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A Study of Productivity in Governmental Companies (Quasi-Governmental) in Iran's Stock Exchange

[1]Parviz Saeidi and [2]Neda Jorjani

[1]Faculty Member, Islamic Azad University, Ali Abad Katoul Branch, Iran
[2]Islamic Azad University, Ali Abad Katoul Branch, Iran

Abstract: Productivity has an important and effective role in the growth of production and satisfaction among governmental companies (quasi-governmental). We can determine the performance of governmental sectors.(quasi-governmental) for optimization of production resources through analysis and calculation of efficiency factor from total factor productivity. The purpose of this study is the analysis of the status of efficiency in governmental companies (quasi-governmental). The data were collected in the period of eight years from 2001 to 2009 and were analyzed by using the econometrics methods. For estimating the function the Cobb Douglas function (Cobb-Douglas) were applied. Consequently, by using the outcome of the model estimation, total factor productivity growth in the production in governmental companies (quasi-governmental) were calculated. The rate of 1.34 was determined in the review of securities.

JEL Classification Codes: L16-L25
Key words: Productivity · Total factor productivity (TFP) · Cobb Douglas function · Public companies (Quasi-Governmental)

INTRODUCTION

Productivity is a comprehensive concept that its increases as a necessity to improve living standards, greater prosperity, peace and human prosperity for all countries is a major goal and always is considered by politicians, economist and the governors. Productivity is considered as a more general goal than profitability. Thus, business and production units should always aim to express the efficiency of their productivity. One of the best ways to increase the efficiency with effectiveness is use of productivity as a measure of performance.

Human being has always focused on its economic efforts to achieve the maximum result with minimal resources and facilities. This tendency can be called to achieve higher efficiency and productivity [1].

The company performance can be evaluated in different methods. One of the methods is focus on productivity of the company and the other by assessing the company assessment based on financial information extracted from accounting annual reports of accounting and then be evaluated [2].

Measuring the efficiency and effectiveness can be defined in terms of technical performance. The mean by technical efficiency in the course of the project operation is to convert input to output and the mean by effectiveness in the strategy reflects the degree of achievements of the organization based on outputs. Thus, one of the conventional indexes to realize the power of industrial activities to achieve a comparative advantage in different industries is productivity and its improvements.

Productivity is a degree of effective use of each production factors. Kendrick believes that by improvement in level of productivity of production factors the performance of them can be increased in various industries and due to that the level of manufacturing activity and industrial production growth would be improved [3].

Research Background: Krueger and Tancer, with the growth of productivity in manufacturing industries in Turkey in terms of public and private sectors, Reduction in productivity in the industries of this country are caused by trade restrictions. Furthermore, the result shows that while overall growth in productivity in private industry and government of Turkey was almost identical, the amount of resources and factors of production in state-owned industries has been far more than private industry [4].

Corresponding Author: Parviz Saeid, Faculty Member, Islamic Azad University, Ali Abad Katoul Branch, Iran.

Seshaiah and Reddy studied the trend of productivity over the years (1976-1986) on Andhra Pradesh artificial of India.

They conclude that the total factor productivity in the industries of cotton textile industry, has a decreasing trend and the total factor productivity index for cotton textiles industry has increased during a period with a mild oscillations [5].

Haltiwanger *et al*, studied the difference in productivity between workers in different industries over the years (1985-1996) through the production function method and concluded that the number of workers, age and human capital has had an impact on their productivity [6].

Chun and Nadiri, Sources of productivity growth in the computer industry in America during the years (1978-1999), were investigated. Their results showed that the total factor productivity growth comes from technological innovation and economies of scale in this industry have increased [7].

Yilmazkuday studied the productivity in the manufacturing cycle of public and private sectors in Turkey. They consider the timing of business cycles and found that the public sector has higher productivity growth than the private sector and the total factor productivity in the two parts of the high and low is oscillating [8].

Research Method: The study in its purpose is application and its methods, description and post-event by use of past data. The research was conducted from 2001 to 2008 period. The Statistical Society covers all public companies (quasi-governmental) which are 43 companies and were active in stock. Therefore in this study we did not use sample. In order to analyze research data using econometric methods Manayy Dicke Fuller tests (Dickey Fuller) to estimate the regression test Hasman (Hasman) to determine the effects of fixed and random variables and models and test of heteroscedasticity, White (white) solidarity and self-test (Autocorrelation) and LM test and test... Was used. Thus, for estimating production function for public companies (quasi-governmental) we used the techniques in the OLS estimate and the LS model. OLS is the most widely known method, this method estimations are non-biased, friendly and efficient.

$Q = AK^{\alpha}L^{\beta}z^{J}$

Q = F(L, K, Z)

Q: total production

A: The total productivity

L: labour

K: capital stock

Z: intermediate goods

α: coefficient of elasticity of manufacturing investment

B: modulus of elasticity of production labour

J: modulus of elasticity of intermediate goods production

$$\text{Log}(Q_{it}) = \text{Log}(A) + \alpha\text{Log}(K_{it}) + \beta\text{Log}(L_{it}) + j\text{Log}(Zit) + \varepsilon_{it}$$

Where the index 'i' represents the 'i' th firm and t represents the index is time.

The production function for a group of selected public companies (quasi-governmental) with using panel data and estimating software "Eviews7" we estimate that the results of the production function is as follows:

Research Findings: Estimate the production function of public companies (quasi-governmental):

$$Log(Q_{it}) = Log(-0./82) + 0/19\ Log(K_{it}) + 0/01\ Log(L_{it}) + 0/83\ Log(Z) + \varepsilon_{it}$$

T3= 2.37 T1= -1.82

T4=27.96 T2=5.98

R^2=97 R = 96 F=2262 DW=2/006

As can be seen on the regression estimates, all coefficients are significant parameters (T1 to T4 are all higher than 2 is obtained), the regression is efficient and is able to obtain credit. Also, the R2 model with 95 percent (5% error level) the correlation between the dependent variable (total production) and the independent variables is 97 percent. The coefficient of variation of 90% in the dependent variable (total production) is independent of changes in variables and other 3% is related to other factors.

Detailed results of the assessment of public companies (quasi-governmental):

Ultimate productivity of capital, labour and intermediate goods in the quasi-governmental companies selected are as follows:

Table 1: Results of estimating the production function for public companies (quasi-governmental) shows

Variable Name	The estimated coefficient	Prob
Intercept	-0.82	0.06
Capital stock	0.19	0.00
Total labour force	0.01	0.04
The amount of intermediate goods	0.83	0.00
R^2	0.97	
F-Statistic	2262	0.00
Durbin-Watson stat	2.006	

Table 2: Results of the ultimate productivity of capital, labour and intermediate goods, in public companies (quasi-governmental)

Type of companies	Public companies (quasi-governmental)
Ultimate productivity of capital	$MP_K=(0.19)\times(1.806)=0.34$
The final productivity of labour	$MP_L=(0.01)\times(21.688)=0.21$
The ultimate intermediate goods productivity	$MPZ=(0.83)\times(1.259)=1.04$

Table 3: Results of the efficiency of state-owned enterprises (quasi-governmental)

Calculate the total productivity	$TFP=\frac{AV}{aK+\beta L+jZ}$
State-owned enterprises (quasi-governmental)	1.34

•Ultimate productivity of capital:

$$Mp_k=\frac{aQ}{K}=W\,AK^{a-1}L^{b}=\frac{\partial Q}{\partial K}$$

- The ultimate productivity of labour:

$$Mp_L=\frac{aQ}{\partial L}=\beta KA^{W}L^{\beta-1}=\beta\frac{Q}{L}$$

- Ultimate productivity on intermediate goods:

$$MP_z=\frac{Q}{z}=JAZ^{j-1}K^{a}L^{\beta}=J\frac{\partial Q}{\partial z}$$

- Ultimate productivity of capital in state-owned enterprises (quasi-governmental) is equal to 0.34. This means that if the investment of these companies increases to one unit their production increases up to 0.34 units.
- The ultimate labour productivity in state-owned enterprises (quasi-governmental) is equal to 0.21 a unit. This means that if one unit of labour of these companies increases their production rate is increased up to 0.21 units.
- The ultimate intermediate goods productivity in state-owned enterprises (quasi-governmental) is 1.04 a unit. In the other word, if the consumption of intermediate goods increases one unit then the total production amounts increase to 1.04 unit.

Calculation of the total productivity in state-owned enterprises (quasi-governmental):

For calculating the total productivity, the share of production factors of total costs is calculated and as a result through the desired relation the productivity index and the relationship we calculate the total.

After computing the total productivity of state-owned enterprises (quasi-governmental 1.34 unit is obtained. It is illustrated in Table 3.

The tension produced by state-owned enterprises (quasi-governmental):

Tension produced by each of the factors is achieved towards a relation of ultimate production to the input intermediate production, namely (Mp/Ap).

Estimate of the Cup - Douglas function production tension and coefficients factors of each of production inputs are the same. The tension produced by each of the inputs used in state-owned enterprises (like state) is as follows:

	Capital	Work force	Intermediate goods	E= Mp/Ap
Ultimate Productivity	0.34	0.21	1.04	0.19
Productivity by	1.806	21.688	1.259	0.01
Tension factors	0.19	0.01	0.83	0.83
Manufacturing Region	The second area of economic	The second area of economic	The second area of economic	

As can be seen, Capital tension of production factors., tension of labour production factors and tension of production factors and intermediate goods are all positive and smaller than one. It can be concluded that the public manufacturing enterprises (quasi-governmental) activities are in the area of economic production (ie the second economy). Note that, Stretching the boundaries of the area to be close to zero, two and three are closer to production and also is at the best situation.

CONCLUSION

Total factor productivity in state-owned companies (quasi-governmental) is achieved to 1.34 units. It means that the cost per one IRR in public companies (quasi-governmental) would cost 1.34 unit is added to the income of the company. In other words, if all factors of production increase to one unit, the production increases in public companies (quasi-governmental) up to 1.34 increases.

Also Pilat (Joseph F. Pilat, 1995) in their study concluded that during the period studied in some industries, such as butter leather, metals, machinery, compactness and efficiency of Europe's industries, however overall productivity in butter industries in 1987, about 26% efficiency was in the industries of America. The most important factors affecting the productivity of the butter industries, factors such as excessive use of capital, economies of scale in manufacturing industries and workforce education are known.

In Iranian public companies (quasi-governmental) in the optimal allocation of inputs is derived from the VMP = P(In other words, the optimal allocation of inputs occurs when the value of final production = value of inputs) was calculated vmp_L <p, so the workforce employed in state-owned companies are over-optimized. Therefore, it can be reduced the amount of employment of the workforce in this sector which leads to economically efficient production.

Based on the optimal allocation of intermediate goods in private companies we have: vmp_z <p.

The intermediate product used in private companies is higher than optimal.

This should reduce the consumption of these inputs, so it makes efficient use of resources in this section.

In public companies (quasi-governmental) vmp_z> p and thus the intermediate goods used in state-owned companies (quasi-governmental) is less than optimal. These inputs should be increased so that the company will produce the optimal use of resources.

In this regard Haltiwangr (John, Haltiwanger, 1999) using the method of production workers concluded that the number, age and human capital in productivity affects the company's productivity.

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