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Evaluating the Productivity of the National General Insurance Company by using the Production Function - Douglas Cup For the period from 2009 – 2019

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Abstract:

The aim of study is to estimate the productivity of the National Insurance Company using the Douglas Cup production function, and then measure the extent of the contribution of each of the independent variables and its effect on the dependent variable, and thus knowledge of the elements that have a significant or non-significant effect in the dependent variable. Hence, the importance of research in estimating the production function of Douglas Cup for the General National Insurance Company for the years (2009-2019) in order to demonstrate the extent of the contribution of each of the independent variables represented by (investment, number of employees, value of production requirements) on the adopted variable represented by (production value) By using the letter regression method in the estimation and the most prominent conclusions and recommendations were reached, which is that the production function when using the adopted variable (production value) and the independent variables (number of workers and production requirements) represent the best production function expressing the activity of the General National Insurance Company. And represented by (wages and salaries paid) through (cash wages, in kind, incentives and cash and in-kind rewards as well).

Key words*: Productivity assessment, The National Insurance Company, Cobb-Douglas production function*

I. Introduction :

In general, the service sector and the insurance sector in particular are witnessing changes and developments that have become an inherent feature of the developments taking place in other sectors in various fields. Therefore, organizations that have a desire to survive, grow and excel have to adopt new methods and methods based on providing a higher value to the organization through achieving its goals. The evaluation of the productivity of the National Insurance Company according to scientific methods is one of the strategic

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dimensions that aim at continuous improvement in its performance and increase its productivity. The production function is one of the important methods in measuring the production process by determining the contribution of the labor and capital elements in production in addition to indicating the efficiency of production and knowledge of the return of society. In terms of the statistical increase, decrease and significance of the independent variables, and then knowing the strengths and weaknesses of those variables.

Based on the foregoing, we seek to deepen the theoretical and applied approach to the concept of the production function, Douglas Cup, by estimating the production function of the national insurance company, so that (number of workers and wages) was used to represent the labor component. As for the capital variable, it was represented by investment, and the dependent variable included (Output value).

To achieve this, in addition to the research objectives, the research has been divided into four sections, according to the following order:

- The first topic: the methodological framework for research and some previous studies.

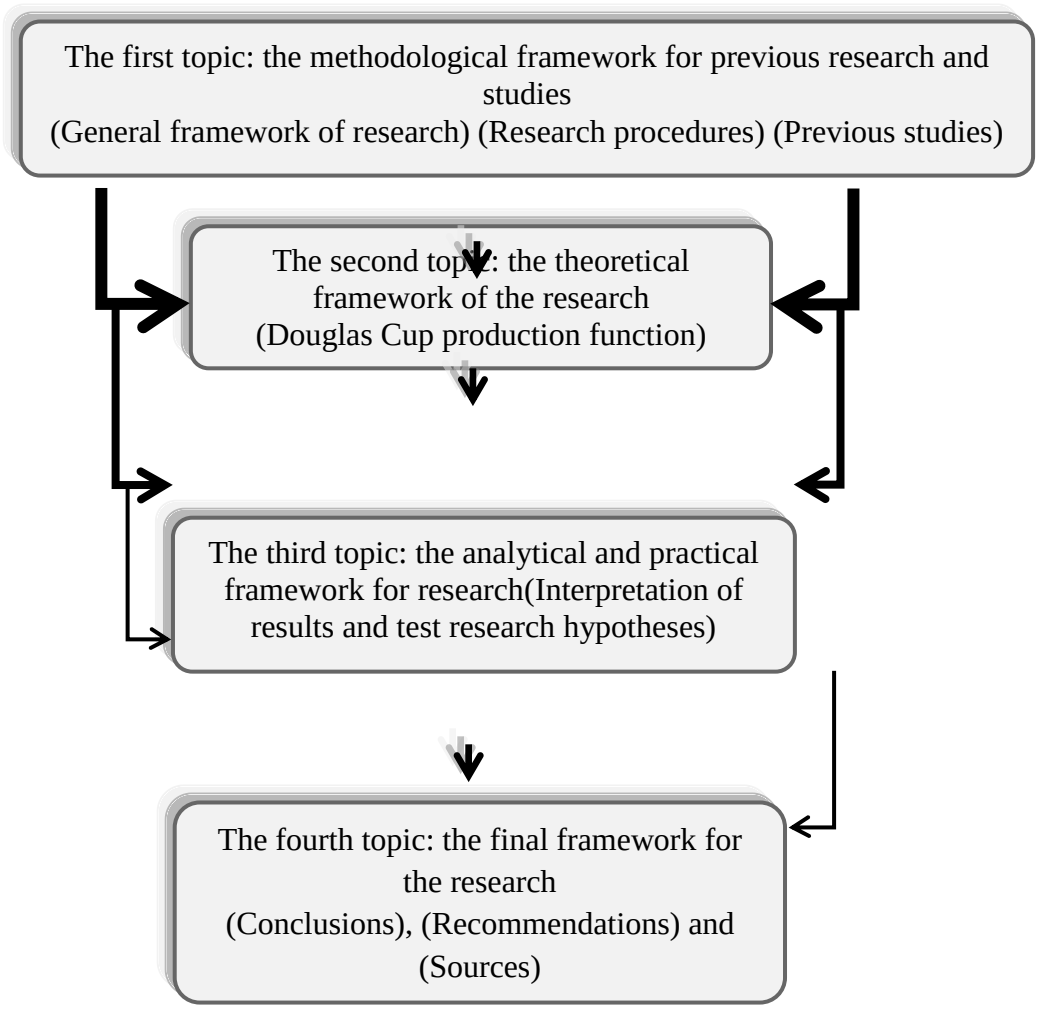
- The second topic: the theoretical framework of the research.

-The third topic: the analytical practical framework for research.

-The fourth topic: the final framework of the research.

Therefore, the researcher will rely on presenting the research information on the following form:

Figure (1) an outline of research topics



The first topic: the methodological framework for research and some previous studies

The current section reviews the methodology used in preparing the research, as well as some previous studies, through the following:

First: The general framework and research procedures: It includes the following:

1 - The problem of research: The National Insurance Company suffers from a decrease in annual production levels as a result of a decrease in the productivity of the number of different documents in some of its departments, which affects its financial performance and the strength of its financial suitability and the failure to fulfill its obligations towards the major risks that may fall, as well as its customers and its weak capacity Competitiveness and being one of the self-financing service sectors, it must maintain a high level of performance that guarantees growth, survival and continuity through careful analysis of the strength and weakness of its production in the number of documents for different types of insurance in the Iraqi insurance market. Hence the research problem represented by raising the following main question:

How effective is the production function of Douglas Cup in evaluating the productivity of the National Insurance Company?

2 - Objectives of Research: To encompass the dimensions of the research problem, it seeks, in its theoretical and practical aspects, to achieve the following:

a. Estimating productivity for the National Insurance Company using the Douglas Cobb production function.

B. Defining and clarifying production functions in proportion to the environment of service companies, and in particular the insurance service.

T. Measuring the contribution of labor and capital to the production process.

D. Providing recommendations to the company for the research sample in light of the results, as well as determining future research directions.

3 - Importance of research: The importance of research is highlighted in the following:

a. The National Insurance Company, in light of the rapid environmental changes, needs to evaluate its production through the number of documents in order to know the strength of its financial suitability and the continuity of practicing all its insurance activities.

B. Application of the production function of Douglas Cup as a means of analyzing the strength and weakness of its insurance activities in the National Insurance Company, as well as diagnosing the causes of weakness in the number of documents, which may produce results that contribute to the use of new methods followed by management in the researched company.

T. Diagnosing the profitability of the National Insurance Company through productivity in the number of documents and the possibility of developing appropriate solutions in the event of low productivity in some of its departments.

4 - Hypothesis of Research: In this research, each of the following hypotheses of nullity will be tested: -

H1: There is no significant effect for each of the independent variables represented by (investment and number of employees) on the dependent variable (production function).

H2: There is no significant effect of each of the independent variables represented by (investment wages and salaries) on the dependent variable (production function).

H3: There is no significant effect for each of the independent variables represented by the bit (number of workers and production requirements) on the dependent variable (production function).

H4: There is no significant effect for each of the independent variables represented by bit (production requirements, wages and salaries) on the dependent variable (production function).

5- Methodology of Research: The current research has dealt with two dimensions: theoretical and applied, while the theoretical dimension deals with the theoretical aspects of explaining the concept of the production function and its types. The documents for the total insurance company to find out the most prominent indicators to answer the research problem and to prove or deny the research hypothesis.

6 - Limited of research: includes the following:

a. Temporal boundaries: The search started on (01/10/2020) and ended (04/15/2020), the duration of the search application.

B. Spatial boundaries: The application was limited to the National General Insurance Company.

7 - Society and sample of research:

The National Insurance Company is the parent company in the Iraqi insurance sector, and it is a self-financing company affiliated with the Ministry of Finance. It was established according to Law No. (56), which was published in the Iraqi newspaper al-Waqa'i 'No. (2861) on 7/23/1950 with government capital, to which the official departments contributed in the amount of (1) million dinars. As it started its business in early 1952 by practicing marine insurance and insurance from fire and various accidents, taking advantage of the work that it received directly from the government sector departments, in addition to little of what it received from the business of the private sector. She specialized after the nationalization decisions in 1964 with general insurance work (all types of insurance except for life insurance) and in 1988 this specialization was abolished in the company's work as it became practicing life insurance in addition to general insurance in implementation of Iraqi government decision No. (392) on 27/4 / 1988. As a result of the conditions of the blockade imposed on Iraq in 1990, the economic boycott decisions were issued and the international reinsurance facilities were withheld from the Iraqi market, and the insurance protection granted to all local economic sectors decreased. In 1997 he witnessed the issuance of the Public Companies Law No. (22) of 1997 according to which the National Insurance Company became a public company based on the Certificate of Incorporation No. (54) on 12/24/1997 issued by the Iraqi Ministry of Trade. There has also been a new phase of the reality of insurance activity in general and of the national insurance company in particular, represented by the return of the Iraqi insurance activity to the global market and the creation of new reinsurance agreements with the most prominent reinsurance companies that have been dealt with, including the German Munich Re and the Kuwaiti Insurance Company. The company's capital has been increased from (2) billion Iraqi dinars to (15) billion Iraqi dinars, according to the General Secretariat of the Council of Ministers letter No. 10930 on 1/4/2010, which includes Cabinet Resolution No. 132 of 03/30/2010. Currently, the company practices all types of general insurance (marine insurance, fire and accident insurance, auto insurance, agricultural insurance, and engineering insurance), life insurance, reinsurance and providing advice in every case related to insurance. The organizational structure of the National Insurance Company consists of (11) central supervisory departments linked to the company (13) branches (8) specialized and five geographical branches, linked to branches (40) offices, of which (29) geographic offices, (8) border offices, and (3) Specialized offices.

9 - Tools of Research: Use the following research data and information to be collected:

- Scientific references: available (Arabic and foreign) and related to the research topic.

Records, reports and final accounts of the company for the period from 2009 to 2019.

Second: Previous Studies

A group of previous studies and researches that are directly related to the current research are presented chronology, they are as follows:

The study (Diab 1993): titled "The Saudi Air Transport Industry" aimed at analyzing and measuring the production function in Saudi Airlines, using the production function Cobb - de Class, the elasticity of constant substitution, and the transformed function (transcendent) of production, in order to estimate the factors of production used and represented Basically with labor and capital, and knowing whether this industry is characterized by increasing or decreasing returns to scale, by using the least squares method, I have concluded that this capital-intensive industry has stable real operating yields and revenues, and by relying on the Cup-de-Class function that has been formulated and applicable to it. The constant of returns to scale. That is, it has a steady real operating yield.

2. A study (Griliches, 1998) "The process of calculating the main sources of productivity growth in American industry after the end of the Second World War aimed at showing and estimating the results resulting from the estimation of production relations according to a model represented by (value added, the measure of man's working hours, capital, various measures). For quantities of labor and capital, industry transactions and fictitious variables, random variables) and this is used in estimating economies of scale, and I concluded that the difference in the quality of work was important in the process of calculating the difference in labor productivity.

3. The study (Martin and Mitra 1999) “Estimating production functions in a group of countries aimed at identifying the productivity of production factors in the agriculture and industry sector. In this study the production function of the Cobb-Duclas type and the transformed production function of the first degree were used and after that the selection was made. Cobb-Duclas production function.

4. Research (Abdel-Karim 2003): entitled "Analysis of the production function of the Mansour General Company for Engineering Industries in Iraq for the period 1989-2001." The aim of the research is to estimate the production function of the Cobb-Douglas of the Mansour General Company for Engineering Industries in Iraq for the period (1989- 2001) in order to demonstrate the contribution of each of the independent variables represented by (number of workers, wages and salaries paid, value of production inputs, investment) to the dependent variable (production value, total added value), using the Ordinary Least Square method. Until the production function when using the adopted variable (total added value) and the independent variables (investment, wages and salaries paid) represents the best production function expressing the activity of Al-Mansour General Company for Engineering Industries in terms of its conformity with the economic theory. And attention to the investment component because it has a prominent role in raising the production process.

5. A study (Abu Jameh, Jaber, 2008): titled “The Performance of Palestinian Industry, Standard Analysis of the Industrial Production Function for the Period 1994-200”. This study aimed to evaluate the performance of the Palestinian industry for the period 1994-2000. For this purpose, the study establishes the Cobb-Duclas function for industrial production. That link production with both fixed capital investment and industrial employment. The individual differences between the different industries have been inferred by introducing imaginary variables to the industrial production equation. And I reached a conclusion that the improvement in industrial performance during this period indicated the possibility of progress in this performance with the occurrence of a favorable environment in this sector.

6. A research (Ali, 2010): entitled "Evaluation of the production of the State Company for Battery Industry for the period from 1992-2002 using the production function of the Douglas Cup", and the aim of the research is to estimate the production function of the Douglas Cup for the General Company for Battery Industry and measure the contribution of the labor and capital elements in the production process. And by using the least

squares, the best relationship of the production process was reached between the dependent variable (production value) and the exploited variables (investment and wages). It also recommended raising the investment contribution through the optimal investment of capital assets (machinery, fuel).

Discussing previous studies and the extent to which they are used

The previous studies, in their various forms, focused on the application of production functions in industrial organizations only. As for the current research, they focused on their use in a service company. This gives great importance to the research, as the research sought to put an intellectual framework on how to apply the Cobb-Duclas production function in the national insurance company that did not reach it or at least did not apply it yet - according to the researcher's knowledge - as for the areas of benefit from previous research, it was to know the aspects that It did not address it, and start from where this research ended, and it allowed building and designing the current research methodology and the sequence of its paragraphs, through learning and benefiting from the experiences of others, as well as choosing and adopting mathematical analytical methods and models used in the application of production functions, in particular the appropriate Cobb-Douglas production function in Current search.

The second topic: the theoretical framework of the research

This topic aims to build a knowledge base for the variables of the research, by defining its concept, and exploring its intellectual and applied content, which helps in determining the paths of the applied aspect, and we will work to achieve this through the following:

2-1: the concept of production function

The production function expresses the mathematical or engineering relationship between production inputs and outputs, so that it shows the largest quantity that can be produced using a certain amount of production elements (Hirschey and Pappas 1987) and defines it (Makhoul, 2003,280) as "a technical relationship that shows the quantities used from production elements which Achieving the maximum production, which is a discretionary relationship, as it contributes to solving the selection problem for the project, as the project has several technical methods of production. It is defined as the amount of production of a commodity as a function of income from the factors used in it. The production functions are used to find out whether the compensation paid to the factors of production is equivalent to the value of the contribution of these factors in the production process or otherwise, and the production function has some characteristics, including:

A- The function is meaningless if any of the elements included in the production take a negative or zero value.

B-The production function is homogeneous, and the degree of homogeneity depends on the relationship between the increase in the elements of production and the increase achieved in production. In production elements the function is homogeneous and nonlinear.

C- The marginal productivity of both labor and capital is usually greater than zero (positive). The marginal productivity of labor (MPL) is positive and decreases as the work increases with the stability of capital, meaning that:

$$\frac{d^2}{dL^2} < 0$$

That is, the increase in work with constant capital leads to a diminishing increase in output due to the decrease in the degree of benefit from additional work due to the limited capital formation, as well as the case with regard to the productivity of capital MPK)).

$$\frac{d^2 Q}{dK^2} < 0$$

In other words, increasing the capital with constant work factor leads to a diminishing increase in output due to the decrease in the degree of utilization of the additional capital due to the limited number of workers (Ali, 2011, 136-137).

The production function is one of the most important basic relationships between economic variables, which links the maximum volume of production to the inputs used in the production process. The production function can be expressed in its simplest form by the following mathematical formula:

Q = F(K, L) ----------(1)

whereas :-

Q: - Represents production

K: - represents the capital

L: - represents the work item

Where the formula No. (1) shows the relationship of production with the two elements of labor and capital, and highlights the importance of the production function in that it illustrates the technical relationship that shows the effect of production elements on the volume of production. Economic theory assumes that the factors of production are characterized by positive productivity.

2-2 :Types of production functions

After reviewing the literature, there is a group of production functions that will be enumerated in order to define, focus and display the commonly used function among these functions, which is included in the title of the research, which is the production function COB-Duclas. The other functions are the production function with constant substitution elasticity (C.E.S.), the sectional production function, the transcendent production function, the variable substitution production function, the production function of "Zinler-Revanker," (Muhammad, 2012).

2-3: Cobb-Douglas production function

This function in which economists Paul Douglas and CW Cobb tried to adapt data on American industry in the period from 1899-1922 AD to measure the extent of the contribution of labor and capital to production is one of the most important economic analysis tools that have appeared so far, which has spread widely and is still widely used in the field of Economic studies, in addition to that this function is considered the tool that enabled economists to build models and discover other functions that led to a clear revolution in the methods of economic analysis in our time. The duclas cup production function can be represented as follows:

$$Q = \beta_0 L^{\beta_1} K^{\beta_2} e^{u}$$ ----------**(2)**

U : Random error

β_0 : Efficiency Parameter

β_1 : Labor elasticity

β_2 : Capital elasticity

In order to estimate the parameters of the Cobb-Duclas production function, it is converted to the linear function using the natural logarithm according to the following formula:

Q=B0+B1log L+B2log K+E ---------- **(3)**

The most important features of the Douglas cup production function are as follows:

- The intensity of the productive process

Three cases of the intensity of the productive process can be distinguished, in which they are: -

1-The productive process is labor intensive:

$$\frac{\beta_1}{\beta_2} \succ 1$$ ----------(4)

2-The productive process is capital intensive:

$$\frac{\beta_1}{\beta_2} \prec 1$$ ----------(5)

3-The production process is equal in terms of mixing production elements:

$$\frac{\beta_1}{\beta_2} = 1$$ ----------(6)

4- The share of the component in the production process

The share of the labor component in the production process can be found according to the following formula: $w = \frac{\beta_1}{\beta_1 + \beta_2}$ ----------(7)

As for the share of capital, it can be found as follows: $w = \frac{\beta_2}{\beta_1+\beta_2}$ ----------(8)

Return to scale:

It is defined as the production response to the increase in all inputs. So that three cases of volume return can be distinguished namely:

- Constant return to scale, in which it is: $\beta_{1+}\beta_2 = 1$ ----------(9)

$2 \geq 1$ ----------(10) + β1β- Increasing return to scale, which is:

$2 \leq 1$ ----------(11) + β1β-Decreasing return to scale, which includes:

(Abdel Karim, 2003,313-315).

2-4: Estimation by the character regression method

hen regression suffers from the problem of multiple linear relationship, and when we say that the independent variables are not orthogonal, in this case problems arise in the ordinary least squares capabilities, represented by an increase in the variances of the estimated coefficients and instability in them, and this inflation is represented in the diagonal elements of the standard matrix. Both Hoerl & Kennard (1970) craft the letter style that helps.

Which helps to find stable capabilities in the presence of multiple linear relationship. This method is a modification of the usual least squares method, and through it we obtain capabilities that are biased from society, but have a desirable characteristic despite their bias, which is that they have averages squares with fewer errors than they were in the case of regular small squares, and the limits of confidence in him are narrow, so this is known as the slope of the letter It is a method of modifying the regular least squares in the event of a linear overlap between the independent variables and it is considered one of the biased methods, and it depends on adding the constant k to the elements of the matrix before taking the inverse to it. The character regression capabilities can be obtained using the following formula:

$$\hat{\underline{\beta}}_{(k)} = (X'X + k)^{-1}X'\underline{Y} \quad \textbf{.....(12)}$$

whereas :

X: Represents the matrix of independent variables Represent the dependent variable: Y

Y: Represent the dependent variable vector

K: Represents the character parameter

$\hat{\underline{\boldsymbol{\beta}}}_{(\boldsymbol{k})}$: The estimated parameters are represented by the character regression method

The character parameter can be calculated according to Hoerl & Kennard)) and according to the following formula:

$\boldsymbol{k_i = \frac{\sigma^2}{\beta_i^2}}$, $\boldsymbol{0 \leq k_i \leq 1}$ (alrawi, 1987).

The third topic: the practical framework

- Presentation, analysis and discussion of the results

The researcher used the (R) program to extract the results as follows:

First: The results of the assessment (production value) as an approved variable, and each of (investment and number of employees) as independent variables.

For the purpose of making the estimation of the model, it is necessary to verify that there are no problems in the model. In other words, verify the assumptions of the least squares method, and the results are as in the following table:

Table (1) Heterogeneity and Self-Correlation Test

the test	Name of the test	The value of the test statistic	The probability value
Heterogeneity test of variance	Breusch-Pagan test	BP = 2.8615	0.2391
Self-correlation test	Durbin-Watson test	DW = 1.7753	0.2539

From Table (1) we note the following:

1. There is no problem of heterogeneity of variance because the probability value of the test is greater than (0.05), which means we accept the null hypothesis that states the homogeneity of the variance of the model and reject the alternative hypothesis that states the heterogeneity of variance for the model.

2. The absence of the self-correlation problem in the model because the probability value of the test is greater than (0.05). This means accepting the alternative hypothesis that states that there is no correlation between the errors of the model.

To test the presence of the problem of linearity, we will use the condition index test as follows:

Table (2) Test of the existence of the problem of linearity

Eigenvalue and Condition Index			
Eigenvalue	**Condition Index**	**x1**	**x2**
2.9961648451	**1.00000**	**0.0005748109**	**2.518426e-05**
0.0037146606	**28.40032**	**0.9265605547**	**8.419862e-03**
0.0001204942	**157.68838**	**0.0728646344**	**9.915550e-01**

From the results of Table (2) we note that the (Condition Index) values are greater than 15 and this indicates the existence of the problem of linearity in the model and this requires addressing this problem by the method of estimating the character slope of the production function of Douglas Cup, as in Table (3) following:

Table (3) estimating the parameters of the Douglas Cobb function for the first case

Coefficients: for Ridge parameter K= 0.54214
Estimate Estimate (Sc) StdErr (Sc) t-value (Sc) Pr(>|t|)
Intercept 9.5664 14.4195 2.3774 6.0653 0.0002 ***
x1 0.0083 0.0402 0.1179 0.3411 0.7411
x2 1.2635 0.4566 0.1179 3.8739 0.0040 **
Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1**
Ridge Summary
R2 adj-R2 DF ridge F AIC BIC
0.293500 0.215000 1.257090 7.765179 -36.764570 -9.887532
Ridge minimum MSE= 0.1090959 at K= 0.54214
P-value for F-test (1.25709 , 9.29074) = 0.01668452

We note from Table (3) the following:

1. The investment variable (x1) has no significant effect on the production value of the National Insurance Company, as the value of (p-value) is greater than (0.05).

2. The variable of the number of workers (x2) has a significant effect on the production value of the National Insurance Company, as the value of the propensity for this variable reached (1.2635), which means that increasing the labor component represented by the number of employees by (100%) leads to an increase in the value of production to (126.35). %)

3. The production process goes through the stage of increasing the volume yield, where the volume yield (0.0083 + 1.2635 = 1.2718) is greater than the correct one, meaning that the production return for the volume is increasing, and this means that increasing both (investment and the number of workers) by (100%) leads to an increase. Production rate (127.18%)

4. The value of the corrected determination coefficient reached (0.215000), which means that the independent variables represented by the two components (investment, number of employees) explain about (21.5%) of the changes occurring in the dependent variable represented by the value of production, while the remaining percentage (78.5) is due to factors other than Included in the model and under the random error component.

5. The calculated value of the (F) test statistic was (7.765179), which is somewhat high and is significant, as the value of (P-value) is less than (0.05). This means that the independent variables (investment and number of employees) together have a significant effect on the dependent variable (Output value).

Second: The results of the assessment (production value) as an approved variable, and each of (investment and number of employees) as independent variables

For the purpose of making the estimation of the model, it is necessary to verify that there are no problems in the model. In other words, verify the assumptions of the least squares method, and the results are as in the following table:

Table (4) Heterogeneity and Self-Correlation Test for the second case

the test	Name of the test	The value of the test statistic	The probability value
Heterogeneity test of variance	Breusch-Pagan test	BP = 3.5845	0.1666
Self-correlation test	Durbin-Watson test	DW = 1.3169	0.07984

From Table (4) we note the following:

1. There is no problem of heterogeneity of variance because the probability value of the test is greater than (0.05), which means we accept the null hypothesis that states the homogeneity of the variance of the model and reject the alternative hypothesis that states the heterogeneity of variance for the model.

2. The absence of the self-correlation problem in the model because the probability value of the test is greater than (0.05). This means accepting the alternative hypothesis that states that there is no correlation between the errors of the model.

To test the presence of the problem of linearity, we will use the condition index test as follows:

Table (5) Test of the existence of the problem of linearity in the second case

Eigenvalue and Condition Index			
Eigenvalue	**Condition Index**	**x1**	**x3**
1 2.996214e+00	**1.00000**	**0.0004776741**	**5.069535e-06**
2 3.762181e-03	**28.22062**	**0.7607444078**	**1.711444e-03**
3 2.394846e-05	**353.71024**	**0.2387779180**	**9.982835e-01**

From the results of Table (5) we note that the (Condition Index) values are greater than 15 and this indicates the existence of the problem of linearity in the model, and this requires addressing this problem by the method of estimating the character slope of the production function of Douglas Cup for the second case, as in Table (6) following:

Table (6) Estimation of the Douglas Cobb function parameters for the second case

Coefficients: for Ridge parameter K= 0.67543					
	Estimate	**Estimate (Sc)**	**StdErr (Sc)**	**t-value (Sc)**	**Pr(>|t|)**
Intercept	**1.2416**	**11.1706**	**2.5382**	**4.4010**	**0.0018 ****
x1	**-0.0012**	**-0.0060**	**0.1019**	**-0.0585**	**0.9546**
x3	**1.0595**	**0.4482**	**0.1019**	**4.3983**	**0.0018 ****
Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1**					
Ridge Summary					
R2	**adj-R2**	**DF ridge**	**F**	**AIC**	**BIC**
0.260600	**0.178400**	**1.106200**	**9.698719**	**-37.748647**	**-10.931647**
Ridge minimum MSE= 0.2478732 at K= 0.67543					
P-value for F-test (1.1062 , 9.438562) = 0.01050961					

We note from Table (6) the following:

1. The investment variable (x1) has no significant effect on the production value of the National Insurance Company, as the value of (p-value) is greater than (0.05).

2. The independent variable (wages and salaries) (x3) has a significant effect on the production value of the National Insurance Company, as the value of the propensity for this variable is (1.0595), which means that an increase in wages and salaries by (100%) leads to an increase in the value of production to (105.95) %)

3. The production process goes through the stage of increasing the volume yield, where the volume yield (- (0.0012 + 1.0595 = 1.0585)) is greater than the correct one, meaning that the production return for volume is increasing, and this means that increasing each of (investment, wages and salaries) by (100%) leads To increase production by (105.85%)

4. The value of the corrected determination coefficient reached (0.178400), which means that the independent variables represented by the two components (investment, number of employees) explain about (17.84%) of the changes occurring in the dependent variable represented by the value of production, while the remaining percentage (82.16) is due to factors other than Included in the model and under the random error component.

5. The value of the (F) test calculated was (9.698719), which is somewhat high and is significant, as the value of (P-value) is less than (0.05). This means that the independent variables (investment, wages and salaries) together have a significant effect on the dependent variable (Output value).

Third: The results of the estimation (production value) as an approved variable and each of (number of employees and production requirements) as independent variables

for the purpose of conducting the estimation of the model must be verified that there are no problems in the model.

Table (7) Test of heterogeneity and self-correlation for the third case

the test	Name of the test	The value of the test statistic	The probability value
Heterogeneity test of variance	Breusch-Pagan test	BP = 0.87334	0.6462
Self-correlation test	Durbin-Watson test	DW = 2.0102	0.2534

From Table (7) we note the following:

1. There is no problem of heterogeneity of variance because the probability value of the test is greater than (0.05), which means we accept the null hypothesis that states the homogeneity of the variance of the model and reject the alternative hypothesis that states the heterogeneity of variance for the model.

2. The absence of the self-correlation problem in the model because the probability value of the test is greater than (0.05). This means accepting the alternative hypothesis that states that there is no correlation between the errors of the model.

To test the presence of the problem of linearity, we will use the condition index test as follows:

Table (8) Test of the existence of the problem of linearity

Eigenvalue and Condition Index			
Eigenvalue	**Condition Index**	**X2**	**X4**
2.998987e+00	**1.00000**	**1.121037e-05**	**7.750474e-05**
9.499967e-04	**56.18575**	**4.225102e-03**	**4.529843e-01**
6.346826e-05	**217.37468**	**9.957637e-01**	**5.469382e-01**

From the results of Table (8) we note that the (Condition Index) values are greater than 15 and this indicates the existence of the problem of linearity in the model, and this requires addressing this problem by the method of estimating the character slope of the production function of Douglas Cup for the third case, as in Table (9) following:

Table (9) estimating the parameters of the Douglas Cobb function for the first case

Coefficients: for Ridge parameter K= 0.435443					
	Estimate	**Estimate (Sc)**	**StdErr (Sc)**	**t-value (Sc)**	**Pr(>|t|)**
Intercept	**10.0669**	**10.2691**	**1.4673**	**6.9986**	**0.0001 *****
x2	**0.8150**	**0.2945**	**0.0848**	**3.4718**	**0.0072 ****
x4	**0.1694**	**0.3783**	**0.0848**	**4.4592**	**0.0016 ****
Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1**					
Ridge Summary					
R2	**adj-R2**	**DF ridge**	**F**	**AIC**	**BIC**
0.53130	**0.47920**	**1.13752**	**19.15126**	**-44.51897**	**-17.68951**
Ridge minimum MSE= 0.04186631 at K= 0.435443					
P-value for F-test (1.13752 , 9.482231) = 0.001260144					

We note from Table (9) the following:

1. The independent variable, the number of employees (x2), has a significant effect on the production value of the National Insurance Company, where the value of the propensity for this variable is (0.8150), which means that increasing the labor component represented by the number of employees by (100%) leads to an increase in the value of production to (81.50%)

2. The independent variable of production requirements (x4) has a significant effect on the dependent variable, the value of production, as the slope reached (0.1694), which means that an increase in production requirements by (100%) leads to an increase in the value of production to (16.94%).

3. The production process goes through a phase of diminishing volume yields, where volume yields (0.8150 + 0.1694 = 0.9844) are smaller than the correct one, meaning that the production yield for volume is decreasing, and this means that the decrease of (the number of workers and production requirements) by (100%) leads to Decrease in the value of production by (98.44%)

4. The value of the corrected determination coefficient reached (0.47920). This means that the independent variables represented by the two components (number of workers and production requirements) explain about (47.9%) of the changes occurring in the dependent variable represented in the value of production. Not included in the model and under the random error component.

5. The value of the (F) test calculated was (19.15126), which is somewhat high and is significant, as the value of (P-value) is less than (0.05). This means that the independent variables (number of workers and production requirements) together have a significant effect on the dependent variable (Output value).

Fourth: The results of the assessment (production value) as an approved variable and each of (production requirements, wages and salaries) as independent variables

For the purpose of making estimating the model, it is necessary to verify that there are no problems in the model, in other words verify the assumptions of the least squares method and the results are as in the following table:

Table (10) Heterogeneity and Self-Correlation Test for the fourth case

the test	Name of the test	The value of the test statistic	The probability value
Heterogeneity test of variance	Breusch-Pagan test	BP = 0.11161	0.9457
Self-correlation test	Durbin-Watson test	DW = 1.3908	0.1432

From Table (10) we note the following:

3. There is no problem of heterogeneity of variance because the probability value of the test is greater than (0.05), which means we accept the null hypothesis that states the homogeneity of the variance of the model and reject the alternative hypothesis that states the heterogeneity of variance for the model.

4. There is no self-correlation problem in the model because the probability value of the test is greater than (0.05). This means accepting the alternative hypothesis that states that there is no correlation between the errors of the model.

To test the presence of the problem of linearity, we will use the (condition index) test as follows:

Table (11) Test of the existence of the problem of linearity in the fourth case

Eigenvalue and Condition Index			
Eigenvalue	**Condition Index**	**X3**	**X4**
2.998948e+00	**1.00000**	**2.149333e-06**	**6.134512e-05**
1.040637e-03	**53.68277**	**1.726875e-03**	**3.467761e-01**
1.110885e-05	**519.57706**	**9.982710e-01**	**6.531625e-01**

From the results of Table (11), we note that the (Condition Index) values are greater than 15, and this indicates the existence of the problem of linearity in the model, and this requires addressing this problem by the method of estimating the character slope of the production function of Douglas Cup for the fourth case, as in Table (12) following:

Table (12) estimating the parameters of the Douglas Cobb function for the fourth case

Coefficients: for Ridge parameter K= 0.6435459
Estimate Estimate (Sc) StdErr (Sc) t-value (Sc) Pr(>|t|)
Intercept 4.8811 8.4488 1.5828 5.3378 0.0005 ***
x3 0.6892 0.2916 0.0699 4.1724 0.0024 **
x4 0.1445 0.3228 0.0699 4.6196 0.0012 **
Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1**
Ridge Summary
R2 adj-R2 DF ridge F AIC BIC
0.45490 0.39430 0.94710 17.96305 -43.91337 -17.15968
Ridge minimum MSE= 0.04022749 at K= 0.6435459
P-value for F-test (0.9471 , 9.696325) = 0.00201994

We note from Table (12) the following:

1. The independent variable (wages and salaries) (x3) has a significant effect on the production value of the National Insurance Company, as the value of the propensity for this variable is (0.6892), which means that an increase in wages and salaries by (100%) leads to an increase in the value of production to (68.92) %)

2. The independent variable of production requirements (x4) has a significant effect on the dependent variable, the value of production, as the slope reached (0.1445), which means that an increase in production requirements by (100%) leads to an increase in the value of production to (14.45%).

3. The production process goes through a phase of diminishing volume yields, where volume yields (0.6892 + 0.1445 = 0.8337) are smaller than the correct one, meaning that the production yield for volume is decreasing, and this means that the decrease of (the number of workers and production requirements) by (100%) leads to Decrease in the value of production by (37.83%).

4. The value of the corrected determination coefficient reached (0.39430). This means that the independent variables represented by the two components (number of workers and production requirements) explain about (39.43%) of the changes occurring in the dependent variable represented by the value of production, while the remaining percentage (60.57%) is due to factors Not included in the model and under the random error component.

5. The value of the (F) test calculated was (17.96305), which is somewhat high and is significant, as the value of (P-value) is less than (0.05). This means that the independent variables (wages, salaries and production requirements) together have a significant effect on the dependent variable (Output value).

The fourth topic: the final framework for the research

This topic presents the conclusion of the research represented by the conclusions reached, and recommendations that may guide the company to the sample of the research, as well as a list of references that were used, as follows:

II. Conclusions:

Complementary to the research methodology, and in light of the extrapolation of the literature and the results of the research, we conclude the following:

The production function when using the dependent variable (production value) and the independent variables (number of employees and production requirements) represents the best production function expressing the activity of the National Insurance Company in terms of its conformity with the economic theory since the estimated parameters for each of (number of workers and production requirements) of (0.8150) 0.1694) is confined between (0.1) and its significance from the statistical point of view, according to the (t) test. The value of the corrected coefficient of determination is higher than the other functions and from this function we note the following: -

1. The independent variable, the number of employees (x2), has a significant effect on the production value of the National Insurance Company, where the value of the propensity for this variable is (0.8150), which means that increasing the labor component represented by the number of employees by (100%) leads to an increase in the value of production to (81.50%)

2. The independent variable of production requirements has a significant effect on the dependent variable, the value of production, where the tendency is (0.1694), which means that an increase in production requirements by (100%) leads to an increase in the value of production to (16.94%).

3. The production process goes through a phase of diminishing volume yields, where volume yields (0.8150 + 0.1694 = 0.9844) are smaller than the correct one, meaning that the production yield for volume is decreasing, and this means that the decrease of (the number of workers and production requirements) by (100%) leads to Decrease in the value of production by (98.44%)

4. The value of the corrected determination coefficient reached (0.47920). This means that the independent variables represented by the two components (number of workers and production requirements) explain about (47.9%) of the changes occurring in the dependent variable represented in the value of production, while the remaining percentage (52.1) is due to factors other than Included in the model and under the random error component.

5. The value of the (F) test calculated was (19.15126), which is somewhat high and is significant, as the value of (P-value) is less than (0.05). This means that the independent variables (number of workers and production requirements) together have a significant effect on the dependent variable (Output value).

III. Recommendations:

In order to ensure the success of the implementation of the Douglas Cobb production function at the National Insurance Company, we offer the following recommendations:

1- Paying attention to the work component represented by (wages and salaries paid), through an increase

A- Cash wages: It includes wages and salaries paid

B- Fees in kind: - such as food, clothes, and housing

C- Incentives and rewards in cash and in kind: - to raise his contribution to the productive process

2- Attention to production requirements: - Because it has a major role in the production process, and thus raising the productivity of the company.

3- Paying attention to the investment component because it has a prominent role in raising the production process through the company's entry into long-term investment projects that will contribute to the development of the company's productivity and increase the financial capabilities.

References

1) Annual records and reports of the National Insurance Company for the years (2011-2019).

2) Final accounts and financial statements of the National Insurance Company for the years (2011-2019).

3) Using the Excel program in the analysis.

4) Abdel Karim, Khaled Taha (2003). Analysis of the production function for Al-Mansour State Company for Engineering Industries in Iraq for the period (1989-2001). Journal of Economic and Administrative Sciences, 18 (67), 305-325, University of Baghdad, Baghdad, Iraq.

5) Jaber, Abu Jameh (2008). The Performance of Palestinian Industry, Standard Analysis of the Industrial Production Function for the Period (1994 - 2000) An-Najah University Journal for Research (Humanities) Volume 22 (6) 2008, Palestine University, Gaza, Palestine.

6) Ali, Khaled Jalil, (2010). Evaluation of the production of the State Company for the Manufacture of Batteries for the period (1992-2002) using the production function. Diyala Journal of Science, 7 (1), 135-160, Diyala University, Diyala, Iraq.

7) Muhammad, Tarqoo (August 04, 2012): Evaluating the profitability of an insurance company using production functions. Proceedings of the Seventh International Conference on the Insurance Industry, Practical Reality and Development Prospects - Country Experiences. Faculty of Economic Sciences, Business and Management Sciences, Hassiba Ben Bouali University, Chlef, Algeria.

8) Makhoul, Bassem, (2003). Production function analysis of the building stone industry in the West Bank and Gaza Strip. An-Najah University Journal for Research (Humanities), 17 (2), 278-289, An-Najah National University, Nablus, Palestine.

9) Attia, Abd al-Qadir Muhammad Abd al-Qadir, The Hadith in Econometrics between Theory and Practice, 2004 .

10) Diab, Abdel Aziz, (1993). Estimation of the production function of Saudi Airlines, an applied study on the air transport industry in the Kingdom of Saudi Arabia, Journal of Administrative Sciences, King Saud University Journal 60 (1), King Saud University, Riyadh, Saudi Arabia**.**

11) Grliches , ZVI. Production Function In Manufacturing : some Preliminary Results. Practicing Econometrics: Essusin Meth0d and Application. Edward Elgar. UK and USA,1998.

12) Martin, Will, and Mitra, Devashish Productivity Growth and Convergence in Agriculture and Manufacturing Development Research Group. World Bank. 1999.