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Full Length Research Paper

The significance of efficiently run companies in Iran: The case of companies in Golestan Province

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This research has a practical purpose and is a descriptive retrospective study conducted over a period from 2000 to 2011. The main purpose of the current study is to measure the productivity of selected industries and companies listed in the companies in Golestan Province of Iran. Company performance can be assessed in two different ways. One way is to take into account company productivity, and the other way is to evaluate companies based on their annual accounting reports extracted from company financial information (Kitaeva, 2003). According to the experiences gained in industrial countries, having an implementation of a proper evaluating system of productivity and even without any changes can increase productivity by 5 to 10% (Mahboubi, 2003). From the results which show the significance test for the hypothesis of the coefficients of R, it is clear that the level of statistic significance (Sig), error rate test for independent variables is 5%.

Key words: Productivity, total factors productivity (TFP), strategic, Golestan Province.

INTRODUCTION

Experiences in South Africa have been largely analogous to those in West American, as annual species replace perennials on degraded rangelands (Dean et al., 1995). Restoration efforts based on non-local materials and large-scale mechanization have not been capable of reversing the trend of environmental degradation (Pellant and Monsen, 1993). The importance of locally adapted and collected material has become increasingly obvious (Belnap, 1995; Linhart, 1995).

The problems with invasion of weeds, increasing fire frequency, mined land reclamation, soil loss, and lack of economic opportunity for rural populations are similar across many temperate and tropical arid regions. Lessons learned over the past four decades in Nevada have broad applications to other areas. Only a few years ago it was accepted that reclamation of areas with low precipitation in the American west was not technically or economically feasible. Now successful revegetation with native species is the norm, even in the hottest and driest areas of the Great Basin it is considered routine (Richards et al., 1999; Ross, 1999).

Company performance can be assessed in two different ways. One way is to take into account company productivity, and the other way is to evaluate companies based on their annual accounting reports extracted from company financial information (Kitaeva, 2003).

Measuring productivity can be defined in terms of technical performance and effectiveness. By technical efficiency, we mean converting inputs to output in the course of the operation. Effectiveness in the strategic area refers to the degree to which organizations‟ objectives based on the output can be reached (Rouse et al., 1997).

The strategic importance of productivity for any company or organization shows the need to have a control on it. By measuring its productivity, a company develops an explicit link between productivity and other strategic objectives. Apart from its strategic advantages, measuring productivity is helpful in other supporting functions.

Nowadays, productivity is known as one of the most important strategies to improve the economic, social and cultural development of nations. Success in accelerating the improvement in productivity is one of the main conditions to achieve the proper position in the global competition and to increase prosperity of people"s life.

Measuring productivity can be defined in terms of technical performance and effectiveness. By technical efficiency, we mean converting inputs to output in the course of the operation. Effectiveness in the strategic area refers to the degree to which organizations" objectives based on the output can be reached (Rouse et al., 1997). Improving productivity is normally a primary responsibility of a management. Increasing productivity is not possible without analyzing it. Measuring productivity in private companies helps us to identify effective factors improving productivity.

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 beings have 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 (Abtahi and Kazemi, 2001: 3).

LITERATURE REVIEW

What is strategy?

For almost two decades, managers have been learning to play by a new set of rules. Companies must be flexible to respond rapidly to competitive and market changes. They must benchmark continuously to achieve best practice. They must outsource aggressively to gain efficiencies. And they must nutture a few core competencies in the race to stay ahead of rivals. Positioning-once the heart of strategy-is rejected as too static for today's dynamic markets and changing technologies. According to the new dogma, rivals can quickly copy any market position, and competitive advantage is, at best, temporary. But those beliefs are dangerous half-truths, and they are leading more and more companies down the path of mutually destructive competition. True, some barriers to competition are falling as regulation eases and markets become global. True, companies have properly invested energy in becoming leaner and more nimble. In many industries, however, what some call hypercompetition is a self-inflicted wound, not the inevitable outcome of a changing paradigm of competition (Porter, Michael E: 996,1-18).

The root of the problem is the failure to distinguish between operational effectiveness and strat egy. The quest for productivity, quality, and speed has spawned a remarkable number of management tools and techniques: total quality management, `benchmarking, time-based competition, outsourcing, partnering, reengineering, change management. Although the resulting operational improvements have often been dramatic, many companies have been frustrated by their inability to translate those gains into sustainable profitability. And bit by bit, almost imperceptibly, management tools have taken the place of strategy. As managers push to improve on all fronts, they move farther away from viable competitive positions. Operational effectiveness and strategy are both essential to superior performance, which, after all, is the primary goal of any enterprise. But they work in very different ways. A company can outperform rivals only if it can establish a difference that it can preserve. It must deliver greater value to customers or create comparable value at a lower cost, or do both. The arithmetic of superior profitability then follows: delivering greater,value allows a company to charge higher average unit prices; greater efficiency results in lower average unit costs Porter, Michael E: 996,1-18).

Ultimately, all differences between companies in cost or price derive from the hundreds of activities required to create, produce, sell, and deliver their products or services, such as calling on customers, assembling final products, and training employees. Cost is generated by performing activities, and cost advantage arises from performing particular activities more efficiently than competitors. Similarly, differentiation arises from both the choice of activities and how they are performed. Activities, then, are the basic units of competitive advantage. Overall advantage or disadvantage results from all a company's activities, not only a few (Porter, Michael E: 996,1-18).

How useful is Marginal Productivity Theory? Reality of the fantasy world of economists

The marginal productivity theory of income distribution has come in for a lot of criticisms, but are they justified? To start with, you cannot criticise something unless you know precisely what it is you are criticising. Marginal productivity theory has been criticised for assuming perfect competition.

Marginal productivity theory merely states that to maximise profits, an employer will employ workers up to the point where the workers" marginal cost equals the extra revenue added by that worker: $MC_L = MRP_L$. This applies equally under perfect competition, monopoly and monopsony. What it does say is that *if* there is perfect competition then the worker"s *wage* will equal MRP_L. It certainly does not say that there will always be perfect competition, or that $W = MRP_L$ in other market structures.

A second criticism is that employers simply do not behave in this „marginal way", weighing up each

additional worker‟s costs and revenues for the firm. There are three possible reasons for this.

Ignorance of the theory of profit maximization

The employer may use some rule of thumb, but nevertheless in attempting to maximise profits. This is a criticism of the theory only if the theory is supposed to describe how employers actually behave. It doesn‟t. It merely states that, if firms are attempting to maximise profits, they will in fact be equating MC_L and MRP_L, whether they realise it or not.

Possibility of calculating a worker's marginal productivity

When workers are part of a team, it is not usually possible to separate out the contribution to output of each individual. What is the marginal productivity of a cleaner, a porter, a secretary, a security guard, or even a member of a production line? Similarly, it may not be possible to separate the contribution of workers to output from that of their tools. A lathe operate is useless without a lathe, as is a lathe without a lathe operator.

This is a more fundamental criticism. Nevertheless it is possible to amend the theory to take this into account. First of all, an employer can look at the composition of the team, or the partnership of worker and tools, and decide whether any reorganisations or alternative production methods will increase the firm‟s profitability. In doing this, the changes in costs resulting from the reorganisation must be weighed against changes in output and hence revenue. Secondly, the employer can decide whether to expand or contract the overall size of the team, or the number of workers plus machines. Here, the whole team or the worker plus machine is the „factor of production‟ whose marginal productivity must be weighed against its costs.

Firms do not always maximize profit

This is a criticism only if the theory states that firms are. As long as the theory is merely used to describe what would happen *if* firms maximised profits, there is no problem. This criticism then is really one of how the theory is used. But even if it is used to predict what will actually happen in the real world, it is still relatively accurate in the large number of cases where firms‟ behaviour only slightly diverges from profit maximising. It is clearly wrong in other cases. A final criticism is the moral one. If economists focus their attention exclusively on how to maximise profits, it might be concluded that they are putting their seal of approval on this sort of behaviour. Of course, economists will respond by saying they are doing no such thing: they are confining themselves to positive economics. Nevertheless the criticism has some force. What an economist chooses to study is in part a normative decision.

Solow (1957) pioneered in developing and applying a preliminary approach to analyse productivity growth by using partial factor productivity. This indicator of productivity is measured by the ratio of total production factors of the product to one of the inputs. However, this method is not applicable in determining the role of factors that can affect productivity growth. To eliminate this deficit, Jorgenson et al. (1987) divided factors affecting the production growth rate into two parts. The first part is about the role of the growth rate of inputs, and the second part is about the impact of residual terms on TFP. On the basis of this method, TFP is calculated as the discrepancy between the growth rate of a product and the weighted average growth of inputs (the share of inputs in the gross value of the product in each part).

A review of the studies in different countries shows that most of the recent studies in TFP and factors affecting it are based on the Jorgenson Gollop model, where they presented a model for analyzing the total productivity growth against its sources for individual industries. The productivity growth for every industry was obtained from the proportion of gross product of every sector to the total GDP. These include studies conducted by Abimanyu and Xie (1994) and Tham (1994). The results of these studies indicate that capital accumulation is one of the principal factors affecting the growth and development of an industry. According to the above-mentioned subjects, the following studies are presented.

Margono and Subhash (2006) studied and analysed efficiency and productivity in Indonesian manufacturing industries. This study investigated technical efficiency and productivity growth by TFP in food, textile, chemical and metal industries in Indonesia using the stochastic frontier model during the period of 1993 to 2000. Estimation of productivity growth by TFP revealed that productivity in Indonesian manufacturing industries decreased by 2.73, 0.26 and 0.5% for food, textile and metal industries, respectively. However, in chemical industries, it increased by 0.5% during the period under investigation. The decomposition of TFP growth indicates that the growths are driven positively by technical efficiency changes and negatively by technological progress in all four sectors**.**

Yilmazkuday (2009) studied productivity cycles in public and private manufacturing sectors in Turkey, and, based on the multi-stage Gibbs-sampling approach, compared the productivity of the two in a period of three months during 1988-2006 using functional regime shifting model. Considering business cycle time for the test period, it has been outlined that: Public sector had a higher productivity growth rate compared to the private sector and both systems are met by high and low productivity growth (Yilmazkuday, 2009: 21-40). In his study entitled “Efficiency, Change of Productivity and Value of the Company during Financial Crisis: Some Evidences from Asian Banks”, Lin (2010) reviewed

efficiency in banking industry and used Malm Quest index to measure efficiency of banking industry in nine eastern Asian countries from 1993 to 2002. Experimental results revealed that, after Asian financial crisis (1993-2002), technical efficiency dwindled in Indonesia, Malaysia and Thailand.

To find correlation between changes of productivity in favor of the value of the company, this study structurally analyzed and made a comparison of changes of productivity of the banks in nine eastern Asian countries. Obtained results proved that in countries where banks improved in general technical efficiency after the Asian financial crisis, change of scale efficiency and technical change had boosted. Change of scale efficiency and change of net efficiency were the important factors affecting value of the company after Asian financial crisis in 1998-2002, and turned out to have a significant role in investments made within bank markets (Lin et al., 2010: 3978-4002).

In a 2005 study, Harchaoui and Morisette undertook a similar examination to that attempted in this report, but used the business sector, not the total economy. They looked at the relationship between the changes in productivity, real wages, and income distribution over the period 1981 to 2004. First, they found that much of the difference between the growth rate of labour productivity and the growth rate of product wages occurred in the late 1990s. Second, they found that such a gap had occurred in all other OECD countries examined except the United States. Finally, they concluded that the decline in labour share of non-university educated workers and an increase in the labour share of university education workers in recent years had resulted from technological change.

The Centre for Spatial Economics (2007) explored some of the reasons behind labour‟s declining share of national income and the policy implications. This study reiterated the observation of Fisher and Hostland (2002) that labour productivity growth had outpaced the growth in real wages since the mid 1990s. The study noted that Canada was not alone in this divergence, but that countries like the United States and United Kingdom, with larger and fast growing information and communications technology sectors had seen larger and more persistent gaps between the growth in labour productivity and real wages. The authors concluded that the decline in

Canada‟s labour share was highly cyclical and would likely be reversed in an economic slowdown. The policy recommendations were to increase competition in labour markets by improving regional and occupational mobility.

When using appropriate measures, studies on the relationship between labour productivity and real wages in Canada seems to concur that the divergence observed since the mid 1990s is cyclical and will be reversed over time. Apart from those studies noted here, there has not been a great deal of recent research on the relationship between labour productivity and real wages in Canada.

Criteria for Performance Excellence Framework

The framework connecting and integrating the Categories is given below. Information and Management forms the basis of the framework (Figure 1). Reliable information that is readily available to all decision-markers is the foundation of sound business decision-making. Without accurate information and sound analysis, leaders lack a basis for making decisions, employees cannot know how well they are performing, and it is impossible to effectively manage critical processes.

Consequently, business performance suffers. On the left of the chart, we see the closer inter-relationship between leadership, strategic planning and customer and market focus. Leadership sets the direction, goals and values for the company. The overall strategy is translated into action plans used throughout the company while customer and market requirements drive all of these activities(Smart Busines Devopment Center.,2012).

On the right side of the chart we see how plans and goals take shape in the day-to-day activities of the company. Human resource activities such as employee selection, work design and training all reflect the company‟s strategic direction and understanding of the marketplace. Similarly, these same forces govern company processes, the methods used by employees to accomplish and manage the work. To be managed efficiently, the processes require that accurate, timely information be deployed to all employees.

Finally, all of the previous activities produce the company‟s business results. As this chart graphically illustrates, strong business performance is a direct result of the interaction between marketplace understanding, sound information and process management performed by a well-organized and trained staff and guided by a clear strategic direction(Smart Busines Devopment Center.,2012).

Background of Research

In their study entitled “Efficiency, Productivity and Ownership Structure of Securities: Taiwanese Companies”, Liao et al. (2010) aimed at investigating changes in productivity of companies operating in (Stock) Exchange market in Taiwan. Malm Quest index has been applied to measure change of productivity for Taiwanese companies operating in Exchange during 1992-2007, and a comparison was made between change of productivity in three periods: pre-crisis, pre-crisis to financial reform, after financial reform. Finally, a series of analyses were performed to specify efficiency parameters. They found out that so long as companies operating in Exchange were recording positive growth rate in Taiwan, Asian financial crisis would affect both efficiency and earnings of Exchange industry. Findings indicate that outdoor monitoring mechanisms are more affecting than indoor

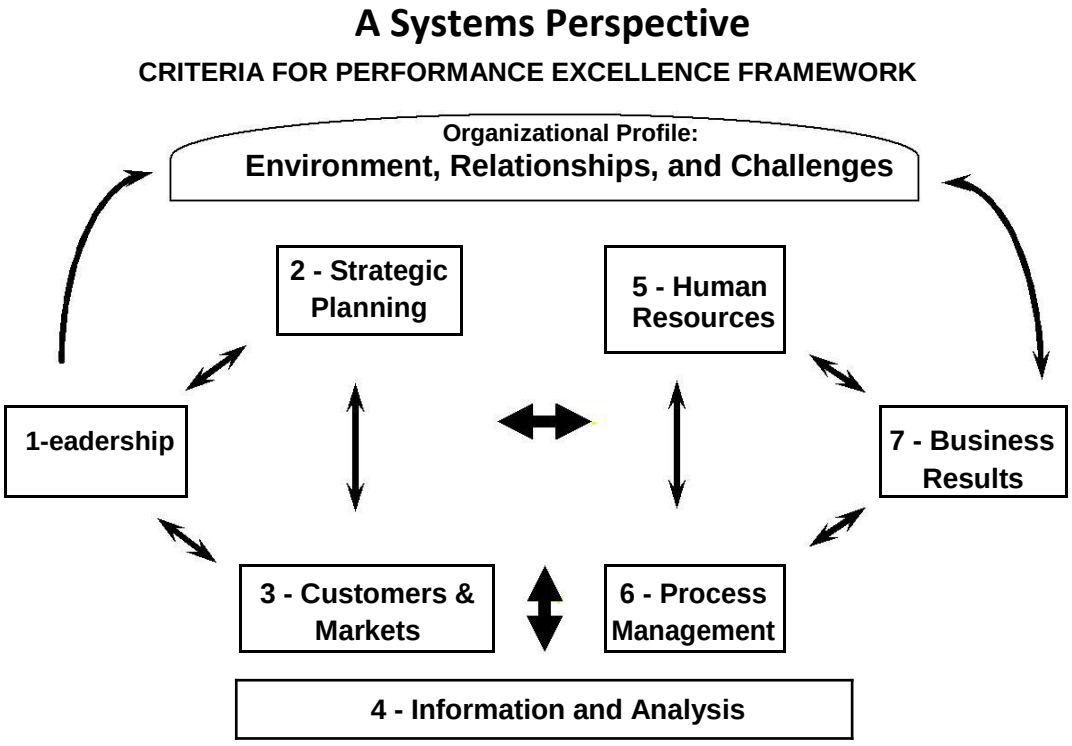

Figure1: Criteria for Performance Excellence Framework
Source: Smart Busines Devopment Center (2012). Criteria for Performance Excellence,The foundation for the SMART .Self-Assessment, university of missour Extension.

ones (Liao et al., 2010: 46).

Lin (2010) explored efficiency, productivity change and corporate value during the financial crisis. Using data from Asia banks, this study reviewed efficiency in the banking industry using the Malmquist index to measure the relative efficiency of the banking industry in nine Eastern Asian countries from 1993 to 2002. The empirical results showed that after the Asian financial crisis (1998–2002), technical efficiency dwindled in Indonesia, Malaysia and Thailand.

This study conducted structural analysis and comparison of changes in the productivity of banks in nine Eastern Asia countries to ascertain the correlation of productivity changes with the corporate value. Changes in scale efficiency and net efficiency were the important factors affecting company valuation after the Asian financial crisis in 1998–2002; these factors turned out to have a significant role in investments made within the banking market.

Yilmazkuday (2009) studied the productivity cycles of public and private manufacturing sectors in Turkey by using a regime shifting model applied through the multi-move Gibbs-sampling approach over the quarterly period of 1988–2006. By considering business cycle time for the sample period, the study determined that the public sector had higher productivity growth rates compared with the private sector, and that both systems contained high and low productivity growth regimes.

Halkos and Tzeremes (2007) studied the relationship between companies‟ size and their productivity performance; they claim that productivity levels are likely to be in contrast the company‟s size. In other words, smaller companies organized production process differently than larger companies knitted organized. First, one expects to observe a positive impact on productivity levels because of the overhead costs. However, when a company grows beyond a certain size, the scale of the savings will probably have a negative impact on the productivity levels.

Margono and Subhash (2006) studied and analyzed efficiency and productivity in Indonesian manufacturing industries. Using random frontier model, this research has investigated technical efficiency and productivity growth by total factors (TFP) in food, textile, metal and chemical industries in Indonesia during 1993-2000. Estimation of productivity growth by total factors (TFP) revealed that productivity in Indonesian manufacturing industries has been decreased down by 2.73%, 0.26%

and 0.5% for food, textile and metal industries, respectively; while, it had been increased by 0.5% for chemical industries within the time under investigation. Distinction between the productivity growth by total factors (TFP) revealed that this growth (development) was being affected positively by changes in technical efficiency and negatively by technological development in all of the four sections (Margono and Subhash, 2006: 979-995).

Fernandes (2008) studied firm productivity in Bangladesh manufacturing industries, checking for relationship between productivity by total factors (TFP) for firms in Bangladesh via data. By controlling industry, circumstances and constant annual effect, she found out that firm size and age had a converse and a U-like converse relationship, respectively, with productivity by total factors (TFP). Findings also revealed that problems such as difficulty with financing, elaborate administrative system and violations could make productivity by total factors (TFP) existing in the firm decrease (Fernandes, 2008: 1725).

Haltiwanger and et al. (1999) studied the differences in productivity among different industries during the 1985-1996 period using the production function method and concluded that the number of workers, age and human capital affect productivity.

Idson and Walter (1999) also used the production function approach to study and compare the work force productivity within small and large industries such as fabricated metals, machinery, electrical equipments, and transport equipments. They concluded that large industrial labor force has improved productivity than small industries due to the use of technology, equipment and organization.

Pilat (1995) compared the productivity of various industries in South Korea, with similar industries in America and Europe. He found that, although productivity in some Korean industries such as leather, metals, and machinery was comparable to that of their European counterparts, the overall productivity of Korean industries was about 26 percent that of American industries. To his view, factors such as the use of capital, savings resulting from industrial-scale production and workforce education are the most important factors causing this difference in productivity of American and South Korean industries.

Seshaiah and Reddy (1993) studies productivity trends in some industries of Anthrapradesh Manufacturing Sector. They used a translog function and a Divisia index to compute productivity in four industries: cotton textiles, tobacco and beverages, food products, and paper and paper products. The set of explanatory variables includes the stock of capital, labor and fuel in addition to a time variable that serves as an agency for the review of technical progress in industry. Gross national product was used as the dependent variable. The authors concluded that the overall productivity in all industries except the cotton textile industry experienced a downward trend. Total productivity in the cotton textiles industry has, by contrast, increased during the period, with mild fluctuations.

Bonelli (1992) analyzed the relationship between total productivity and output growth of manufacturing industries in Brazil. His research revealed that there is a direct relationship between output growth and productivity growth. Bonelli"s analysis also showed that about 40% of the productivity growth in Brazilian industry corresponds to the growth and expansion of exports.

RESEARCH METHODOLOGY

This research has a practical purpose and is a descriptive retrospective study conducted over a period from 2000 to 2011 (Figure 2). The statistical population of this study includes industries known as profitable on the basis of previous studies. Additional requirements were that the companies" data were available during the course of the study and that their stocks were active. Thus, 19 companies from 5 industries were selected. To collect data for this study, time series values of employment and capital stock statistics of 5 industries were extracted from basic financial statements reported between 2000 and 2011. For measuring partial productivity of capital, final productivity of capital was used as the ratio of changes in added value to capital changes. Since the ratio of output to input for measuring TFP cannot represent a suitable estimate of its real amount, the production function technique was used to measure TFP, and ordinary least squares (OLS) was used to estimate introduced functions.

Introduction to the model

To estimate and evaluate TFP, production functions were used. To estimate private companies" production functions, OLS and LS techniques were used because OLS is the best known and widely used method; its estimations are non-biased, compatible and efficient.

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

$Q = F(L, K, Z)$.

Q: Total production, A: Total productivity parameter, K: Capital stock, L: Labour, Z: Intermediate goods, α: Investment"s produced coefficient of elasticity, β: Labour productivity"s coefficient of elasticity, J: Production elasticity coefficient of intermediate goods.

$$log\ (Q_{it}) = \log(A) + \alpha\log(_iK_{it}) + \log(L_{it}) + J\log(Zi_it) + _i\varepsilon_{it}$$

$$log\ (Q_{it}) = \log(A) + \alpha\log(_iK_{it}) + \log(L_{it}) + J\log(Zi_it) + \varepsilon_{it}$$

Here, the indexes i and t represent i^{th} company and the time. The mentioned production function was estimated for a selected group of private companies by using a Panel data approach and Eviews7 software. In general,

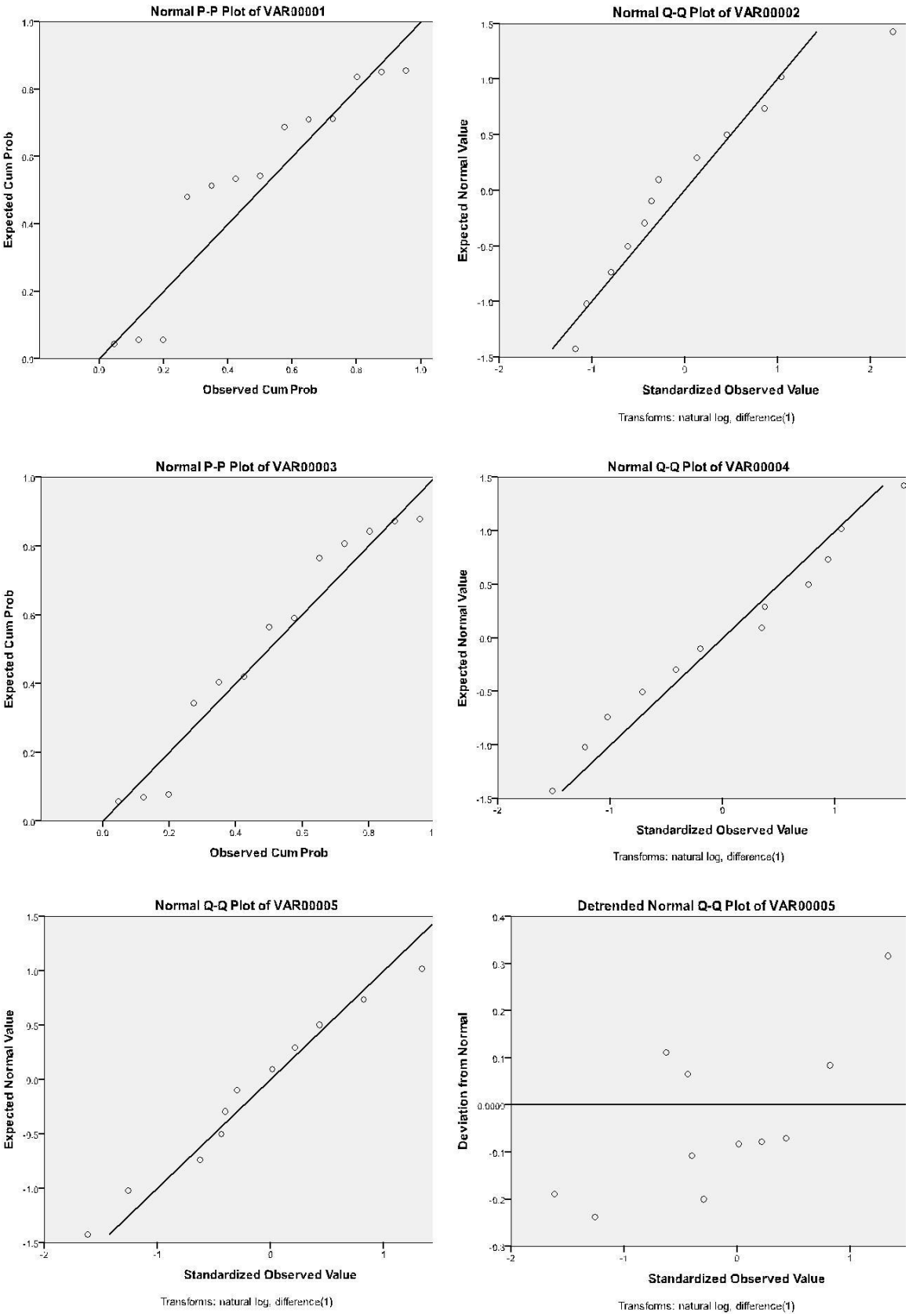

Figure 1. Research variables from the period of 2000 to 2011.

TFP is the ratio of output (real added value) to average weight of inputs. This reflects the share of each input in total production cost, and is calculated using a modified Kendrick index as follows:

$$TFP = AV\ j\ (Ak + \alpha\beta L + j\ Z)^{-1}$$

where TFP is the total factor production, AV is added value, L is labour force, K is capital and Z is intermediate goods. Therefore, TFP expresses exogenous technical progress in a production model. It is about how production changes with time when production inputs (work and capital) are fixed. $MP_{i,t}=\Delta\ VA_j/\ F_{i,j}$

If this ratio is expressed as the changes of output to changes of one input, it is called final productivity of a factor. In the above function, MP_{ij} is the final productivity of the factor i (labour force and capital) in department j, $_j$ VAΔ is the changes in added value of department j and $_{ij}$FΔ is the changes in input of factor i (labour force and capital) in department j. Likewise, efficiency is defined by dividing a weighted combination of output by that of input. The weights are actually the produced value or spent cost. The production function was estimated for a group of selected private companies by using a Panel data approach and the Eviews7 software, where:

Efficiency = total outputs/total inputs.

RESULTS

Data analysis

To describe the research results and data analysis of the study, the main three following hypotheses are used: The following equation is used to estimate the coefficients of various factors expected to influence agriculture TFP.

$$log\ (Q_{it}) = \log(A) + \alpha\log(_iK_{it}) + \log(L_{it}) + J\log(Zi_it) + \varepsilon_{it}$$

$$log\ (Q_{it}) = \log(A) + \alpha\log(_iK_{it}) + \log(L_{it}) + J\log(Zi_it) + \varepsilon_{it}$$

OR :

$$\mathrm{Ln(TFP_t)} = \alpha_0 + \alpha_1\mathrm{Ln(HC_t)} + \alpha_2\mathrm{Ln(FER_t)} + \alpha_3\mathrm{Ln(ACR_t)} + \varepsilon$$

where TFP, HC, FER, ACR, and AUC are already explained and Ln refers to natural logarithm of variables.

All variables are measured in index numbers. α_i are long-run coefficients to be estimated; ε is white noise random error; and t refers to time period. Rational for including each of the independent variables is as under. A host of factors might affect TFP in the agriculture sector. However, the present study has focused on the most relevant ones.

Table 4 represents the relationships between variables Pearson correlation coefficient based on the assumption that, respectively, between the first variable (VAR1) with respect to the second variable (VAR2) and third (VAR3), fourth (VAR4), and variable (VAR5), Pearson correlation coefficient, respectively: (0.4730) (0.5360) (-.085) (-.001), more. But Pearson correlation coefficient, respectively, between variable (VAR2) compared to the first variable (VAR1) and third (VAR3), fourth (VAR4), and variable (VAR5), Pearson correlation coefficient is the face (0.473), (0.3290), (-0-.090), (.2120). For variable coefficient III (VAR3), the first variable (VAR1), second (VAR2) and fourth (VAR4), and V (VAR5), are respectively equal to: (0.5360) (0.2930) (0.671), (0.4240). Pearson correlation coefficient, respectively, the fourth variable (VAR4) compared to the first variable (VAR1) and second (VAR2) and third (VAR3), and V (VAR5), respectively Pearson correlation coefficient is :(-.085), (-0.090) (0.0811) (0.2120). Finally, Pearson correlation, respectively, between the fifth variable (VAR5) compared to the first variable (VAR1) and second (VAR2) and third (VAR3), and V (VAR5), Pearson correlation coefficient is thus equal to (- 0.001), (0.090) (0.2120) (0.424) (0.081).

The results in Tables 1 to 8 show that the correlation coefficient variables of r related to the first hypothesis can be stated by the explanatory variable. The importance of productivity in business strategy of Golestan province is that there is a significant relationship and this relationship is significant at a confidence level of 95%. In other words, the 95% assumption (H1) is confirmed. The coefficient of determination (R), which is equivalent to (0.925^a), and the coefficient of determination coefficient (R^2), which is equivalent to (0.855) and the adjusted coefficient of determination (R-Squared), which is equivalent to (0.783), the authenticator. The first hypothesis shows that Tables 4 to 7 represent the first description of the statistical theory research. According to these tables, as shown in Column B, the constant coefficients and independent variables in the regression equation are presented. Thus, the model equation is estimated as:

$$\mathbf{y = -13.847 - .440\ X_1 + 23.194X_2 + -10.834X_3 + -3.597X_4 + \varepsilon_{i,t}}$$

Also, the Column level of significance (Sig) and the results of the significance test for the hypothesis show the coefficients of R. As shown in Table 6, it is clear that the level of statistic significance (Sig), error rate test for independent variables is 5%. Therefore, given that the error level of 5% is considered for this study, this variable is significant and the hypothesis is confirmed. Independent variables and the dependent variable has a significant impact. The second column in Table 6 shows the correlation coefficient (.925 ^{a}.) and the third column squared correlation coefficient or the coefficient of determination (amount of variability in the dependent variable that can be explained by the regression) (.55) shows (0.855), change of responsibility is dependent on the assumption variable. The importance of productivity in business strategy of Golestan province is that there is a significant relationship in the estimated standard error

Table 1. Statistical population of this study (Companies in Golestan Province).

Number	Type of industry	Private company
1	All kinds of food products and beverages	5
2	Chemical materials and products	4
3	Pharmaceutical materials and products	5
4	Other non-metallic mineral products	3
5	Machinery and equipment	3
Total of variable		20

Table 2. Annual data of research variables from the period of 2000 to 2011.

Year	Log of variables of research				
	TFP	HC	FER	ACR	AUC
	3.735251	3.908792	4.023307	3.817272	2.414305
2000	4.266994	4.092277	4.060637	3.870812	2.423819
2001	4.005622	4.027851	4.103158	3.955354	2.497565
2002	3.015209	4.059735	4.073904	3.94389	2.517974
2003	3.812008	4.221997	4.059301	3.863316	2.496168
2004	4.30393	4.09097	4.093644	3.90249	2.483972
2005	4.039084	3.903532	4.089293	3.920141	2.473648
2006	3.057461	3.749094	4.054292	3.897563	2.524097
2007	3.800977	4.121777	4.071861	3.843568	2.556242
2008	4.314275	4.082959	4.102154	3.862233	2.550717
2009	4.040738	4.030967	4.098065	3.910599	2.496404
2010	3.060747	3.938372	4.018423	3.872464	2.427535
2011	3.77544	4.023149	4.021311	3.808982	2.525576
SUM	49.22774	52.25147	52.86935	50.46868	32.38802
AVERAGE	7.032534	7.464496	7.552764	7.209812	4.62686

Source: Central Bank of Islamic Republic of Iran.

Table 3. Annual data of research variables from the period of 2000 to 2011.

Year	LN of variables of research				
	TFP	HC	FER	ACR	AUC
	1.317815	1.363228	1.392104	1.339536	0.881411
2000	1.45091	1.409102	1.40134	1.353464	0.885344
2001	1.387699	1.393233	1.411757	1.37507	0.915316
2002	1.103669	1.401118	1.404602	1.372168	0.923455
2003	1.338156	1.440308	1.401011	1.351526	0.914757
2004	1.459529	1.408782	1.409436	1.361615	0.909859
2005	1.396018	1.361882	1.408372	1.366128	0.905694
2006	1.117585	1.321514	1.399776	1.360351	0.925883
2007	1.335258	1.416284	1.4041	1.346401	0.938538
2008	1.461929	1.406822	1.411512	1.351246	0.936374
2009	1.396427	1.394006	1.410515	1.363691	0.914851
2010	1.118659	1.370767	1.39089	1.353891	0.886876
2011	1.328517	1.392065	1.391608	1.337362	0.926469
SUM	1.317815	1.363228	1.392104	1.339536	0.881411
AVERAGE	1.45091	1.409102	1.40134	1.353464	0.885344

Source: Central Bank of Islamic Republic of Iran.

Table 4. Correlations of research variables from the period of 2000 to 2011.

Correlations						
		VAR00001	**VAR00002**	**VAR00003**	**VAR00004**	**VAR00005**
VAR00001	Pearson Correlation	1	.473	.536	-.085	-.001
	Sig. (2-tailed)		.102	.059	.283	.998
	N	13	13	13	13	13
VAR00002	Pearson Correlation	.473	1	.293	-.090	.212
	Sig. (2-tailed)	.102		.332	.269	.487
	N	13	13	13	13	13
VAR00003	Pearson Correlation	.536	.293	1	.271*	.424
	Sig. (2-tailed)	.059	.332		.012	.149
	N	13	13	13	13	13
VAR00004	Pearson Correlation	-.085	-.090	.271*	1	.081
	Sig. (2-tailed)	.383	.269	.012		.292
	N	13	13	13	13	13
VAR00005	Pearson Correlation	-.001	.212	.424	.081	1
	Sig. (2-tailed)	.298	.487	.149	.292	
	N	13	13	13	13	13

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5. Variables entered/removed by the research variables from the period of 2000 to 2011.

Variables entered/removed			
Model	**Variables entered**	**Variables removed**	**Method**
1	VAR00005 VAR00004 VAR00002 VAR00003	.	Enter

a. All requested variables entered.
b. Dependent Variable: VAR00001.

Table 6. Model summary of research variables from the period of 2000 to 2011.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.925[a]	.855	.783	.06044

a. Predictors: (Constant), VAR00005, VAR00004, VAR00002, VAR00003.

Table 7. ANOVA[b] test of research variables from the period of 2000 to 2011.

ANOVA[b]						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	.172	4	.043	11.804	.002[a]
	Residual	.029	8	.004		
	Total	.202	12			

a. Predictors: (Constant), VAR00005, VAR00004, VAR00002, VAR00003
b. Dependent Variable: VAR00001.

Table 8. ANOVA[b] test of research variables at the period from of 2000 to 2011.

Coefficients[a]						
Model[1]		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.847	3.304		-4.191	.003
	VAR00002	.440	.662	.102	.665	.325
	VAR00003	23.194	3.993	1.358	5.808	.000
	VAR00004	-10.834	2.331	-.965	-4.647	.002
	VAR00005	-3.597	1.085	-.518	-3.315	.011

a. Dependent Variable: VAR00001

[1] - REGRESSION- /MISSING LISTWISE- /STATISTICS COEFF OUTS R ANOVA- /CRITERIA=PIN(.05) POUT(.10)- /NOORIGIN- /DEPENDENT VAR00001- /METHOD=ENTER VAR00002 VAR00003 VAR00004 VAR00005.

of the distribution of points around the line regression in two-dimensional space of measures. However, it does not matter if the value of this index is larger than the dispersion of points around the regression line.

Conclusion

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.

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