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# Estimation of the Taxable Capacity: The Case study of a Developing Country

**Shahram Fattahi[1], Mahdi Shokrinia[2], Mehrdad Jaihonipour[3]**
[1]Faculty of Social Sciences, Razi University, Shahid Beheshti Blvd, Kermanshah, Iran;
[2]Iranian National Tax Administration; [3]Askariye Credit Institution
E-mail: sh_fatahi@yahoo.com

**Abstract**

Existence of an effective tax system is essential for economic development. This paper estimates taxable capacity on occupations in Kermanshah province, Iran, for the period 1993-2007. The results indicated that average rate of tax effort in occupations sector is more than 0.17 which represents a tax gap in the occupations sector and the existence of potential capacities. Furthermore, from 1000 business units in the province only 1/4 units pay taxes while the corresponding average level of country is 3/4.

**Keywords**: Taxable capacity, Tax Effort, Economic Development

## Introduction

Effective tax systems are essential for developing countries because they can help promote economic growth. Due to the large budget deficits in many countries, governments have been searching for possible ways of increasing tax revenues to finance public expenditures and narrow the deficit without much distorting economic activities (Le et al, 2012).

In economics, some macroeconomic goals like economic growth are the government responsibility. It is clear that every government needs budget to conduct economic policies. One of the problems for tax system is inability to have tax capacities in the society. Awareness from the rate of unachieved capacity of tax incomes at the level of regional economies is very important.

This paper tries to introduce and estimate taxes on occupations in Kermanshah province. After estimating the capacity of tax on occupations, the rate of tax effort for different years is calculated and estimated. Therefore, this study tries to specify real tax capacity in the Kermanshah province and also to analyze the rate of achieving tax incomes for the period 1993-2007.

Organization of the paper is as follows. Following introduction in section 1, Section 2 defines what tax capacity is. Section 3 presents the literature review. Section 4 describes the methodology used. Section 5 reports the empirical results and finally Section 6 presents the conclusions.

## Tax capacity

Taxes are the most common and important financial resource to supply public incomes and it is one of the most influential and important tools of tax policies that government is able to offer most of the activities, economic and social processes. Financial incomes and reaching at real capacity of taxing in the society is the most important way to decrease reliance to the oil to adjust exchange fluctuations. The most important one is that based on the law of budget in the country the civil expenses in the province are totally dependent on provincial incomes and allocation of provincial credits forms by coefficients of public incomes in the province and as more than 80% of these incomes are allocated to the provincial incomes in the province, therefore tax incomes are used as one important method to be equipped by developmental financial resources in the province. The main motivation of taxing is to finance economic projects related to social services. Efforts to collect tax incomes are determined by introducing tax tools at the level of province. More reliance

on tax incomes, regardless of these tools and factors affecting tax capacities, can not be successful. One of the main strategies about taxes is to increase the level of tax effort by improving methods of collecting taxes and establishing laws and necessary regulations. Taxes capacity provides necessary information about economical potential in equipment tax resources and determines which factors are the most influential ones in acquiring different types of tax incomes. Information about tax capacity on current occupations and comparing them with taxes that will be received can help government in the planning for budgeting based on more reliance on taxes. Precise estimation of incomes of taxes on occupation help government to have more stable planning and rate of cooperation in this sector will be specified in supplying public government expenses more precisely. Literature review related to tax potential capacity in Iran indicates that there is a considerable gap between tax potential capacity and actual tax incomes.

Tax capacity can be interpreted as the taxpayer's ability to pay or the government's ability to raise tax revenue (Chun &Kuo, 2000). Therefore, factors affecting tax capacity can be divided into two groups: Factors related to ability of individuals in paying taxes. In this case, ability of individuals in paying taxes is determined by structural factors like level of income and intentional factors like individual's sense of responsibility to paying taxes. The second type is related to ability of government in collecting and in raising tax revenue. Ability of government in collecting taxes depends on structural factors like easy access to the tax bases and organizational efficiency of tax collection (Karimi, Hoshiar, 2007).

It should be noted that since the correct recognition of intentional factors is difficult it is better to focus on structural factors. For example, assuming other factors fixed the higher level of per capita income shows higher ability of individuals to pay taxes. Also when mineral export is the main share of national gross production, increasing of tax incomes is much facilitated.

The impact of different factors on tax capacity is different from one society to another society. However, influential variables on tax capacity can be divided into two general sets of quantitative and qualitative variables Quantitative variables

The most important quantitative factors affecting tax capacity include the rate of added value of products, per capita income, income redistribution, efficiency of production factors, level of employment and combination of employment, rate of rural and urban population, qualitative and quantitative combination of import and export, and ratio of large economic firms to the entire economic firms.

Although qualitative factors on tax capacity can not be precisely determined, it is possible to refer to state of economy, recession or boom, the culture of paying taxes, rate of organizational ability in collecting taxes, correct recognition and transparency of economic activities, independence or lack of independence of organizations in collecting taxes, coordination of regulations and law transparency.

**Literature Review**

Alfirman (2003) analyzed tax capacity in Indonesia and came to the conclusion that local governments were far from their tax capacity and could increase their tax revenue.

Davoodi and Grigorian (2007) examined the measures of institutional quality and informal economic activity and showed that institutional improvements as well as policy initiatives are important in raising tax revenue performance.

Pessino and Fenochietto (2010) concluded that there is a positive and significant relationship between tax capacity and the level of development, trade, and education.

There have been some studies done on the tax capacity in Iran. Yahyaee (1991), using the ordinary least squares and data from 1983 to 1985, estimated the tax capacity in Iran. She

considered the level of per capita income, economical texture of society, and importance of different types of economical activities, and also influential factors on ability of government in collecting taxes like costs of appointing and collecting taxes as influential factors on tax capacity. The coefficients of related variables are 0.001, 0.112, 0.365, and 0.482 respectively which means positive effects on tax capacity.

Arbab (1987) analyzed tax efficiency in Iran for the period 1973-1985. To examine the achievement or lack of achievement of tax system, different indexes are introduced and considerable indexes were examined in two time periods, 1973-1978 and 1979-1985. The index of annual growth of tax incomes to national income, the index of relate of governmental payments to GDP, the index of relative of government payments to national income, index of receiving taxes to approves taxes, the index of receiving taxes to general incomes of government and index of relative of taxes that is the rate of entire financial incomes that is the relative of the entire tax incomes to domestic gross production, and analyzed indexes in the research. The results showed that industrial sector and commercial subsector of service can pay more tax and it has an impact on tax incomes.

Nikoo (1996) tried to estimate tax capacity in Hamadan province by using the econometric models. He considered variables of export in the region, productions of province in industry sector, productions of mine industry, productions of agricultural sector, and rate of learning education in the province as influential variables on tax capacity. Models were tested statistically for the period 1981-1995. Among estimated different equations the equation with variables productions of province in industry sector, productions of mine industry, productions of agricultural sector, and rate of learning education were significant and had coefficients 0.176, -5.16, 0.006 and 354.83 respectively.

Estimating tax bases in different economic sectors, EhsanFar (2001) calculated added value in Mazandaran province. Tax ratio or ratio of the entire taxes in the region to domestic gross production in the region was used as a dependent variable and added value of different economic sectors and also rate of literacy, which is used as a proxy for per capita income, were explanatory variables. Estimating province tax capacity using time series data for the period 1971-1998 shows a gap between potential tax capacity and actual tax incomes. The estimated coefficients of model represents positive impacts of industrial, mining and service sectors on dependent variable and that service sector is the most important factor. Calculating Tax capacity and tax effort, he came to the conclusion that tax system is not efficient.

With regard to the general tax performance in Iran and calculating tax effort in East Azerbaijan province, Safari (2001) estimated the tax capacity in this province. Tax capacity was defined as tax volume that society has the power of paying it and tax effort are defined as the ratio of collected taxes to tax capacity. Added value in mine and industry and service sectors were considered as influential factors in tax capacity. Also the share of added value in different economic sectors from GDP of province and rate of literacy as tax culture is of influential factors in tax capacity. Finally he concluded that the rate of received tax is of the influential factors on tax capacity in the province and the rate of received tax in the entire period is lower than estimated capacity.

**Methodology**

Related Literature suggests factors like degree of economics openness, level of economic development, combination of incomes and economic structure are determinants of the capacities of accepting taxes. To take these factors into account, the following proxy variables are used.

Proxy variables for economics openness: ratio of import to export, the ratio of foreign trade that can be obtained from the sum of imports and exports divided by GNP.

Proxy variables for the level of economic development: it is the main determinant of tax ratio in the level of income which affects ability in paying taxes. Higher per capita income represents higher level of economic development that itself causes higher acceptance of taxes. Rate of added value in agriculture sector is another criterion in the stage of economic development.

Proxy variables for the combination of incomes or economic structure: mining sector has the main role in domestic gross product. On the other hand, previous studies showed that there is a strong and positive relationship between the share of mining sector of GDP and tax ratio. Furthermore, added value in industrial sector has a positive relationship with tax ratio.

In this research, the data on added value in different economic sectors in Kermanshah province are used as tax basis for the period 1993-2007.

The research hypothesis is as follows:

Tax ability (potential tax) in occupations sector in Kermanshah is more than actual taxes.

In the capacity tax function, t=T(x), it is necessary to introduce vector X. This vector includes value added in different economic sectors.

The following alternative models are used to examine the tax capacity:

1) $TPIU = a_0 + a_1\ VSE + a_2\ VAG + a_3\ VMI + a_4\ x + U$

2) $TPIU = b_0 + b_1\ VSE + b_2\ VIN + b_3\ VMI + b_4\ VAG + b_5\ y + b_6\ (X - M) + U$

3) $TPIU = c_0 + c_1\ VSE + c_2\ VIN + c_3\ VMI + c_4\ VAG + U$

4) $TPIU = d_0 + d_1\ VSE + d_2\ VIN + d_3\ VAG + d_4\ X + d_5\ y + U$

where (TPIU) the index of tax on jobs in the province, (VAG) added value of province in agricultural sector, (x) the rate of exportation in the province (VSE), added value of province in service sector, added value of province in industry sector, added value of province in mining sector, import(M), export and (Y) shows the rate of per capita income.

**Empirical Results**

***Stationarity of variables***

Before estimating equations it is necessary to avoid the spurious regressions. To do so, the Dickey- Fuller test is used for the unit root.

Table (1) reports the results of Dickey- Fuller test. It is clear that all variables are stationary in %95 level of significance.

**Table 1: Results of Dickey- Fuller test**

| Variable | Dickey- Fuller statistics | Result |
|---|---|---|
| TPIU | -3.794 | stationary |
| VSE | -6.093 | stationary |
| VIN | -3.963 | stationary |
| VMI | -3.522 | stationary |
| VAG | -3.802 | stationary |
| X | -3.270 | stationary |
| Y | -3.917 | stationary |
| X-M | -3.593 | stationary |

After analyzing stationary of variables, the potential capacity is calculated for business companies in 2002 and then the results were compared to the estimated model. The same procedure is used for the remaining years.

The tax capacity on occupations has been reported in Table 2.

**Table 2: Total tax on occupations for different sectors (in Million Rials)**

| Sector | Taxes of real individuals |
|---|---|
| Mine | 10470 |
| Industry | 70143 |
| Water | 3946 |
| Construction | 104371 |
| Wholesale | 94347 |
| Hotel and restaurant | 14364 |
| Transportation | 77130 |
| Mediation | 20921 |
| Sum | 395670 |

According to added value for each sector, we conclude that tax capacity on occupations in Kermanshah province is estimated to be 395670 million Rials. The performance of tax income on occupations in 2002 is more than 49780 million Rials which means tax effort on occupations is 12.58%.

**Estimated Model**

Examining different specifications, Model showed to be the best fitting model. The estimated tax capacity model is as follows:

$$TPIU = 18.59 + 0.0124\,VSE + 0.0757\,VIN - 0.0122\,VAG - 0.012\,X + 18276.1\,Y$$

t (2.64) (2.91) (5.59) (-3.13) (-4.51) (3.01)

$R^2 = 0.99$ D.W = 2.1 F = 1197

To test reliability of the estimated tax capacity function, information on added value in different economic sectors in Kermanshah province is used as tax basis. Based on calculation of added value of business companies in every sector, the tax capacity on occupations is 395.670 billion Rials while performance of tax incomes in 2002 is more than 49.375 billion Rials. Therefore, tax effort on occupations in 2002 is estimated to be 12.47%. It should be noted this method can estimate tax capacity on jobs just for 2002, not for other years.

Now we compare the results from added value in 2002 with the results from the estimated model. The values of variables in 2002 are:

VSE = 8779.3 , VIN = 1373.2 , VAG = 2713.6 , X = 752.86 , Y = 0.0078

Putting the above values in the model yields:

TPIU=18.59+(0.0124*8779.3)+(0.0757*1373.2)-(0.0122*2713.6)-(0.012*752.86)+(18276.1*0.0078) =331.58

Therefore, the estimated capacity of tax on occupations in the province in Year 2002 is 331.58.

According to the actual tax on occupations in 2002 which equals to 49.375 billion Rials, the effort of taxes on occupation is 14.89%. The research hypothesis is accepted and it can be said that potential capacity of taxes on occupations is more than the actual tax. Now, we can obtain the tax capacity on occupations and tax effort of province for the whole period (see Table 3).

**Table 3: Estimating potential capacity and tax effort on occupations in Kermanshah province for the period 1993-2007 (billion rials)**

| Year | Actual tax on occupation | Potential capacity of taxes on occupation | Tax effort on occupations | Tax gap |
|---|---|---|---|---|
| 1993 | 5.075 | 34.418 | 0.1475 | 0.853 |
| 1994 | 7.092 | 42.534 | 0.1667 | 0.833 |
| 1995 | 8.425 | 58.139 | 0.1449 | 0.855 |
| 1996 | 12.741 | 83.044 | 0.1534 | 0.847 |
| 1997 | 22.469 | 102.305 | 0.2196 | 0.780 |
| 1998 | 25.495 | 113.523 | 0.2246 | 0.775 |
| 1999 | 28.045 | 152.418 | 0.1840 | 0.816 |
| 2000 | 37.205 | 211.553 | 0.1759 | 0.824 |
| 2001 | 36.300 | 249.314 | 0.1456 | 0.854 |
| 2002 | 49.375 | 331.971 | 0.1487 | 0.851 |
| 2003 | 60.065 | 409.858 | 0.1466 | 0.853 |
| 2004 | 80.980 | 517.715 | 0.1564 | 0.844 |
| 2005 | 105.640 | 628.561 | 0.1681 | 0.832 |
| 2006 | 140.490 | 798.639 | 0.1759 | 0.824 |
| 2007 | 187.790 | 1007.573 | 0.1864 | 0.814 |

Based on table 3, it is clear that sum of the potential tax in the occupation sector is higher than the sum of received real taxes, therefore existence of tax gap is approved and the hypothesis of this research is accepted.

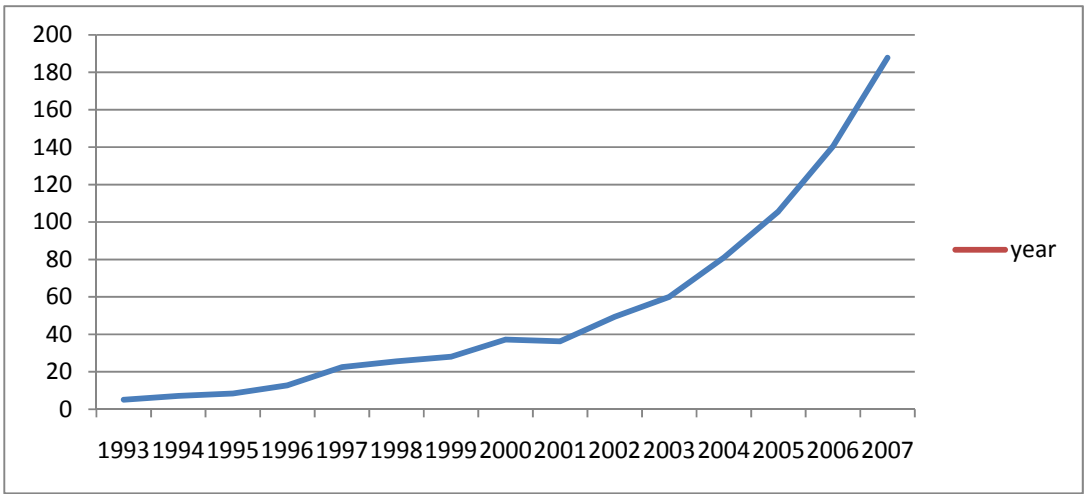


**Figure (1): Tax performance on occupations in Kermanshah province (1993-2007)**

According to Figure 1, an actual tax on occupations in 1993 was 5075 million rials that has grown with 26.77% on average and it reached at 187790 million rials in 2007. Although the share of the tax from the entire taxes of the province has grown appropriately, this share distances from real figure. The reason is that although people in this sector are part of rich group, they have fewer shares in paying taxes and their taxes are lower than state employees.

**Conclusions**

The purpose of this research was to estimate tax capacity on occupations of Kermanshah province. The findings of this research indicated that

-Average rate of tax effort of occupation sector in Kermanshah province during the period 1993-2007 is more than 0.17 which represents tax gap in the occupations sector and the existence of potential capacities in this sector.

-The share of added value in industry sector is larger in providing tax capacity on occupations and shows existence of tax capacity in industry sector. Economic structure of the province is a main factor in determination of tax capacity which can be examined through added value of different sectors.

-Although added value in agricultural sector is in a high level, due to tax exemptions and decreasing the share of this sector in GDP, negative coefficients of added value in this sector is expected. As expected, the weight of foreign trade in the province has a large effect on tax capacity and shows to what extent economic activities in the province is affected by exports. Tax capacity in the province has a negative relationship with volume of exports. Added value in mining sector has a negative impact on taxes on occupations, because mining sector is in the realm of governmental ownership and is exempted from paying taxes.

-Based on the estimated models, it was proved that from 1000 business units in the province only 1/4 units pay taxes while the corresponding average level of country is 3/4 units. Therefore by comparing these two shares we see that table capacity on occupations in the province is more than that of country.

**References**

Alfirman, L. (2003), Estimating Stochastic Frontier Tax Potential: Can Indonesian Local Governments Increase Tax Revenues under Decentralization? Department of Economics, University of Colorado at Boulder, Colorado, Working Paper No. 03-19

Arbab, H. (1987) Examination of Tax Capacity in Islamic Republic of Iran, M.A. Thesis, Tarbiat Moalem University

Chun, G. and Kuo, Y. (2000) Estimation of Tax Revenue and Tax Capacity, Harvard University

Davoodi, H. and Grigorian, D. (2007) Tax Potential vs. Tax Effort: A Cross-Country Analysis of Armenia's Stubbornly Low Tax Collection, WP/07/106 (Washington: International Monetary Fund).

Ehsanfar, M. (2001), Estimation of Tax Capacity in Mazandaran Province during the Period 1971-1998, M.A. Thesis, Mazandaran University

Iranian National Account, 1983- 2003

Iranian Local Account, 1983- 2003

Karimi H, (2007), Examination of Tax Capacity in Kermanshah, Azad University, Kermanshah Branch

Le TM, Moreno-Dodson B, Bayraktar, N (2012), Tax Capacity and Tax Effort: Extended Cross-Country Analysis from 1994 to 2009, The World Bank, Policy Research Working Paper

Pessino, C., and R. Fenochietto (2010), Determining Countries' Tax Effort, Hacienda Pública Española/Revista de Economía Pública, 195, 61–68.

Nikoo S H (1996), Estimation of Tax Capacity of Hamedan Province, Hamedan University

Safari A, (1991), Estimation of Tax Capacity of East Azarbayjan Province, Tarbiat Modares University

Yahyaee F. (1991), Analysis of Tax Combination and Estimation of Tax Capacity in Iran, Journal of Eghtesad & Modiriat, No 7