J. Appl. Environ. Biol. Sci., 5(10S)197-205, 2015

ISSN: 2090-4274
Journal of Applied Environmental and Biological Sciences
www.textroad.com

Measurement and analysis of productivity of inputs in industries located in industrial towns and areas of Fars Province, Iran

Seyed Mohammad Kazem Etemad, Mehrdad Moradi and Enayatollah Najibzadeh

Master student of Department of Economics, College of Humanity Science, Yasouj Branch, Islamic Azad University, Yasouj, Iran

Received: April 20, 2015
Accepted: June 15, 2015

ABSTRACT

Production factors' productivity is one of the important criteria through which one can measure the ability of a group of industrial activities in achieving competitive advantages. Increased productivity of production factors reduces production costs and improves the competitive power of producers in the market. Investors give priority to industries which have better value added and higher productivity. In addition, one of the main objectives of managers in various enterprises is to gain maximum efficiency from existing resources to achieve higher levels of productivity.

The purpose of this study is to evaluate the productivity of production factors among industries in industrial towns and areas of Fars province using production functions. To this end, the production functions of various industry groups were estimated based on cross-sectional data in 2013. Then elasticity of production factors, average productivity and marginal productivity were calculated and the corresponding indexes for these groups were extracted. The results show that the food industry group had the highest productivity of labor, capital and land and the services group had the lowest productivity of workforce and labor. The groups of non-metallic minerals and electrical and electronics and others had the lowest productivity of land in industry group's of industrial towns and areas in Fars Province. Also, having investigate partial elasticity of production factors and productivity indexes, the researchers came to a decision making aapproach and effective suggestions regarding various groups of small and medium industries which are discussed at the end of the paper.

KEYWORDS: Productivity, production functions, elasticity of production factors, Industrial towns, Fars Province

1 - INTRODUCTION

Today, economic boundaries are fading away and competition in the global arena is being intensified; therefore, especially for developing countries like Iran, measurement of efficiency and productivity of production inputs to identify factors affecting them is essential, and is in line with their industrial development. (Ranjbar and Rajabi, 2009).

The growth of production factors' productivity in an industry reduces the price levels and, in turn, reduced prices of production factors can lead to lower average production costs for goods and services in the market as well as increased profitability of the final products in manufacturing units of the industry. These changes significantly increase demand and most importantly, improve the competitiveness of domestic products in foreign markets. As a result, new industrial investments increase and subsequently use of new technology and innovations experiences arise. This will act as an important factor affecting the growth of productivity for the next stage. Moreover, productivity index can be an indication of the extent to which different industry groups compete for development and for attraction of resources and production factors. The productivity index can be compared with global index of industrial productivity to determine the competitiveness of the industry's products in the global markets (Mowla'ei, 1999). Measurement and analysis of production inputs in industry groups make it possible to gain a detailed understanding of the characteristics of each group in the areas like final products, average production, elasticity and sensitivity, and, at the same time, to evaluate the relative advantages of these groups regarding user indexes and capital intensity. These results are important in understanding and making regional decisions about development of each industry by executives, authorities and investors.

Most industries in the industrial towns and areas of Fars Province are small and medium industries. The definition of small and medium industries vary depending on the number of employees, amount of capital and the share of private ownership in different countries. In Iran, some believe that workshops with fewer than 10 employees are small and some assume workshops with fewer than 50 employees as small. This makes a difference in statistics. Small industries play a major role in creating employment and value added in line with development of the countries (Eskandari, 2010).

*** Corresponding Author:** Seyed Mohammad Kazem Etemad, Master student of Department of Economics, College of Humanity Science, Yasouj Branch, Islamic Azad University, Yasouj, Iran

Fars Province has 69 approved industrial towns and areas with a capacity of 15,000 industrial lots and employment of about 150,000 people (Izadi, 2013, Statistics Journal of industrial towns of Fars province, No. 7).

The purpose of this study is to calculate and analyze productivity of production factors of different industry groups based on the International Standard Industrial Classification (ISIC).

The population consists of 1,496 operating and active small and medium industrial units and in industrial towns and areas in Fars province in 2013. A sample of 7 groups was selected from among the population which were investigated based on the results of single groups and the total results of all industries.

2 - REVIEW OF LITERATURE

Given the key and effective role of promoting productivity in economic growth at the macro and micro levels, various studies have been carried out for finding an optimum combination of factors that can enhance productivity. These are briefly described below.

Lotfali Poor and Derakhshani (2009) studied productivity of production inputs in industries at Toos industrial town, Mashhad, Iran. They found that among industry groups in the town, the food group and machine group had higher productivity.

Azarbaijani (2010) studied the productivity of industries in the country based on the ISIC two-digit codes in the period 1967-1985. The indexes showed that among the country's plant industry, machinery, tools and fabric products, basic metal and chemical industry had the highest total productivity.

Moghimi and Jalali (2007), in a study entitled "measuring total-factor productivity (TFP) for economic enterprises: the case study of SAIPA company", used Cobb - Douglas production function and Divisia Index to assess productivity of production factors in SAIPA during 1996-2005. They found that SAIPA's TFP declined from 1996 to 2001, but increased from 2001 to 2005.

Mowla'ei (2003) evaluated and compared the productivity of different small and large industry groups in Iran. The results show that the total, average and marginal productivity of small industries were lower than that of large industries, but a few industry groups are more productive than large industries.

Salimi Far (2005) investigated productivity of production factors and their utilization in large industries of Khorasan Province. The results showed that labor productivity in the industry at national level was higher than that of the province. Comparison between industry groups also indicated that only five of the province's industry groups had a productivity better than national averages.

Sobhani and Mohammadlou (2008) carried out a comparative analysis of productivity of production factors in sub-sectors of industries in the period from 1971 to 2004. In general, their findings showed that factor productivity in sub-sectors of chemical industry and basic metal industry was desirable.

Gelen et al (2006) in a study found that wages increased labor productivity at the firm level by about 9 percent. This is partly because of the motivational effects and partly due to short-term employment of workers.

Bernstein & Mamuneas (2006) in a study entitled "R&D Depreciation, Stocks, User Costs and Productivity Growth for US R&D Intensive Industries", measured productivity of production factors for chemical products, nonelectrical machinery, electrical products and transportation equipment via production function approach by time series data of 1995 - 2000. Measured TFP showed that electrical products had the maximum rate of TFP growth between 1995 and 1999.

Chen and Tang (1990) examined "Export Performance and Productivity Growth" in the Taiwanese industries. The results showed that export not only led to productivity growth in industry in this country, but also increased productivity in other sectors as well.

Idson and Walter (1999), calculated and compared labor productivity in small and large industries, fabricated metals, machinery, electronics, transport equipment and tools by using production function. They found that in large industries, labor has higher productivity than small ones because of using technology, advanced equipment and organization.

3 - MATERIALS AND METHODS

Using cross-sectional data and econometric methods, the researchers investigated the relationship between the output value and inputs of labor, capital and the land value in industries in the industrial towns and areas of Fars Province. Ordinary least squares (OLS) is used to estimate production functions, namely the Cobb-Douglas production function and the transcendental production function, which are widely utilized by economists and experts.

In order to estimate production functions of industries, production function which can best show the relationship between products and outputs with main variables was estimated for each industry group based on the two-digit ISIC codes and for the entire industry. For this purpose, all industries in industrial towns and areas of Fars Province were divided into seven industry groups: food industries, metal industries, chemical industries,

non-metallic mineral industries, cellulose industries, electronics industry and others, textile industry and service industries. For each industry group and the entire industry Transcendental and Cobb-Douglas functions were estimated.

For each industry and production function, the results of significance tests of regression, non-autocorrelation of intercepts**,** normal distribution of intercepts, White-Test of Homogeneity of Variance, non-multicollinearity test, and Model Specification were analyzed and using the F-statistic least squares bound test, better functions were chosen.

The formula of F-statistic least squares bound test is presented below.

$$F = \frac{\frac{R_{ur}^2 - R_r^2}{M}}{\frac{1 - R_{ur}^2}{N - K}}$$

In the above formula R_{ur}^2 and R_r^2 are the unbound and bound models of determining coefficient, respectively and the variables of N , K , M are the number of observations, number of parameters and number of added variables in unbound regression, respectively.

4 - Evaluation of production functions:

4-1 - Cobb - Douglas production function:

Cobb - Douglas production function is one of the most important functions of production in the economy. It was developed by the mathematician Charles W. Cobb (1875-1949) and the prominent American economist, Paul H. Douglas (1892-1976) and named after them in 1928. Douglas used early works by Charles W. Cobb to estimate statistical functions which represent functional form of production function for various manufacturing industries as a function of labor and capital used. Using this function, he could specify the labor and capital shares of total output. It may seem strange. Yet, other people have used these findings in different countries and at different times (Lotfali Poor and Derakhshani, 2009).

This function is characterized by simplicity and is suitable for a wide range of empirical data in various fields. Output elasticity, α, β, measures the responsiveness of output to a change in levels of labor or capital used in production. Depending on whether the sum of α, β is larger, equal to or smaller than 1, the production function has constant, decreasing or increasing returns to scale, respectively. The linear form of the Cobb-Douglas function with three inputs is as follows.

Log Q = log A + α log L + β log K + Y log M

Where the Q is value added in monetary, A is the coefficient of technology, L is labor, K is capital and M is the land value.

γ, β, α are partial coefficient of output elasticity relative to labor, capital and land value.

e(L) = α= MPL/APL , e(K) =β= MPK/APK , e(M) =γ= MPM/APM

MPL =α*APL , MPK = β* APK , MPM = γ * APM

APM, APK and APL are average productivity of labor, capital and land values and MPM, MPK and MPL are marginal productivity of labor, capital and land value.

4-2 -Transcendental production function:

Transcendental production function does not have the limitations of Cobb - Douglas function and can present marginal productivity of non-constant output separately in all three areas of production. In addition, in this function, output elasticity and elasticity of substitution are variable in the range of input changes. A Linearised form of transcendent function in case of three inputs is as follows.

log Q = log A + α log L + β log K + Y log M + b1L + b2K + b3M

where Q is monetary value added, A is the coefficient of technology, L is labor, K is capital and M is land value. The final output elasticity and final input elasticity are as follows.

e (L) = α + b1L e (K) = β + b2K e (M) = Y + b3M MPL = (α + b1L) * APL MPK = (β + b2K) * APK MPM = (Y + b3M) * APM

4-3 - Determining the optimal production function:

Production function was used to study productivity. There are a variety of production functions. Hence, a production function must be selected through which the nature and purpose of the study can be explained. To determine the best functional form F-statistic bound test. In this study, it is attempted to determine the best function from among Cobb-Douglas and transcendental functions. Based on the F-statistic results, the best form for all groups, except metal industries, was transcendental functions. Transcendental production function is an extension of the Cobb-Douglas production function proposed for the first time by Halter et al.

5 - Indexes

5-1 - Labor intensity index

Labor index is a criterion to estimate the partial productivity of labor:

$$L_i = (V_i / N_i) * 100 / (V_t / N_t)$$

where Vi and Vt are respectively value added in the i-th industry and the whole industry. Sine the comparison is among different industries, value added is used instead of output.

Ni and NT are respectively the number of employees in the i-th industry , and the whole industry. If the value of labor intensity index for an industry group is below 100, the intensity of labor use in the industry is higher than the industry average. In other words, it is more labor intense. Li is the labor intensity index for the i-th industry and shows the intensity of using labor in the i-th industry (Lotfali Poor and Derakhshani, 2009).

5-2 - Capital intensity index

Capital intensity index is a benchmark for estimating the partial productivity of capital. The formula is:

$$C_i = (V_i / K_i) * 100 / (V_t / K_t)$$

where Vi and VT are respectively value added for the i-th industry and the whole industry, and Ki and KT are capital stock in the i-th industry, and the whole industry.

Ci is the capital intensity index for the i-th industry and shows the intensity of using capital in the i-th industry.

If the numerical value of the index is less than 100, the industry is more capital intensive than the industry average.

5-2 - Kendrick Index:

One method for direct measurement of TFP was presented by Kendrick. The method is based on a weighted average of labor, capital and land. Kendrick used an implicit production function to estimate changes in productivity. Kendrick's index of total factor productivity is defined as follows:

$$TFP = \frac{V_t}{\alpha K_t + \beta L + \gamma M_t}$$

Where TFP is total factor productivity of production factors, Vt is value added for fixed prices, L is the number of labor or man-hours of work done or paid, β is the share of labor in value added, Kt is the capital share in value added for constant prices, and α is the share of capital in value added. In this study, the value of land in entered as a key variable in the Kendrick index. That is, Mt is the land inventory value for constant prices and Y is the share of land value in value added.

5-2 - Divisia Index

In this method, total factor productivity index is obtained as the ratio of output index to input index. Input index is also calculated as by divisia index value as follows (Askari et al, 2005).

$$D = L^{\alpha} K^{\beta} M^{\gamma}$$

α, β and Y are respectively output elasticities of capital, labor and land value estimated by transcendental production function.

TFP_t^D is the total productivity index at time t, Q_t is the value of production or value added at time t, and D_t is the input index at time t.

6 - Estimating functions

6-1 - Selecting a model for industry groups:

After collecting and sorting data by Eviews7 the Cobb-Douglas and transcendental production functions are estimated by OLS method. The estimates were done for industry groups and the whole industry. Next, the most appropriate function for each industry group was selected and values of elasticity, average output and marginal productivity for each industry group were calculated. It should be noted that R^2 values, regression coefficients, significance tests (t and F), Homogeneity of variance test (White), test of normality of residuals, model specification test, linearity of variables and finally Wald test for non-zero b_i coefficients in the transcendental function were used for both Cobb-Douglas functions and transcendental functions. Also for all industry groups, heteroskedasticity in the OLS has been fixed via software options.

According to estimates made and evaluation of the statistical accuracy of the estimates, the transcendental function was chosen for all industry groups and the whole industry, except for the metal industry. In the table below the results are outlined.

Table 6-2 - Estimates for industry groups in industrial towns and areas of Fars Province

Industry Group	F bound test Prob. F	Function selected	R^2 Adjusted	Calculated F	heteroskedasticity	Durbin-Watson stat	Number of observation
Food	0.00765	transcendental	0.9912	3626.97	-	2.21	193
Metal industry	0.276	transcendental	0.9956	27049.5	-	2.07	362
Chemical industry	0.000	transcendental	0.9924	6174.5	-	1.96	283
Non-metallic mineral industry	0.000	transcendental	0.9961	13019.4	-	1.73	304
Services industry	0.0002	transcendental	0.9924	3194.38	-	2.035	146
Cellulose Industries	0.000	transcendental	0.9947	4851.18	-	1.83	155
electronics industry and other	0.0038	transcendental	0.9939	1417.74	-	1.83	53
The whole industry	0.000	transcendental	0.955	5370.37	-	1.24	1496

6-3 - Table of regression results for industry groups

Industry Group	Linear regression equation
Food industry	logQ = -2.62763397177 + 0.353542056482*log L + 0.656617823181*logK + 0.0613853452593*logM - 0.000977011043828*L + 0.000986057280337*K - 0.000397796831017*M
Metal industry	logQ = -2.56854668455 + 0.324574299827*logL + 0.662068373464*logK + 0.0267397337822*logM
Chemical industry	logQ = -2.21717731916 + 0.218052343724*logL + 0.714410037722*logK + 0.0255625350067*logM + 0.000406278846526*L + 0.00677734548337*K - 0.00332385820749*M
Non-metallic mineral industry	logQ = -1.92167926299 + 0.223483485353*logL + 0.729739500276*logK + 0.0160706433922*logM - 0.00315013147614*L + 0.0132951971664*K + 0.000388417315287*M
Services industry	logQ = -2.63860997514 + 0.232151131077*logL + 0.686063725365*logK - 0.00568142048914*logM + 0.00396571547716*L + 0.0284683909032*K + 0.00962716613943*M
Cellulose Industries	logQ = -2.39561020087 + 0.328246217868*logL + 0.663719559571*logK + 0.0256265422955*logM - 0.00535850837972*L + 0.00910736206067*K - 0.00113099185772*M
electronics industry and other	logQ = -2.2388543569 + 0.197924519048*logL + 0.804603577939*logK - 0.0331329943867*logM + 0.00221097976509*L - 0.00203404576002*K + 0.0204251025856*M
The whole industry	logQ = -2.47571213985 + 0.351102002395*logL + 0.67982656691*logK + 0.0420313686167*logM - 0.00124921928737*L + 0.000964272726478*K - 0.000391474153993*M

6-4 - Calculating partial elasticity, marginal productivity and input productivity index:

Based on the results obtained from calculations and estimates and selection of an appropriate model for each industry group, in this section the main characteristics of industry groups and productivity of production inputs are explained.

Industry Group	Food industries	Metal industries	Chemical industries	Non-metallic mineral industries	Services industries	Cellulose Industries	electronics industry and other	The whole industry
Labor elasticity	0.328	0.324	0.224	0.186	0.252	0.264	0.225	0.334
Capital elasticity	0.674	0.662	0.752	0.783	0.739	0.726	0.794	0.686
Land elasticity	0.059	0.027	0.017	0.017	0.05	0.016	0.007	0.041
Average labor	26	16	14	12	5	12	12	14
Average capital	17.73	6.09	5.59	4.01	1.85	6.82	5.22	6.75
Average land	5.18	2.56	2.95	1.70	5.83	8.25	1.97	3.21
Labor marginal productivity	8.53	5.18	3.14	2.23	1.26	3.17	2.7	4.68
Capital marginal productivity	11.95	4.03	4.2	3.14	1.37	4.95	4.14	4.63
Land marginal productivity	0.3	0.07	0.05	0.028	0.029	0.132	0.014	0.131
Labor intensity	118.6	74.4	95.7	109.7	68.5	119.5	122.1	-
Capital intensity	82.5	88.6	108.8	159.5	81.6	98.9	112.9	-
Kendrick index	0.12	0.14	0.16	0.24	0.04	0.11	0.16	0.07
Divisia index	0.0736	0.0732	0.1013	0.1515	0.0659	0.0946	0.0935	0.0810

7 - Analysis of results

7-1 - Data Analysis:

Analysis of the results of this study to obtain reliable conclusions can be interpreted in three parts. First, partial elasticity of production factors in various industry groups located in industrial towns and areas of Fars is explained. These figures represent the manufacturing activities of the production groups in three regions of production.

Using the relationship between marginal product and average product, three separate production regions are determined. These regions play a crucial role in the consumption of variable inputs. In other words, it determines the level of use of variable input in production. Based on the production chart, the first region of production is from zero input level to maximum average production. The second region (Economic region of productions) starts from the end of the first region, i.e. the level at which the marginal product equals average production, to the input level where the marginal product is equal to zero. The third region of production is the region after the input level at which the end product is equal to zero.

Table 6-4 shows that all the output elasticities of industry groups are located between zero and one indicating that activities of all industry groups are in the second region or economic region of productions.

In general, marginal product is the amount of increase in the output per unit change in the variable input. Marginal productivity represents the change in output that results from changing the variable input by one unit, all other factors remaining constant. Based on the production function, this occurs where the output is maximum and the marginal product is zero. The labor marginal productivity is the change in output that results from changing the labor input by one unit. Therefore, we can say that the marginal product or MPL is the output produced by the latest labor force employed. That is the production rate increase with a unit of change in the labor input.

Marginal productivity of capital (MPK) is the amount of change in the output by one unit change in the capital input. Marginal productivity of land is the amount of change in the output by one unit change in the land input.

Based on Table 6-4, groups of food and metal industry had the highest marginal productivity of labor. In the rest of groups, except for services, marginal productivity of labor is relatively the same. The lowest marginal productivity of labor belongs to the group of services.

The highest marginal productivity of capital belong to the food industry group and the services group had the lowest marginal productivity of capital. The rest of marginal groups had the same marginal productivity of capital.

The food group had the highest and Electrical and electronics and other and Non-metallic minerals and services had the lowest marginal productivity of land.

Marginal productivity indexes based on Table 6-4 represents the results below:

Regarding labor intensity index, if it is less than 100, it is indicative of the labor intensity of the group in question. In other words, such a group has higher intensity of labor use compared to total production groups. Groups of food , non-metallic minerals, cellulose and electronics and other had a labor intensity index of higher than 100, and other groups including metal industry, chemical industry and services had a labor intensity index of less than 100 indicating the labor intensiveness of these groups.

Based on capital intensity index, if the value of the index is less than 100, the group will be more capital intensive compared to other groups. Groups of chemical industries, non-metallic minerals and electronics and other had a capital intensity index of higher than 100, and other groups such as food industries, metal industries, services and cellulose had a capital intensity index of less than 100 indicating their capital intensiveness.

Kendrick index represents a weighted average of inputs and is indicative of input shares in the output. This means that the groups with the highest score on this index, according to the formula proposed in 5-2, do its job with the lowest share of production factors and inputs. The group of non-metallic minerals industry had the highest numerical value on the Kendrick index and other groups are relatively close together in this regard. The group of services had the lowest score on the Kendrick index representing the largest share of input use to achieve added value.

Divisia index represents the ratio of the out index to the input index. In accordance with the formula provided in 5-3, the lower the denominator or the numerical value of Divisia, i.e. the lower the share of input index in the output, the higher the marginal productivity of Divisia for the added value produced. This represents the lower input share of an industry group for more output.

Table 6-4 shows that the group of non-metallic mineral industry had the highest numeric value for and other groups have close Divisia index numerical value. The group of services has the lowest Divisia index representing the largest share of input use to achieve added value.

The average productivity of labor, capital and land represent the productivity of these components in the production function and the output level for each input.

Regarding productivity of labor which is representative of the output change per each labor unit, the food group had the highest productivity of labor and services group had the lowest productivity of labor. Regarding

productivity of capital that represents the amount of output change per each capital unit, the food group had the maximum and the services group had the lowest productivity of capital. With respect to productivity of land representing the the output change per each labor unit, the cellulose industry group had the highest and the non-metallic minerals industry had the lowest productivity of land.

7-2 - Conclusion and suggestions:

The results of this study can pave the way for industrial development of Fars province in areas such as planning to promote small and medium industries in the province. In this regard, some guidelines and suggestions based on the results are presented below.

A: Since preservation and promotion of employment and labor are among the current economic goals of our country, paying attention to the development of small and medium industry groups, particularly those which are more labor intensive than other groups is essential. Based on the results of this study, metal, chemicals and services intensity groups were more labor intensive and can play a more significant role in career development.

B: development of small and medium industries and enhancing their productivity through attracting the lower capital possible is especially important in the current economic situation. Therefore, paying attention to industry groups with labor intensity index of more than 100, which are less capital intensive than other industry groups is a requirement. Therefore, the development of industry groups such as the chemicals, non-metallic minerals and electronics is a priority. Also planning for conducting investment in the province towards industries with labor intensity index of more than 100, is important to accelerate production and employment and also to optimize investment in other capital intensive groups.

C: The group with the highest marginal productivity of capital reported the use of high technology and machinery for production and provision of raw materials in those industries. This shows the necessity of planning to promote industry groups to use modern technology in order to achieve maximum productivity. Therefore, since small and medium industries in the country are moving towards the use of new knowledge and technology, it is necessary to strengthen these groups by counseling them to improve their technical knowledge and to use the expertise in other groups with less capital intensity. According to calculations, food industry group in Fars province had the highest marginal productivity of capital.

D: The highest marginal productivity of labor was caused by optimum use of labor in industry groups. The experience of using labor in this group can be a model for growth and development of human resources in the province. According to calculations, food industry and metal industry had the highest marginal productivity of labor.

E: The results of marginal productivity and average productivity show that marginal and average productivity of labor and capital are identical. However, regarding the average productivity of land representing the value added per a unit of land input, two points are important. First, the monetary value of land was considered in this study. Thus, groups such as cellulose group had the highest productivity of land. They used less land units for more output. The non-metallic mineral industry had the lowest production per unit of land. Second, the technology employed in various industries and locations resulted in use of land for establishing industrial facilities. The numbers obtained in computation tables regarding the average productivity for each industry group can be a good model for land planning and design by different industries.

E: Output elasticities are used to determine the rate of change in the added value in industries per every one percent change in the inputs. This is important in planning to employ labor and capital in small and medium industries. Provision of targeted banking facilities to the priority industries and human resource planning and recruitment for more sensitive groups are some applications of this information.

Regarding sensitivity to change in the capital factor for small and medium industries of industrial towns and areas of Fars, the results showed that groups such as the electronics industry and non metallic minerals and services had higher positive changes in value added per a percentage change in the capital factor than other industry groups.

Also, in the food industry and metal industry groups, for every one percent change in the labor, more positive changes occur in value added than other industry groups. This requires planning to inject the appropriate staffing and expertise and to improve human resource management in these groups.

F: Another point of consideration as observed in studies of productivity in different industries, is the low average productivity of capital relative to that of labor. The reasons for low productivity of capital in different industries include worn out machinery, lack of modern machines and the mismatch of labor and technical knowledge required to effectively use physical capital. Moreover, low productivity of labor in various industrial activities causes exacerbation of lack of capital efficiency. This has led to a drop in actual capacity of nominal production in many industries. Therefore, to enhance productivity in small and large industries in the country would be possible by spreading the culture of productivity, paying attention to industry personnel issues, optimizing the use of equipment and machinery, adopting monetary and foreign exchange policies and modifying appropriate laws and regulations. The authorities must consider these issues in their policy making for industries.

G: Given the fact that in this study, measurement and comparison of input productivity was intended, the results about qualitative and quantitative properties of the inputs in the production process can indicate the level of productivity in various industrial activities. However, the effects of other factors such as the quality of raw materials, energy type, technology, management and use of ergonomic measures to increase the mach between human and machine on improving productivity should not be overlooked. Moreover, the lower education level of industry executives and technical staff play a negative role in the productivity. Therefore, the followings are suggested as solutions to improve other factors.

1. Improving the quality of labor through constant staff training
2. Solving the technological problems of small and medium industries by improving the production process
3. Training industry executives and familiarizing them with modern principles of industrial management in order to improve organizational processes of production
4. Providing financial, technical, educational and information support for small and medium industries
5. Strengthening effective industry associations and NGOs for small industries and supporting the creation of industrial clusters in the country in order to increase the competitiveness of small industries before large ones.

REFERENCES

1. Zara Nejad, M. and Ansari, E. (2007). Measuring productivity of capital in large industries of Khuzestan province, Journal of Economic Surveys.
2. Sobhani, H. and Mohammadlou, H. (2008). Comparative analysis of productivity of production factors in sub-sectors of Iranian large industries.
3. Salimi Far, M. and Nasr Esfahani, A. (2007). Analysis of productivity trends in Isfahan Steel Company during the first to third Iranian Economic Development Programs.
4. Alimoradi, Z. (2008) Measuring the growth of total factor productivity in the industry and mining sector and its contribution to the growth of value added of the sector.
5. Moghimi, F. and Jalali, G. (2007). Measuring total-factor productivity (TFP) for economic enterprises: the case study of SAIPA Company.
6. Mowlaei, M. (2005). Evaluating and comparing the productivity of small and large industry groups in Iran.
7. Azerbaijan, K. (1989). Measurement and analysis of productivity in Iranian industries.
8. Azerbaijan, K. (1990). Econometric model of factors affecting the productivity of industries in Iran.
9. Tafazzoli, F. and Farshid M. H. (2002). Estimates of productivity in the industrial sector and its determinant factors by sub-sectors.
10. Khaksar, GR. (2001). Measurement and analysis of productivity in the Iranian aluminum industry.
11. Zara Nejad, M. and Ghanadi B. (2005). Estimates of labor productivity in industries of Khuzestan province.
12. Salami, H. And Nasser Sh. (2000). Comparison of productivity in industry and agriculture sectors and factors affecting it.
13. Shojaei, A. S. (2001). Factors affecting the growth of Iranian industry sector by growth factors and Total Factor Productivity.
14. Shhryar Poor, A., Tavakoli A. and Azerbaijani K. (2000). Measuring and analyzing output productivity in Iranian industry groups.
15. Qotmiri, M.A. and Jafar, Q. (1996). Measurements and analysis of factors affecting the productivity of industries in Iran.
16. Gujarati, D. (1999), Principles of Econometrics, translated by Hamid Abrishami, Tehran University Press.
17. Akbari, N. and Ranjkesh M. (2003) Investigating the growth of total factor productivity in agriculture sector in Iran.
18. Rahimi, M. (2002). Measurement and analysis of productivity of production factors in major industry groups in Kurdistan province.
19. Izadi et al (2013). Statistics Journal of industrial towns of Fars province.
20. Bonelli, R. (1992). Growth and productivity in Brazilian Industries. Journal of Development Economics, 39(1):85- 109.
21. Chen, T. & D. Tang. (1990). Export Performance and Productivity Growth; the Case of Taiwan. Economic Development and Cultural Change, 38 (9): 577- 587.
22. Christensen, L. & D. Cummings. (1981). Real Product, Real Factor Input, and Productivity in the Republic of Korea, 1960-1973. Journal of Development Economics, 8: 285- 302.

23. Krueger, A. & B. Tancer. (1982). Growth of Factor Productivity in Turkish Manufacturing Industries. Journal of Development Economics, II (3): 307- 325.
24. Henderson, James M., Richard E. Quandt, Microeconomic Theory, Third Edition, London, McGraw-Hill Book Company, 1980, P.113.
25. Idson Todd L. and Walter y.o1, Workers Are more Productivity Theory, Third Edition, London, McGraw-HillBook Company, 1999
26. Johannes, Tabi.Atemnkeng [2005], "Fiscal Policy and Sector Productivity
27. Convergence in Cameroon: Implications for Poverty Reduction", University of Dschang, Cameroon Press.
28. Fernandes, A. M. (2003). Trade Policy, Trade Volumes and Plant-Level Productivity in Colombian Manufacturing Industries. World Bank Policy Research Working Paper 3064