A Comparative Analysis of Productivity in Agricultural, Industry and Business in Kurdistan Province

Reza Zarei¹*, Shohre Vakilian², Fereshte Zarei³ and Safa Zarei⁴

¹ Instructor of Accounting, University of Kurdistan, Sanandaj, Iran
² MS in Economy, Sharif Venture Capital Fund, Tehran, Iran
³ MS. in Economy, National Iranian Oil Refining & Distribution Company, Tehran, Iran
⁴ BS of Business Administration (Insurance, Finance and Accounting), University of Hartford, Hartford, USA

ABSTRACT

As far as production always needs the production factors, an increase in production is possible only in two cases; either increasing the amount of the production factors or manipulating them in a better way. Regarding resource limitations, having a better resource management and applying new approaches in combining the resources optimally would help an increase in production. As long as productivity is of great importance, in this paper we have first introduced the theoretical basis and the literature and afterwards we have calculated the productivity of the production factors; i.e. labour and capital, in Agricultural, industry and Business in Kurdistan. The findings of the paper showed that the greatest general productivity goes to Agricultural compared to industry, Business and Services. By the end, we have introduced and analyzed the influential factors on the total factor productivity of all the factors. Real wages, the actual costs of using the capitals, the capital per head and the relationship of the scientific, technical and expert staff with the occupation generally were chosen as the effective variables in the general productivity of the factors all. As estimated, real wages, the actual costs of using the capitals, the capital per head and the relationship of the occupation generally were chosen as the effective variables in the general productivity of the factors all. This negative coefficient of the capital per head declares that the tendency towards technology and capital activities does not help the total factor productivity to raise.

KEYWORD

Capital, Labour, Partial Productivity, Productivity, Total Factor Productivity.

INTRODUCTION

The Kurdistan province is in neighborhood with Western Azerbaijan, Hamedan, Zanjan and Kermanshah provinces, area 28203 square kilometer. Due to sharing a border of 230 km with Iraq, cultural and ethnic resemblances and family relationships between the citizens of the two neighboring countries and being located in the South and North-West transit route of Iran, numerous economic potential capacities have been created. During the last few years the average gross domestic product in the Kurdistan province has been less than the whole country's average and in the last two decades the services sector share in gross domestic product has been more than the agriculture sector and the latter one more than the industry and mining sector share itself.

The notable point is that even with the total political, economic and social security in the area in the last decades, economic potential of agricultural and industrial production growth has still been steady in the province, but there hasn’t been the possibility to use the production capacity of the province. It could be said that different factors such as the lack of appropriate production planning by the public and private sectors, the absence of appropriate production culture, risk averse economic activists in agricultural and industrial production, incompetency of monetary institute and bank financial supports from farmers and craftsmen, lack of appropriate policies to attract foreign and domestic investments in the province even with the economic and political security, etc. have made it difficult to exploit the production potentials properly so social and economic indexes of the province such as unemployment rate and employment level, capitation income, poverty line, the private sector’s share of economic and social activity indexes are less than the whole county’s normal and average level. The main issue is that the production infrastructures of the province are weak and substructures such as communication infrastructures, methods of production
mechanism, human capital level and the financial supports of the producers in the territory are lower than the needed level to its growth and development. Both the infrastructure and the level of production and trading factors have caused the production and economic activities in the province not to meet the people’s consumption needs and lead the level of development toward the stable economy.

In this regard the present study evaluates the partial and total productivity in three sectors of agriculture, industry, business and services in Kurdistan province. It also reviews the productivity indexes and the effective factors in it.

**Productivity theoretical bases**

Productivity is the criterion to evaluate the activities. Since men’s activities can’t be aimless, when it’s about productivity, the evaluation of any activity is meaningful in accordance with its aim. Thus it’s reviewable from two distinguished angles. On the one hand it’s the role of the activity’s effectiveness in achieving the requested aim and on the other hand the activity’s efficiency is put forward. Then it could be said that the Productivity has got two components:

\[ \text{Productivity (doing the activities properly) + effectiveness (doing the right actions)} = \text{Productivity} \]

**Proficiency:** It is the proportion of the achieved actual output to the standard and determined (expected) output. In other words, it is the proportion of the workload being done to the workload that should be done. For instance if the output of a worker is 120 pieces in an hour and the determined production rate after engineering and ergonomic considerations is 180 pieces an hour, the output of this worker will be 0.667\[4\].

**Effectiveness:** It is the index of tendency toward organizational aims. Thus in the definition of aim, complete accuracy should be considered so that must be neither unusual and farfetched nor simple and obtainable. It is observed that proficiency has got a quantitative aspect however, effectiveness has got a qualitative aspect. It should be noticed that proficiency and effectiveness are not necessarily aligned or moving along because proficiency involves a scale of outcomes that may not necessarily be ideal. Effectiveness seeks optimization and profit-making opportunities through economic characteristics of the current products. Effectiveness is not aiming at how to do the work but rather determining the products that have a good economic outcome or result in its best kind. Although an institute may produce the goods and the services efficiently but it could be ineffective, so even the most proficient institute can still survive without being effective. Thus it could be mentioned that the basis of successfulness is effectiveness. So productivity is a combination of proficiency and effectiveness and it involves both of the categories[4]. Later on four types of productivity used in theoretical and practical issues are being pointed out:

1. **Partial productivity** is the proportion of the product’s amount and its value to one level of the input. For instance output per hour for each person (labor force productivity) or generated income interest per each capital Rial and so on.

2. **Total productivity** is the proportion of the total value of the product to the total value of all the consumed inputs. This index measures up the total input joint and simultaneous effects associated with the obtained product.

3. **Multifactorial productivity:** in calculating the multifactorial productivity instead of putting all the factors in the denominator only some factors of the total production value is being set there.

4. **Total factor productivity (TFP):** Total factor productivity is indeed measuring the rate of labor force inputs qualitative aspects improvement and also the proficiency of the combinations of these two factors. TFP reflects the effectiveness and proficiency of using the production factors for producing goods, services and outcomes simultaneously and involves all the qualitative factors that lead to the optimal use of the current sources in order to obtain more output per input unit.

**TFP means:**

- More intelligent usage of available resources.
- Applying new technology and elevating the current level of technology.
- Innovation.
- Better management techniques.
- Specialization.
- Proficiency improvement.
- Education, skills and worker experiences.
- Advancement of IT usage.
- Generally TFP could be illustrated in four categories:
  - Total factor productivity based on labor force partial productivity
  - Total factor productivity based on capital partial productivity
  - Total factor productivity based on material partial productivity
  - Total factor productivity based on energy partial productivity[2].

Generally speaking, productivity indexes divides into two categories of partial productivity indexes and total factor productivity. In partial productivity indexes the connection between output and one input is considered while in total productivity the connection between the output and all of the inputs is regarded. Partial productivity indexes are resulted from dividing added-value by specified input amounts. If in productivity calculation one of the inputs will be considered, this definition of productivity is called partial productivity. The most important meaning of partial productivity is labor force productivity. In labor force calculation the input is the amount of labor force that has been used in output.
production in a specific period. Partial productivity can be used and calculated in any of the total input components such as capital, ingredients, electricity power, the earth energy or anything associated with it[1][2].

Partial productivity indexes have got a deficiency as well. Partial index promotes in degeneration of other index's cost (substitution effect). The common example is appointing a capital supply that makes savings in labor force. So labor force productivity promotes however, capital productivity may be defected. It means with increasing investment, due to applying advanced and modern supplies less labor force is needed but this amount of investment wouldn't substitute the specified work. The concept of total factor productivity is a modern concept in economic growth literature that has developed in clarifying the rest of the production growth during the last decades. There are different understandings and definitions in each period based on different types of people, experiences, pre-mentalities and considered goals and investigators sometimes due to its ambiguity tries to dissociate it into different parts and in the other cases pose the total factor productivity in total factor production qualities. Total factor productivity could be defined as a kind of combinatory productivity of the total inputs. By this definition such an index doesn't have the issues of single-factor productivity. By regarding such an index, the investigator can't choose one of the productivity factors to measure up the productivity growth; because all the factors are involved in determining the total factor productivity. Furthermore, the effect of each production factor on total factor productivity is variable[4]. Total factor productivity is the proportion of the output to the total production factor inputs and if it is supposed that production factors only includes work and capital, total factor productivity could be calculated as this formula:

$$ TFP = \frac{O}{W_L + W_K} $$

"O" is the output amount that is usually applied in transformative industry as added-value. "L" and "K" in order are related to amounts of work and capital in production period and "Wk", "Wl" are the relative importance (relative share) of work and capital inputs in production activity that FTP is calculated for them. Thus, total productivity scale illustrates the total consumed factors and resources to create the outcome. In productivity calculations it should be noticed that sometimes productivity increase and reduction is not due to promotion and improvements and even management weakness and resources misuse. Especially it is necessary in monetary system that rise and fall of the money value and increase and reduction is not due to promotion and improvements and even management weakness and resources misuse. In productivity and efficiency studies, the method of calculating total factor productivity (FTP) has been applied.

**Calculating Productivity Factors and Total Factor Productivity of Agriculture, Industry and Business Sectors Using Econometric Estimation**

It has been used in calculating total factor productivity, comparing and studying partial productivity from collected data based on the yearly surveys and the information gathered from Kurdistan province statistical annuals and related organizations during the 1995 to 2010 years. Added-value, employment and investment statistics in each sector has been gathered by Kurdistan province annuals. For capital balance calculation in each sector, one of the capital balance estimation methods is using the acceleration principle. Based on acceleration principle it is supposed that the proportion of current ideal capital to production in each industry is fixed and this formula is true:

$$ \alpha = \frac{K^{*}}{K} $$

$$ K_{t}^{*} = \alpha Y_{t} $$

And for the last period we have:

$$ K_{t-1}^{*} = \alpha Y_{t-1} $$

Net investment in the current time (Int) equals the difference between the last period real capital balance (Kt-1) and the current ideal capital balance (Kt*):

$$ I_{nt} = K_{t}^{*} - K_{t-1} = \Delta K_{t} $$

If net investment leads the capital amount change to ideal capital level and in other words the actual capital balance in each period equals the ideal capital storing:

$$ K_{t-1} = K_{t-1}^{*} = \alpha Y_{t-1} $$

And from net investment formula this result is expected:

$$ I_{nt} = \alpha Y_{t} - \alpha Y_{t-1} = \alpha \Delta Y $$

Supposing the existence of depreciation and acceleration formula, there is:

$$ I_{t} = (K_{t}^{*} - K_{t-1}) + \lambda K_{t-1} $$

$$ I_{t} = \alpha Y_{t} - \alpha Y_{t-1} + \lambda \alpha Y_{t-1} $$

Based on what has been mentioned so far, the capital balance is calculated in relation with acceleration principle for each of the sectors. The capital price statistics are calculated as:

**WL:** Total workers services compensation

$$ \alpha = \frac{WL}{Q} : \text{Labor force share of production} $$

1 - \alpha: \text{Capital share of production} \\

$$ R = \frac{(1-\alpha)Q}{K} $$

Numerator is dealing with capital factor, and for obtaining the denominator that is the capital balance, simple acceleration model during 1995-2010 years has been applied.

The number of scientific, technical and specialized workers of each sector has been obtained based on general soul and domicile census and the results of family employment and
unemployment census during 1995 to 2010 years. By emphasizing on econometric apparatuses and Microsoft Eviews and based on research theoretical bases and also applying Cub-Douglas production function, the proper pattern to modeling labor force and capital productivity in three sectors of agriculture, industry and business is presented. Based on reviewing research theoretical bases and in neoclassical growth model framework, Solow presents a growth model that labor force and capital balance factors are the main growth factors. So, production function is as:

\[ Y = K^\alpha (AL)^{1-\alpha} \]

In this function “\(Y\)” indicates production rate, “\(K\)” capital, “\(L\)” labor force and “\(A\)” indicates technical knowledge balance. Considering the previous studies in order to review and analyze the effective factors in productivity, the presented Cobb-Douglas production function could be reformatted as:

\[ Y = (TFP)K^\alpha L^{1-\alpha} \]

In this model TFP indicates total factor productivity. As previously mentioned, Solow provided a theoretical framework in order to interpret the existence of a residual part referred to as total factor productivity. This model is estimated for investigating the effective factors in productivity through applying different econometric techniques. Assuming a fixed amount of outcome in relation to the scale, the mentioned model could be written as follows:

\[ \frac{Y}{L} = TFP \left( \frac{K}{L} \right)^{\alpha} \]

If we take the logarithm of both sides of the above equation, we have:

\[ \ln \left( \frac{Y}{L} \right) = \ln(TFP) + \alpha \ln \left( \frac{K}{L} \right) \]

By estimating the above model, total factor productivity and its effective variables it goes as:

\[ \ln(TFP) = \ln(Y) - \alpha \ln K - (1 - \alpha) \ln L \]

The above model is applicable to estimating productivity in all of the three sectors.

**LABOR FORCE AND CAPITAL PRODUCTIVITY IN AGRICULTURE SECTOR**

**TOTAL FACTOR PRODUCTIVITY IN AGRICULTURE SECTOR:**

It’s the total proportion of produced product value to the total value of all the consumed inputs. This index measures the joint and simultaneous effect of all the inputs and resources (including human resources, materials and components, capital and so on) in relation to the obtained product value. Assuming the fixed amount of outcome compared with the scale in the above model, total productivity factor goes as: net proportion of product to total labor force and capital inputs. Usually instead of net product, added-value and in the denominator labor force and capital total values are set.

Total factor productivity chart indicates that in most reviewed years this index has a rising process so that total productivity annual growth in agriculture sector during the years 1995 to 2005 has been 6.24 percent on average. It is while in the years 2005 to 1389 total productivity annual growth in agriculture sector has been 21.39 percent. The reason for such a significant growth could be sought in the increase of employed skillful and educated farmers in this sector during the last years. The presence of specialized and educated agriculture human resources in the province is the most important reason to this significant growth of total productivity process in agriculture sector. The most important factors in agriculture total productivity growth in Kurdistan province are as follows: Adequate water and soil resources, decent precipitations, unique rich fields and various plant and animal genetic resources, balanced distribution of the rural population in rural areas, possibility to increase added-value by creating transformative industries, suitable climatic conditions for the development of dry farming gardens, high capacity of producing milk and meat.

**CALCULATING PARTIAL PRODUCTIVITY OF LABOR FORCE AND CAPITAL FACTORS IN AGRICULTURE SECTOR:**

Partial productivity is the proportion of value and amount of the product to one level of the input; like product per man hour (labor force productivity scale) or the value and amount of the provided product per ton of consumed raw material (material productivity) or interest revenue generated per Rials (capital productivity) and so on.

So here to calculate labor force partial productivity in agriculture sector this relation is used as follows:

\[ TFP_{LVP} = \frac{Y_v}{L_v} \]
Also to calculate the capital partial productivity in agriculture sector is goes as:

\[ TFP_{RVP} = \frac{Y_V}{K_V} \]

It would be cleared through comparing capital and labor force partial productivity in agriculture sector that labor force productivity is always more than capital. The most determinant factor of production factor productivity level is production technology (regarding usage or capital intensiveness) in economic sectors. Reviewing employment share and capital balance of different economic sectors indicates that production technology in some sectors is more capital intensive and allocates more capital share to it. The added-value share of different sectors regarding employed production factor extent by each one of them indicates that some of the sectors despite employing a more share of production factor, playing a less important role in creating the whole economy added-value. This is due to the difference in production factor productivity level in economic sectors. Labor force productivity in agriculture sector during the specified period has got a growing and almost fluctuating process. Comparing labor force productivity fluctuations and added-value alteration indicates a close connection between labor force and added-value productivity fluctuations. As it is observed in the chart, capital partial productivity in this sector has a decreasing process. It can be mentioned that actually capital partial productivity in agriculture sector of Kurdistan provincehas an average 1.35 percent annual growth while labor force partial productivity in agriculture sector has an average 17.09 percent annual growth. Some reasons of capital productivity decrease in this sector are idle capacity machinery because of inappropriate geographical distribution, high depreciation of agricultural machinery, dispersion and small farming units, long-term development projects being completed by construction Jihad. Employing agricultural machinery is limited and generally about 85 percent of the farming activities are mechanizes and he current mechanization coefficient is 51 percent. Unique climate conditions, investment high risks due to draught and small lands are the effective factors of capital partial productivity decrease in comparison with labor force partial productivity.

**CAPITAL AND LABOR FORCE PRODUCTIVITY IN INDUSTRY SECTOR**

Total factor productivity index of industry sector has had a fluctuating process so that productivity annual growth in industry sector during the 1995 to 2005 years has been relatively 1.026 percent. Some significant features of this sector that stops it from being efficient are: state structure of this sector, production unit dispersion, inefficient management of industrial units, the lack of providing legal bases to efficient activities of private sector, permanent increase of production factor price, etc. Supporting staff of investment as investors’ reference center especially foreigner investors has been established since 1992 in the country. This staff has started its activity from 1992 until now in the province and during its activity period has been able to provide an appropriate basis to support and attract them to be present in Kurdistan province. As it is cleared from the year 2002 onwards, industry sector productivity fluctuations process has been decreased in the province.

**CALCULATING LABOR FORCE AND CAPITAL PARTIAL PRODUCTIVITY FACTOR IN INDUSTRY SECTOR:**

Partial productivity is the proportion of product value and amount to a level of input. Like product per man hour (labor force productivity index) or the value and amount of the provided product per ton of consumed raw material (material productivity) or interest revenue generated per Rials (capital productivity) and so on.
So to calculate labor force partial productivity in industry sector this relation is being used:

\[ TFP_{Lb} = \frac{Y_b}{L_b} \]

Through comparing capital and labor force partial productivity in industry sector, it is observed that in this sector labor force productivity is always more than capital productivity. In industry sector, labor force partial productivity has had an increasing and less fluctuating process. In this sector with simultaneous employment of idle capacities during post war reconstruction and completing the incomplete projects, labor force productivity has had some improvements. In the other years labor force productivity process in this sector has been mainly affected by added-value fluctuations. Capital partial productivity in this sector has a more fluctuating but increasing process. It could be mentioned that from the year 2005 onwards attracting investment is for the sake of job opportunity creation and economic prosperity, and the ninth government priorities in this area has led to the attraction of investments in Kurdistan province. But still due to technology weakness, capital high depreciation, low capital added-value in comparison with labor force, labor force partial productivity in industry sector is more than capital partial productivity on this sector.

**LABOR FORCE AND CAPITAL PRODUCTIVITY IN BUSINESS SECTOR:**

In this sector, total factor productivity index has had a decreasing process as total productivity annual growth in business sector has been during 1995 to 2002 years has been moderately 15.38 percent annually. This is while during 2003 to 2009 years total productivity annual growth in business sector has been -2.77 percent and the reason for such a significant decrease could be sought in increasing process of smuggling during the last decade in the province. Smuggling goods is one of the challenges that has affected economic security. Since economic security is domestic investors’ right, then increasing process of smuggling in the last decade due to current price and inflation fluctuations, capital attraction, wrong policies and low economic security level have made Kurdistan an important bypass for smuggling goods, so it has been always at the end of the national facility receiving list. Population of this province is also inactive and won’t produce added-economic value in the absence of planned investments. Thus inactive population of the province especially in the marginal towns and villages which are in the last line of receiving economic, cultural and social facilities is having a tendency toward goods smuggling. Yet there is a significant point that the main profit of this smuggling won’t be earned by depriving marginal town people, but it goes for the brokers and dealers.
To calculate capital partial productivity in business sector this relation is applied:

$$ TFP_{Kp} = \frac{Y_b}{K_b} $$

Comparing capital and labor force partial factor productivity in business sector indicates that labor force productivity is more than capital productivity in this sector. Labor force partial productivity in business sector during the observed years and after a severe downfall during 1996-7 years has had a slight increasing process. Labor force partial productivity decrease in capital partial productivity in this sector is not in a proper condition and facing a severe continuous downfall in the last years.

**MODEL AND METHODOLOGY**

Effective factors in capital and labor force productivity are checked out in this section. Considering the point that total factor productivity is capital and labor force productivity estimation, then effective factors in total factor productivity are the same ones as in capital and labor force productivity. In this article it is assumed that total factor productivity depends on real salaries (w), real price of using each capital unit (r), Capital per capita ($\frac{K}{L}$) and the proportion of organized and specialized employees and workers to the total employment ($\frac{L}{L}$) and the estimated form is:

$$ TFP_{it} = \beta_1 W_{it} + \beta_2 R_{it} + \beta_3 \left( \frac{K}{L} \right)_{it} + \beta_4 \left( \frac{L}{L} \right)_{it} + \mu_t + n_i + \epsilon_{it} $$

In which:
- “TFP” is the total factor productivity
- “w” is real salary
- “r” is the real price of using each capital unit
- ($\frac{L}{L}$) Would be the proportion of organized and specialized employees and workers to the total employment

This relation is a time-series model but in order to consider sections role, i.e. different sections as well, a dynamic model with panel data is applied, that goes:

$$ TFP_{it} = \alpha_1 W_{it} + \alpha_2 R_{it} + \alpha_3 \left( \frac{K}{L} \right)_{it} + \alpha_4 \left( \frac{L}{L} \right)_{it} + \mu_t + n_i + \epsilon_{it} $$

In which “i” and “t” in order indicate country and time, $\mu_t$, time-specific effect, $n_i$, country-specific effect.

Putting sectors alongside with time and using pooled data has the advantage that by consideration of development level differences of agriculture, business and industry sector, it would be easier to review effective factors’ role in productivity.

There are different methods to estimate a pattern with pooled data, such as:
- Model estimation, assuming the same intercept for all the levels
- Model estimation, assuming the intercept difference for different sections (fixed or stable effects)

In order to specify which one of the above assumptions should be applied this test must be employed:

$$ F = \frac{(SSR_{pool} - SSR_{fixed})/(n - 1)}{SSR_{fixed}/[nt - (n + k)]} $$

In which $SSR_{pool}$ indicates the total squares of estimated model errors assuming identical intercepts and $SSR_{fixed}$ shows the total squares of estimated model errors assuming different intercepts that has been estimated by the fixed effect method. Thus the model is needed to be estimated once by assuming identical intercepts for all sectors and once by ignoring this assumption.

The “F” statistic to examine this assumption is zero and intercept for all the levels are the same.

If “F” be with $(n - 1)$ freedom degree in numerator and $[nt - (n + k)]$ in denominator and more than the “F” in the table, the zero assumption is rejected and intercept differences for different sectors are accepted.

In “F” equation “n” indicates section numbers, “t” time series observation times.

**Tab.1. “F” test for all three agriculture, industry and business sectors**

<table>
<thead>
<tr>
<th>sectors</th>
<th>SSR_{pool}</th>
<th>SSR_{fixed}</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
<td>25396.25</td>
<td>24167.37</td>
<td>0.392</td>
</tr>
</tbody>
</table>
The table “F” in 5 percent meaningfulness level is about 1.4, so the solution to “F” statistic is not in refusal area and the theory of identical interceptions won’t be rejected.

After determination of the point that the intercept for different sectors is the same, the model is estimated by Pooled Least Squares. Thus estimating Pooled Least Squares model is presented in table 2.

$$ TFP_{it} = \lambda_1 W_{it} + \beta_1 P_{it} + \beta_2 \left( \frac{K}{L} \right)_{it} + \beta_3 \left( \frac{L}{K} \right)_{it} + U_t $$

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Amount</th>
<th>Scale</th>
<th>t Static</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1.632410</td>
<td>0.541257</td>
<td>3.015958</td>
<td>0.0026</td>
</tr>
<tr>
<td>$\lambda_1$</td>
<td>0.023038</td>
<td>0.005012</td>
<td>-7.887333</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\beta_1$</td>
<td>0.155018</td>
<td>0.015441</td>
<td>10.03913</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\beta_2$</td>
<td>-0.063168</td>
<td>0.022990</td>
<td>-2.747585</td>
<td>0.0061</td>
</tr>
<tr>
<td>$\beta_3$</td>
<td>0.2440359</td>
<td>0.0000138</td>
<td>-2.602281</td>
<td>0.0093</td>
</tr>
</tbody>
</table>

Regarding the achieved results it is observed that $\lambda_1 = 0.023038$ is positive and statistically meaningful. In other words, the relation between the real salary and total productivity in all sectors is positive and by increasing the real salary, total factor productivity would increase. Then by increasing the real salaries, labor force would be more and better. Then it adds up to labor force enthusiasm and other production factors such as machinery and facilities would be employed better and more than that, labor force motivation to improve education and skill levels would increase.

Considering the results it is regarded that $\beta_3 = 0.155018$ is positive and meaningful statistically. In other words the relation between the real price of applying total factor productivity and capital in all sectors is positive and by increasing the real price of using capitals, total factor productivity would rise. Because with increasing the real price of using capitals, there would be more investment being done in the plans with more productivity and due to increasing the price of capital opportunity, the employer tries to utilize the capital facilities in its best kind.

Individual capital coefficient negativity means $\beta_2 = -0.063168$ then capital per capita effect in productivity is negative and tendency towards capital intensive technology and activities wouldn’t help the total factor productivity elevation.

Regarding the achieved results, then $\beta_3 = 0.2440359$ is positive and statistically meaningful. In other words the relation between proportion of organized, technical and specialized employees to total factor productivity and total employment in all sectors is positive and by increasing this proportion of organized, technical and specialized employees to total employment, total factor productivity would increase.

**CONCLUSION AND SUGGESTIONS**

Through calculating total productivity in three sectors of agriculture, industry and business, it could be concluded that total r productivity in agriculture sector is more than business sector and in business sector is more than industry sector. At the end, effective factors in total factor productivity had been introduced and analyzed. Based on the present study results real salaries, real price of capital utilization, proportion of scientific and specialized employees to total employment in province have a positive effect on total factor productivity and a negative effect on capital per capita. Technical and specialized labor forces are known as the most effective production input and individual capital balance as the least effective one which could be interesting to policy makers in Kurdistan province. Meaning one expert specialized and technical labor force and one machinery unit in order has more and less effect on productivity of all three sectors than the other variants.

As the current statistics indicate, although productivity growth of agriculture sector is more than industry and business sector, but yet production and productivity level in industrial and agricultural activities which is the basis of each economy has been really weak and their improvement is not getting any better, as productions of these industries in the province has been almost fixed and even with full political and economic security in the area there isn’t still proper investment improvements not even after 8 years of war.

The noticeable point is with full political, social and economic security in the last decade in the area and economic potentials of fixed agricultural and industrial product growth in the province, there hasn’t been the possibility of using productive capacities; the main reasons to that are:

1. Ignorance and no sufficient education of producers and economic activists.
2. Lack of integrated planning and state proficiency in productions and utilizing productive capacities and advantages of the province.
3. Multiplicity of bogus jobs in the area and excessive wasting of labor force and human resource in these jobs.
4. Lack of adequate coordination by state and private sector departments and organizations to create economic policies.
5. Lack of competence and skillful experts in state and private sector department and organization, and naturally no good knowledge of industrial and manufacturing advantages.
6. Economic activists’ risk aversion in industry and agriculture sections and their risk-taking in trading activities.

One of the economic advantages of Kurdistan province is its trading sector and dynamic business. Through efficient utilization of trading and business opportunities, province development level could be improved and get closer to the government economic goals in the area. But business capabilities and long history of trading in the province due to its geographical situation are people’s motivations and trading culture in the area in the last few years and in domestic trading, there has been a pretty appropriate
institutionalization and strengthening that includethree marginal markets with more than 12000 local merchants and businessmen, 13 marginal cooperatives with 280000 population, border trading with more than a hundred million dollars a year, trading banks with international trading operations, local and trans-area market network, all in all make a high potential of creating special and even free trading zones. It must be mentioned that not only special zones haven’t been created but also there are several problems in border trading and markets such as: lack of up to date and efficient substructures in the markets, electricity disconnections and no amenities, no cooperation between related offices and organizations to facilitate merchant’s and businessmen affairs, lack of large storehouses and appropriate fridges.

The mentioned subject indicate that although province’s export and trading industry comparing to other activities are in a better condition and can’t be counted as an advantage but it could be clearly pointed out that available capacities in this industry haven’t been utilized properly like agriculture and industry sector, and by appropriate planning and educating in production and business-related issues and through regarding strategic position of the province like being close to great consuming markets such as Iraq, production level, productivity and employment, economic stability and other economic and social indexes could be improved.

REFERENCES


