR _{it}	0.0139	0.0023	0.0000
UNEM _{it}	-0.0085	0.0016	0.0000
Weighted Statistics	$R^2=0.9929$	D-W=1.8617	

Summary of the results of specification estimation with fixed and random effects method as table (3) and (4) displayed.

Table 4: Goffman model			
Estimation Method: EGLS, Random Effects			
Dependent Variable: $\log(G_{it})$			
independent Variable	Coefficients	S.E	Prob
C	4.1625	0.3251	0.0000
$\log(Y_{it}/N_{it})$	1.1502	0.0359	0.0000
SEC _{it}	-0.0003	0.0002	0.0850
UR _{it}	0.0230	0.0025	0.0000
UNEM _{it}	-0.011	0.0020	0.0000
Weighted Statistics	$R^2=0.9025$	D-W=1.2854	

To review significant of all the coefficients, the Wald test is used after estimating the final model. For all the coefficients, the value of F and Chi-squared statistics is bigger than the table and the value of F and Chi-square statistics in the Peacock-Wiseman's model was less the table only about the coefficient of population density or the scale effects of population density statistics. This coefficient was not statistically significant at the 5 percent level although this coefficient in the Goffman's model was significant at the 10 percent level.

The value of coefficient determination of regression estimated is relatively high in both models; then, it can be concluded income Y_{it} or per capita income Y_{it}/N_{it} , the scale effects SEC_{it}, the rate of urbanization UR_{it} and the unemployment rate UNEM_{it} have been able to explain changes in government expenditure G_{it} well. On the other hand, the value of Durbin-Watson statistics in the Peacock-Wiseman's

model was relatively about 2 and can represent lack of autocorrelation between error terms; and the value of this statistics in the Goffman's model is relatively spaced with 2 although the probability of emergence of such a problem is relatively low for panel data with a short period. Also, given that the estimation method was at least weighted squares, it can be claimed that the problem of heteroscedasticity in cross-section (provinces), if there is, has also been eliminated.

As it is observed, in the Peacock-Wiseman's model, the positive income coefficient in accordance to the theory is almost equal to 1.11; that is every one percent increase in income in provinces of the country on average results in the increase of 1.11 percent of government expenditure in provinces. The coefficient of negative scale effects and in accordance with the theory is statistically non-significant and for this reason, it cannot be interpreted. The coefficient of the positive urbanization rate and in accordance with the theory is almost equal to 0.014. Therefore, every one unit increase in the rate of urbanization occurred as a result of increased urban population or migration from villages to cities causes an increase of 0.014 percent unit increase in government expenditure in provinces. On the contrary, the coefficient of the negative unemployment rate is almost 0.008; that is every one unit increase in the unemployment rate in provinces of the country on average causes a reduction in government expenditure about 0.008 unit in provinces.

In the Goffman's model, the positive per capita income coefficient in accordance to the theory is almost equal to 1.16; that is every one percent increase in per capita income in provinces of the country on average results in the increase of 1.16 percent of government expenditure in provinces. The coefficient of negative scale effects and in accordance with the theory is statistically non-significant at the 5 percent level although this coefficient is significant at the 10 percent level. Therefore,

every one unit increase in the scale effects results in the reduction of government expenditure about 0.0003 unit. The coefficient of the positive urbanization rate and in accordance with the theory is almost equal to 0.023. Therefore, every one unit increase in the rate of urbanization occurred as a result of increased urban population or migration from villages to cities causes an increase of 0.023 unit increase in government expenditure in provinces. On the contrary, the coefficient of the negative unemployment rate is almost 0.011; that is every one unit increase in the unemployment rate in provinces of the country on average causes a reduction in government expenditure about 0.011 unit in provinces.

5-1- Wagner's law test

In the end, it should be judged about the establishment of Wagner's law for provinces of Iran with the use of income coefficients in all models. To accept Wagner's law, the income coefficient in the Peacock-Wiseman model and per capita coefficient in the Goffman's Model must be larger than one. After estimating each of the models, this work is performed using the Wald test that the results are available in summary in Table (5).

Model and null Hypothesis	F statistics	d.f	Prob
Peacock-Wiseman $H_0: \alpha_2=1$	13.9556	(1,304)	0.0002
Goffman $H_0: \beta_2=1$	19.9041	(1,331)	0.0000

Since the value of Chi-squared and F statistics for all the models are relatively high and in other words, the significant level in these tests is less than 5 percent and close to zero, the assumption of zero is rejected for all models, and therefore, the alternative assumption on the establishment of Wagner's law in provinces of

Iran is accepted. So, based on the results of both models, it can be claimed by increasing income or per capita income in the country's provinces, government expenditure has increased more relatively.

5- Conclusion and suggestions

Public expenditure trend is indicated in macro models of public expenditure over a long period. In fact, in these models, the study of public expenditure growth is in a desired period. These models include the development models of public expenditure growth, Wagner's law and Peacock-Wiseman's analysis. Based on Wagner's law, with increasing income in an economy, expenditure of the public sector increases more. Wagner has studied the public sector growth of some European countries, the United States and Japan and expressed his theory based on these experiences. In this research, the validity of Wagner's law is taken into account for 28 provinces of the country in the period of 2001-2012.

The aim of this research is that the relationship between the size of public sector (government expenditure) and the size of the economy (income or per capita income) in provinces of the country is taken into consideration. For this purpose, the two famous models, Peacock-Wiseman and Goffman are used in this field. In the Peacock-Wiseman's model, the relationship between government expenditure and income is reviewed in provinces. In Goffman model, the relationship between government expenditure and per capita income is examined in provinces. Of course, the impact of other factors such as population density, urbanization rate and the unemployment rate in provinces on government expenditure are also put into account.

Considering that the nature of data is panel, first, each of the models is estimated by the method of fixed and common effects. Given that, in all models, the value of F statistics is larger

than that of the table, the method of fixed effects is accepted; then, all two models are estimated by the method of random effects and based on the value of Hausman statistics, the method of fixed effects for Peacock- Wiseman model and the method of random effects for Goffman model are selected between random and fixed effects.

In the Peacock-Wiseman's model, every one percent increase in income in provinces of the country on average results in an increase of 1.11% of government expenditure in provinces. In the Goffman's model, every one percent increase in per capita income causes an increase of 1.09% in government per capita expenditure in provinces. Based on these results, Wagner's law has been approved for provinces of the country. With regard to the establishment of Wagner's law, you should expect that with the increase of economic growth in the country's provinces, the size of government will increase more.

The coefficient of negative scale effects, as expected, in the Peacock-Wiseman's model is not statistically significant at the 5 percent error level. Of course, this coefficient in the Goffman's model is significant at the 10 percent error level. In case, a major part of public services (such as education and health) is fairly homogeneous, a reverse relationship can be expected between the local population density and the size of government. The local population density is measured to express the scale effects as the entire population of province divided by the number of counties in a province. It can be concluded from insignificant coefficient of population density that public services such as education and especially health are not homogenous in provinces of the country.

In both models, the coefficient of the positive urbanization rate is almost equal to 0.014 and 0.024; therefore, every one unit increase in the rate of urbanization occurred as a

result of increased urban population or migration from villages to cities causes an increase of 0.014 or 0.024 unit increase in government expenditure in provinces. So, it can be concluded government expenditure has been more towards cities in provinces of the country and villages have taken less advantage of public services based on government expenditure. For this reason, by larger proportion of urban population, the size of government gets greater.

In both models, the coefficient of the negative unemployment rate is unexpectedly almost -0.008 and -0.011; that is every one unit increase in the unemployment rate in provinces of the country on average causes a reduction in government expenditure about 0.008 and 0.011 units in provinces. It is expected that the relative size of unemployed population (compared with employed one) increases the level of public expenditure. Martin (1982) obtained a positive correlation between public expenditure and the ratio of student population as well as the elderly. Students demand for educational services while the elderly need more health care. The unemployed may usually request local government to spend more expenditure to compensate for unemployment and job training. Therefore, it is expected the government is bigger in provinces where the unemployed constitute more percentage of population. While the results of the study are unlike the evidence that Cusack et al. (1989) and Esping - Anderson (1996) provided from a positive relationship between the unemployment rate and the size of government.

The evidence shows in the country, provinces that due to appropriate economic infrastructure have more growth and development, possess less unemployment rate, have been able to use the entire budget allocated by the government and even in that year or the next year, demand for more budget as well. On the contrary, provinces that due to inappropriate infrastructure have less economic growth and

development, possess more unemployment rate, in some years, were not able to use the budget allocated by the government and even some of it gave back to the Treasury at the end of the year. According to these items, a reverse relationship between the size of government and the unemployment rate in provinces of the country can exist with economic conditions of provinces.

Reference

- 1) Abizadeh, Sohrab. (1988). "Economic Development and Income Elasticity of Demand for Government." *Social Indicators Research*. 20: 15-43.
- 2) Akitoby, Bernardin, Benedict Clements, Sanjeev Gupta, and Gabriela Inchauste. (2005). "Public Spending, Voracity, and Wagner's law in Developing countries", *International Monetary Fund*, Washington.D.C.
- 3) Alesina, Alberto F. and Romain T Wacziarg. (1997). "Openness, Country Size and the Government." *NBER Working Paper No. w6024*.
- 4) Baltagi, Badi H. (2005). "Econometric Analysis of Panel Data.", Third edition, John Wiley & Sons Ltd.
- 5) Christopoulos, Dimitris. K. and Efthymios G.Tsionas.(2003). "Testing the Buchanan-Wagner Hypothesis: European Evidence from Panel Unit Root and Cointegration Tests." *Public Choice*. Vol 115, no 3-4: 439-453.
- 6) Dadgar, yadolah and roholah, Nazari (2009), The effects of globalization on the government's business. *Journal of Business Research*, Vol 5 , No. 48., (in Persian).
- 7) Dogan, E. and T.C. Tang. (2006). "Government Expenditure and National Income: Causality Tests for Five South East asian Countries", *International Business & Economic Journal*, Vol 5 , No 10: 49-58.
- 8) Haji, Gholamali and M. Hassan, Fotros (2011) Test of Wagner's hypothesis by using the bounds testing approach. *Journal of Applied Economics*. Volume 2, Issue 4, (in Persian).
- 9) Hondroyannis, George and Evangelia Papapetrou. (2001). "An investigation of the public deficits and government spending relationship: Evidence for Greece", *Public Choice* 107: 169-182.
- 10) Huang, Chiung-Ju. (2006). "Government Expenditure in China and Taiwan : Do they Follow Wagner's Law?." *Journal of Economic Development* . Vol 31, no 2: 139-148.
- 11) Khodaparast Mashhadi, M., Ali Fallahi, Mostafa Salimi Far and amin, Haghnejad (2012), the Survey of Wagner's validity and the Keynesian view of the economy: a time-series analysis, *Journal of Economic Research*. Volume 12, Issue 1, (in Persian).
- 12) Legrenzi, Gabriella. (2004). "The Displacement Effect in the Growth of Governments." *Public Choice* . Vol 120, no 1-2: 191-204.
- 13) Mahdavi, Saeid. (2011). "A re-examination of Wagner's Law using US total state and local expenditure and its sub-categories." *Journal of Economic Studies*. Vol. 38 No. 4.,: 398-413.
- 14) Mehnatfar, Yusuf and Ahmad, Jafari Samimi (1999), Factors affecting the cost of government in the provinces of Iran. *Modares of Islamic Science's*, No. 10, (in Persian).
- 15) Mohammadi, Hassan, Murat Cak and Demet Cak. (2007). "Wagner's Hypothesis: New Evidence from Turkey using the Bounds Testing Approach", *Journal of Economic Studies*, Vol.35, No.1 : 94-106.

- 16) Musgrave, R.A. (1969). "Fiscal Systems", Yale University Press, New Haven, CT.
- 17) Musgrave, Richard and Peggy Musgrave. 1994. Public Finance in Theory and Practice. Translate of Masoud Mohammadi, Y Ebrahimifar. Tehran: Management and Planning Organization.
- 18) Narayan, Paresk Kumar, Ingrid Nielsen and Russell Smyth. (2008). "Panel Data, Cointegration, Causality and Wagner's Law: Empirical Evidence from Chinese Provinces ",China Economic Review ,No.9: 297-307.
- 19) Peacock, A.T. and Wiseman, J. (1979). "Approaches to the analysis of government expenditure growth", Public Finance Quarterly, Vol. 7 No. 1: 3-23.
- 20) Peacock, A.T. and Wiseman, J. (1967). "The Growth of Public Expenditure in the United Kingdom, 2nd ed., Allen and Unwin, London.
- 21) Pourmoghim, Seyed javad (1976). Public sector economy. Tehran: Ney publication. Fourth edition.
- 22) Ram,Rati. (1987). "Wagner's Hypothesis in Time-Series and Cross-section Perspectives, The Review of Economics and Statistics. vol. 69, no 2: 194-204.
- 23) Rodrik, Dani. (1998). "Why Do More Open Economies Have Bigger Governments?." The Journal of Political Economy, Vol. 106, No. 5: 997-1032.
- 24) Samudram, Muthi, Mahendhiran Nair and Santha Vaithilingam. (2009). "Keynes and Wagner on government expenditures and economic development: the case of a developing economy", Empirical Economics, 3: 697-712.
- 25) Tobin, Damian. (2005). "Economic Liberalization, the Changing Role of the State and "Wagner's Law": China's Development Experience since 1978." World Development. vol. 33, no :729-743.
- 26) Wagner, Adolf. (1967). "Three abstracts on public finance", in Musgrave, R.A. and Peacock, A.T. (Eds), Classics in Theory of Public Finance, St Martins Press, New York.
- 27) Wu, Alfred M. and Mi Lin. (2012). "Determinants of government size: evidence from China." Public Choice. 151: 255-270.
- 28) Yousefi, Mahmood and Sohrab, Abizadeh. (1992). "Wagner's law: New evidence", Atlantic Economic Journal , Vol.20, No.2: 322-339.