Available online at http://ijdea.srbiau.ac.ir

Int. J. Data Envelopment Analysis (ISSN 2345-458X)

Vol.8, No.2, Year 2020 Article ID IJDEA-00422, 13 pages
Research Article

International Journal of Data Envelopment Analysis

Science and Research Branch (IAU)

Performance of Working Capital Management Indices of Working Capital Insurance Companies in Tehran Stock Exchange Using Data Envelopment Analysis

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Received 05 January 2020, Accepted 24 April 2020

Abstract

Working capital indicators can be one of the most influential indicators in companies' financial decision-making. Therefore, research in this field can be useful. The main purpose of this study is to measure efficiency by considering working capital management indicators with the help of super-efficient data envelopment analysis models. Many researchers, including Goal et al. (2014), have used current measurements of the efficiency of working capital management indicators, despite the shortcomings of the cash conversion cycle, specifically in the cash conversion cycle. In this study, according to their idea, 21 companies active in the Iran Insurance Industry Exchange have been evaluated over a 5-year period. Periodic review can reveal information about firms' performance fluctuations as well as the relationship between changes in their rankings and changes in working capital indicators. Since this assessment is based on working capital indicators, the results will provide better opportunities for business managers, shareholders and investors to make large and partial decisions. Finally, the above method of data envelopment analysis will be compared with traditional methods.

Keywords: Working Capital Management, Data Envelopment Analysis, Cash, Cash Conversion Cycle.

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1. Introduction

One of the most important factors that affect the performance of companies is working capital management. Simply put, A) the set of amounts invested in current assets is working capital. B) Determining the volume and composition of resources and expenditures of capital that increase the wealth of shareholders is called working capital. C) The factor that reduces the value of the company is the optimal level of working capital. For example, the main reason for the delay in delivering goods to the customer and the loss of sales in the first quarter of the fiscal year is the inadequate maintenance of inventory and goods at the end of the last quarter of the last fiscal year. Since a large part of the capital of organizations is dedicated to the working capital factor, so in management, much attention is paid to them [1]. Every company or organization faces financial decisions that involve analyzing financial problems. In these cases, the company's financial manager or CEO decides what should be done to solve the problems. In other words, working capital can be recognized as a measure of the liquidity of a company's operations. Working capital management is faced with short-term investment management and short-term investment decisions of the company. Sharm Vukumar (2011) [2] stated that the working capital of a company refers to money that is kept in the bank or, if necessary, they are able to quickly convert it into cash. In a broader sense, working capital is actually a thermometer of corporate financial health. The shorter the gap between your assets and the company's short-term debt, the healthier your business will be. The overall goal of working capital management is that a company should be able to continue its corporate activities in the best possible way by managing the relationship between current assets and current liabilities.

The main components of working capital in the insurance industry can be considered as "inventory", "debts", "various creditors", "sales" and "operating cash flow". Among these indicators, inventory, debts and various creditors have been used as input and sales variables and operating cash flow as output variables. Since the major part of working capital investment is in the form of inventories and liabilities, the choice of input variables is visual. In addition, various lenders are considered as an input because it is a short-term liability and reduces the investment required in working capital. The importance of working capital management can be expressed as "working capital management" is an efficient working capital that is an integral part of the company's overall strategy and is used to create stock value. For management (CEO), working capital management is very important because this activity affects the performance and liquidity of the company, in other words, the profitability of the business depends on the ability to effectively manage inventory and debt [3]. Higher working capital (more), in addition to higher and higher interest costs, also faces higher credit risk and the company is exposed to financial crisis and consequently bankruptcy [3]. Using the traditional method, the company's liquidity situation is invested according to different perspectives on current capital. The operational perspective of investment was introduced by Richards and Laughlin (1980), [4] who introduced the concept of cash conversion cycle (ccc). In most working capital studies, this cash conversion cycle has been used as an important measure of efficiency in working capital management. Some studies have used a cash conversion cycle, the cash conversion cycle. However, it cannot be effectively measured by an analyst outside the management of the company. In the case of the Net Trading Cycle (NTC), the formula of which is equal to ((inventories + liabilities - creditors) * 365 / sales); They discussed

alternative trade. In recent years, a trend towards performance measurement using one of the basic models; Data Envelopment Analysis (DEA) is proposed; In particular, the measurement scenario in Iran has been used extensively, using the non-parametric data envelopment analysis method to calculate technical performance scores. However, this technique has not been used in working capital management studies, especially in the insurance industry [3], [5].

Data Envelopment Analysis (DEA) uses a mathematical programming model to evaluate the efficiency of decision units (DMUs) that produce multiple outputs by consuming multiple inputs. Since evaluating the performance of a company is very important and the size of efficiency can be considered as a criterion for evaluating the performance of organizations, this issue has always been considered by various researchers. In Farrell's view, the evaluation of unit performance was done in terms of single input and single output. Has been presented and it is called (DEA) [6]. Basic DEA models evaluate the relative efficiency of units (DMUs) in two basic characteristics, "model nature and model-scale return." The nature of the models can be the nature of the input or output. The nature of the input is when it is kept constant in the output evaluation process and the goal is to minimize the inputs of the unit under evaluation. In a similar way when the nature of the output is to keep the level of inputs constant in the evaluation process and the goal is to maximize the level of output of the unit under evaluation. The model-scale return index can also have three modes: fixed, ascending and descending. For more information, refer to Banker et al. (1984), [7]. DEA is a nonparametric method. For example, this data does not accept any particular structure. Thus, unlike other measures, there is no hypothesis about the structure of production performance. In the DEA, the weight of inputs and outputs are not fixed. This technique allows each DMU in the unit under evaluation; Choose your weight for inputs and outputs; Therefore, the weighted ratio of outputs to weighted inputs is maximized. However, there is a limitation: the specified weight must be such that no DMU can achieve a weighted output to weight input ratio greater than one. An efficient DMU is one that scores one. Therefore, the performance limit defined in the DEA includes all efficient DMUs. There are two main techniques developed in the DEA: a) The Charness CCR model (with a fixed-scale return condition). B) BCC bunker (with condition of return to variable scale) [7]. If we want to find efficient units, we can use one of two models. The proposed BCC model is an extended CCR model for technologies that yield variable scale. By creating a performance boundary instead of a straight line, a convex boundary is created [8]. Therefore, in a real-life scenario with different scale values, the BCC model is more appropriate. However, its disadvantages are that it leads to a large number of efficient DMUs compared to the CCR model. The BCC model can also have the nature of input and output.

With the BCC model performance value, it is not easy to rank efficient units because it assigns a performance value of one to all efficient units, and this can be achieved for more than one DMU. All DMUs on the efficient border are known as efficient. So, we cannot compare and rank efficient DMUs. To overcome this weakness, Anderson and Peterson (1993), [9] introduced the distance of the unit under evaluation to the new limit of the ranking criterion of efficient units by removing the unit under evaluation from the possibility of producing the BCC model. The model (AP) calculates the rate of change of the

unit under efficient evaluation up to the new boundary created by the removal of the unit under evaluation. There are many articles on super-efficiency in data envelopment analysis, in this section we will mention some examples of uses of DEA supercar models. Phadke et al. Have researched on reliable access to electricity in India. In their research, they used the DEA super-efficient model. Because consumers in India are less willing to pay and because of subsidized tariffs, Indian facilities in rural areas have no financial incentive. They offer suggestions for improving the reliable and stable condition of the electricity [10]. Suzukia et al. Evaluated Japanese cities using a super-efficiency model in DEA. They have introduced a new model that offers a more realistic performance improvement plan. A dynamic system of goal settings designed to achieve the goal improvement level [11]. Lina et al. Used a super-efficient model to evaluate mutual funds. They have introduced a new model based on distributed returns and appropriate risk measurement options. Their proposed model can deal with negative amounts of risk, transaction costs and return measures [12]. Wang et al. Evaluated a Chinese two-stage environmental network using a super-efficient model. At first, they achieved good results in improving the overall efficiency of China's industrial system, but did not offer a solution to further improve it [13]. Tian et al. Used weighting oversupply and a super-efficient SBM model to measure regional transport stability. They have proposed a new index system that includes economic, social, systematic and environmental indicators to measure the sustainability of regional transport. The results of the implementation of their proposed model are consistent with reality [14].

The second part of the present article includes materials and methods that include the super-efficiency model and the required concepts and terms. The third part describes the steps of conducting research. In the fourth section, a practical example is analyzed and at the end we will have the results section.

2. materials and methods

In this section, we will briefly state the items needed to continue the present study [15].

2-1- Cloud efficiency model of data envelopment analysis

In this paper, we use a super-efficient data envelopment analysis model with variable-scale returns on the nature of the input. In other words, since the model used in this paper has an input nature, the purpose is to evaluate the efficiency of working capital management, so that the working capital index is reduced by converting the $\sum_{j=1,j\neq 0}^{n}\lambda_j = 1$ constraint to the $\sum_{j=1,j\neq 0}^{n}\lambda_j \leq 1$ constraint in the AP model ([9]) Is enabled. Therefore, the Return to Scale Model Return (DRS) is considered to be a specific example of the Variable Scale Return (VRS) model (similar to the work of Gowal et al. (2014) [16]).

$$\begin{aligned} &\theta^* = Min \quad \theta^{sup} && (1)\\ &s.t. \quad \sum_{j=1,j\neq 0}^{n}\lambda_j x_{ij} \leq \theta^{sup} x_{io} \qquad i = 1,\dots,m,\\ &\qquad \sum_{j=1,j\neq 0}^{n}\lambda_j y_{rj} \geq y_{ro} \qquad r = 1,\dots,s\\ &\qquad \sum_{j=1,j\neq 0}^{n}\lambda_j \leq 1\\ &\qquad \lambda_j \geq 0 \qquad j = 1,\dots,n,\ j \neq 0, \end{aligned}$$

In the above model θ^*, the super-efficient size, $Y_j = (y_{1j},\dots,y_{sj})$ and $X_j = (x_{1j},\dots,x_{mj})$ represent the output and input indices and λ represents their weight. In the practical example section, we will describe the results of the above efficient data envelopment analysis model.

2-2 Required concepts and terms

Definitions of terms and the required management concept are given in this section.

Table (1): Abbreviation and Concept

Title	Abbreviation	Concept
cash conversion cycle	CCC	The time interval between receiving money from the customer to paying money to the supplier is called the cash conversion cycle. (Capital Principles Test Preparation Page 134)
Return on Asset	ROA	This index shows how profitable the affiliates of the entire "assets of that company" are. ROA is an idea related to performance management; Manages assets by generating profits; Which can be obtained from the formula of "division of annual profit" over "total assets of the company."
Working Capital management	WCM	The WCM model uses portal building. By using this, the aspect of advertising is done in the best way and also new and various goods and services of the organization or company can be introduced to current or future customers. (Pixcom.ir)
cash flow from operations	CFO	Indication is a cash that is obtained from the continuous activities of the company and these funds are used in various cases (special and non-special) according to the opinion of the esteemed board of directors. By dividing this criterion by the number of shares, the cash flow from operating activity can be determined for each share. (Mohsen Peykani 1391),[15].

3. Steps to do the job

In this article, we intend to provide a way for shareholders and senior managers of the insurance industry to use it to achieve the best possible performance of the company.

For this purpose, we proceed according to the following steps:

Step 1: (Data collection)

We have inquired about the required indicators of companies active in the insurance industry in the last 5 years from the Tehran Stock Exchange Organization and have listed them in the table.

Step 2: (Determine input and output indicators)

We derive income from current liabilities of the financial statement and output from current assets of the financial statement.

Step 3: (data calculation)

The super-efficient DEA model introduced in the previous section has been used for evaluation and ranking of insurance industry companies in the years 1393 to 1397. The DEA output is executed using GAMS software.

Step 4: (Calculate the Spearman rank correlation coefficient for each year)

In the first case, we rank companies based on CCC and ROA, in the second case, companies are ranked based on ROA and DEA, and in the third case, we rank companies based on CCC and DEA. The correlation scale will then be compared with the critical values. In the next section, we will implement the above steps on a real example.

4. Practical example

We know cash flow from assets. Therefore, one of the main goals of DCM is cash from operating activities. All information related to inputs and outputs is taken from the annual financial statements of companies and assistance is obtained from the library of the Tehran Stock Exchange. This information includes 21 insurance companies in the stock exchange.

In this section, we evaluate 21 insurance companies active in the Tehran Stock Exchange during the years 1393 to 1397; Their names are given in Table (2).

Table (2): The names of active insurance companies in Tehran Stock Exchange

number	Name of Company	number	Name of Company	number	Name of Company
1	Amin Reinsurance	8	Cooperative insurance	15	**Sinai Insurance**
2	Iranian Reinsurance	9	Hafiz Insurance	16	**Entrepreneur Insurance**
3	Alborz Insurance	10	Dana insurance	17	**Kosar Insurance**
4	Arman Insurance	11	Insurance is	18	**Our insurance**
5	Asia Insurance	12	Razi Insurance	19	**Nation Insurance**
6	Parsian insurance	13	Saman Insurance	20	**Homeland Insurance**
7	Pasargad Insurance	14	Sarmad Insurance	21	**New insurance**

The studied indicators are as follows:
Input indicators: current financial facilities received, premium savings and deferred claims savings.
Output Indicators: Demand from group and affiliated companies, claims from insurers and agents, and claims from insurers and reinsurers.
The values of indices of 21 active insurance companies in Tehran Stock Exchange in 1397 are given in Table (3). The table of other index values in other years has been omitted because it is easily accessible from the stock exchange organization.
Now we do the following steps in order:
1. We get the performance value from a super-efficient data envelopment analysis model.
2. Calculate the ROA and cash flow of companies.
3. Compare the ROA and a super-efficient DEA of companies.

Table (3): Values of indices of 21active insurance companies in Tehran Stock Exchange in 1397.

number	Request from group companies and affiliated companies	Claims on insurers and agents	Claims on insurers and reinsurers	Current financial facilities received	Save the premium	Save deferred damages
1	-	221,021	-	-	266,735	887,542
2	-	308,576	-	-	283,437	736,930
3	417,959	9,606,559	417,959	12,005,539	12,005,539	3,967,783
4	734	2,079,830	734	1,177,266	1,177,266	620,713
5	903,543	9,512,727	903,543	22,627,050	22,627,050	5,908,892
6	204,161	11,536,158	204,161	16,571,845	16,571,845	3,350,174
7	-	2,430,484	43,203	-	21,052,788	2,362,279
8	-	1,906,574	-	-	1,132,913	451,068
9	14,800	142,681	14,800	193,846	193,846	100,559
10	856,833	13,731,947	856,833	14,948,559	14,948,559	2,989,353
11	33,229	17,184,747	33,229	9,991,409	9,991,409	6,808,755
12	27,788	7,213,055	27,788	4,320,952	4,320,952	1,956,750
13	-	1,946,605	301,210	-	8,601,675	545,885
14	23,381	1,627,658	23,381	2,052,343	2,052,344	420,426
15	-	2,936,468	403,028	-	3,451,571	1,055,576
16	-	1,469,803	1,006,774	-	23,015,840	-
17	739,411	6,404,453	739,411	8,873,913	8,873,913	1,955,832
18	-	1,085,790	-	7,696,323	7,696,323	1,162,020
19	383,639	5,156,949	383,639	5,124,255	5,124,255	1,930,441
20	-	710,991	5,923	-	775,973	697,293
21	-	1,639,626	58,720	-	5,704,129	754,852

The super-efficient DEA model was used for the insurance industry from 1393 to 1397. In order to rank companies, we implement the super-efficiency model for each year. According to the amount of super-efficiency, companies with the highest level of super-efficiency have a better ranking, the results of which are given in Table (4).

Table (4): The amount of super efficiency of companies in the years 1393 to 1397.

number	1397	1396	1395	1394	1393	number	1397	1396	1395	1394	1393
1	0.64714	0.97712	0.85107	1.56099	3.814	12	1.18787	1.18787	0.71131	0.67056	0.3882
2	10.45714	2.48105	3.55997	0.97407	0.9568	13	1.40594	0.83364	0.56375	0.46382	0.2124
3	0.71938	0.68547	1.05827	0.59464	0.5087	14	0.71538	0.71538	0.49295	0.83228	0.9213
4	1.44730	1.44730	1.13914	1.17241	0.6827	15	1.24647	2.15762	3.03819	1.38798	1.1452
5	0.37954	0.37954	0.75231	0.72819	2.4678	16	1.21564	1.18843	0.19942	1.46199	0.5211
6	0.60409	0.60409	3.1742	0.16537	0.0276	17	0.94513	0.75280	0.72157	0.84313	0.6527
7	0.20552	0.26014	0.22044	0.20149	0.1078	18	0.22262	0.22262	0.19987	0.27738	0.3654
8	1.16747	1.16747	1.49721	0.78219	1.488	19	1.10878	0.90619	0.99384	1.77350	1.1414
9	1.16747	3.08861	3.70486	3.16227	0.911	20	0.73244	0.71608	0.91721	0.73009	0.7569
10	0.46691	0.62250	0.35025	0.68520	0.0249	21	0.36936	0.37443	0.48654	0.35969	0.1797
11	0.78834	0.78834	2.64305	5.29332	1.6684						

The value of super-efficiency 0.0248 in 1393 indicates that Company One in 1393 was inefficient. The value of super efficiency 10.45 in 1397 indicates that the company was efficient in that year. Due to the amount of super-efficiency of the company, which is the highest, the company has moved the efficient frontier more than the others. Assigning weight to the components of the unit, i.e. inputs and outputs, is a limiting condition for all companies. DEA-based analysis provides the freedom for each company to determine the weight for inputs and outputs by the model, so that each company's performance scores are not maximized to other companies. A company that is efficient in managing inventory assigns more weight to inventory input. In addition, the weight of inputs and outputs for a particular company can be obtained using the DEA model results, and according to the weights of inputs and outputs obtained for a company in a particular year, it is possible to effectively manage the company. win. The lowest weight inputs (s) are not effectively managed because they are used to calculate the minimum efficiency. In order to improve the efficiency of the company, these resources should be used by the management of the company.

Since the DEA-based benchmark is able to perform sensitivity analysis, it would be useful for a company to improve planning and budgeting. Sensitivity analysis for a particular input shows the sensitivity of each company's performance to changes in that input. In addition, data envelopment

analysis provides a benchmark for each inefficient DMU. These values are considered as criteria for ranking units. The values of λ in relation to these criteria indicate that the point of the efficient boundary for the DMU under evaluation indicates that its inputs have decreased (DMU image), if the input decreases, since such a point (i.e. the image point) must be a linear combination Be efficient DMUs, so these values of λ act as a weight. Weights when multiplied by the input of DMUs indicate the point on the border where the inefficient DMU is displayed. This type of analysis is not possible by traditional WCM criteria. In addition, DEA is able to provide sensitivity analysis for efficient companies. It provides information about the allowable increase (decrease) in inputs (outputs) so that the company remains efficient.

The results of the super-efficient model in DEA, as shown in the tables, provide a benchmark for companies. This column offers three types of information.

1. For companies with more than one efficiency: It is a list of inefficient companies that become efficient units by reducing their input; In other words, with this conversion, they get an efficiency score equal to one.

2. For companies with a super-efficiency score of more than one: includes a number of companies whose efficiency score is one and their target has changed the possibility-production (PPS) boundary. Such units are called peak efficiency. To be. Thus, in general, the DEA approach to WCM performance can help a company improve the amount of input (output) changes so that it remains efficient during the recovery. The company can use this information to decide which inputs and how much need to be reduced to achieve an efficient company. This is a clear advantage over traditional measures such as CCCs and ROAs, as they merely provide efficiency measures without information on how to increase or decrease inputs for efficiency.

3. For companies with a super-efficiency score equal to one: includes a number of companies whose efficiency score is one and their target has not changed the possibility-production (PPS) boundary. Such units are called efficient (Poor performance or strong performance).

Then, according to the Spearman correlation coefficient for each year, in the first case, companies are ranked based on CCC and ROA, in the second case, companies are ranked based on ROA and DEA, and in the third case, companies are ranked based on CCC. And DEA rated. We will then compare the correlation scale with the critical values.

Table (5): Spearman correlation coefficient values between DEA and CCC and ROA index

ROA& CCC			ROA &DEA			CCC & DEA		
Spearman correlation coefficient	Year	Rank	Spearman correlation coefficient	Year	Rank	Spearman correlation coefficient	Year	Rank
0.622077922	1394	2	0.242857143	1393	1	0.281818182	1393	1
0.6	1395	4	0.233766234	1394	2	0.103963635	1394	2
0.54025974	1397	5	0.186424174	1396	4	-0.192207792	1396	3
0.532467532	1396	3	0.055212734	1397	3	-0.194218912	1395	4
0.523376623	1393	1	-0.098701299	1395	5	-0.22215006	1397	5

According to Table (5), we found that the correlation between the values according to ROA and CCC is relatively high, which indicates a similarity in the ranking. The correlation between DEA-based rankings and the two traditional ROA and CCC measures is also high, with both the ROA and CCC correlation with DEA for each of the insurance industry companies exceeding the critical values in the 99% confidence interval. This suggests that DEA measurements are able to rank companies similar to ROA and CCC.

According to Table (5), the relationship between ROA and CCC rankings and company performance and strong evidence of a positive relationship between them. The super efficient correlation coefficient of DEA and CCC has been negative in some years (such as 1396, 1395 and 1397). This indicates that increasing one causes a decrease of the other, so we will have different rankings.

The correlation coefficient of DEA and CCC in 1393 and 1397 is positive, so the ranking in these years should be similar and in 1395 due to being negative should be different.

In Table (6), we examine the asset return ratios and liquidity ratios for different companies in different years.

Table (6): ROA ratio and CCC ratio

Fiscal year	1397		1396		1395		1394		1393	
number	Return on Assets (ROA)	Liquidity ratio	Return on Assets (ROA)	Liquidity ratio	Return on Assets (ROA)	Liquidity ratio	Return on Assets (ROA)	Liquidity ratio	Return on Assets (ROA)	Liquidity ratio
1	16.27	2.53	12.50	2.69	11.72	2.69	14.36	3.15	12.94	1.47
2	23.63	2.76	12.75	2.97	12.62	2.98	15.52	3.26	14.10	3.49
3	2.01	0.22	2.31	0.24	2.40	0.24	2.71	0.32	2.80	0.40
4	-8.86	0.17	2.30	0.27	1.82	0.27	6.98	0.19	3.89	0.67
5	0.99	0.16	1.03	0.17	0.89	0.17	0.85	0.14	0.80	0.15
6	2.08	0.11	2.32	0.20	5.24	0.20	4.59	0.22	6.42	0.11
7	2.60	0.48	3.19	0.41	4.30	0.41	5.04	0.28	5.92	0.18
8	1.32	0.05	0.93	0.22	2.59	0.22	22.71	0.86	8.11	2.57
9	1.18	0.08	-33.07	0.07	0.18	0.07	3.70	0.23	5.32	0.14
10	1.02	0.07	1.27	0.11	0.74	0.11	0.47	0.08	2.28	0.08
11	2.08	0.04	5.55	0.16	9.27	0.16	10.14	0.39	8.38	0.18
12	0.00	0.04	1.87	0.08	7.59	0.08	4.40	0.26	0.11	0.33
13	2.43	0.13	6.25	0.16	4.24	0.16	2.79	0.16	3.55	0.25
14	4.75	0.11	6.24	0.56	7.35	0.56	8.03	0.23	11.90	0.92
15	2.34	0.15	1.68	0.15	3.97	0.15	1.75	0.04	0.57	0.04
16	0.04	0.44	0.06	0.38	1.06	0.38	2.21	0.22	1.22	0.22
17	3.11	0.21	0.93	0.11	3.85	0.11	3.99	0.21	5.02	0.09
18	3.43	0.65	3.39	0.61	3.94	0.61	5.92	0.59	8.49	0.85
19	4.32	0.43	2.85	0.45	5.67	0.45	4.41	0.49	7.10	0.26
20	13.85-	0.14	-11.20	0.17	0.86	0.17	1.91	0.44	2.73	0.41
21	2.57	0.46	1.00	0.41	-14.14	0.41	0.23	0.34	6.35	0.18

In Table (7), we examine the asset return ratios and data envelopment analysis for different companies in different years.

Table (7): ROA ratio and DEA super efficiency score

Fiscal year	1397		1396		1395		1394		1393	
number	Return on assets ROA	Super-efficiency	Return on assets ROA	Super-efficiency	Return on assets ROA	Super-efficiency	Return on assets ROA	Super-efficiency	Return on assets ROA	Super-efficiency
1	16.27	0.64	12.50	0.97	11.72	0.85	14.36	1.56	12.94	3.81396
2	23.63	10.40	12.75	2.48	12.62	3.55	15.52	0.97	14.10	0.95675
3	2.01	0.71	2.31	0.68	2.40	1.05	2.71	0.59	2.80	0.50867
4	8.86-	0.14	2.30	1.44	1.82	1.13	6.98	1.17	3.89	0.68273
5	0.99	0.37	1.03	0.37	0.89	0.75	0.85	0.72	0.80	2.46781
6	2.08	0.60	2.32	0.604	5.24	3.17	4.59	0.16	6.42	0.02761
7	2.60	0.21	3.19	0.26	4.30	0.22	5.04	0.2	5.92	0.10778
8	1.32	1.16	0.93	1.167	2.59	1.49	22.71	0.78	8.11	1.48801
9	1.18	1.16	-33.07	3.088	0.18	3.7	3.70	3.16	5.32	0.91099
10	1.02	0.47	1.27	0.622	0.74	0.35	0.47	0.68	2.28	0.02485
11	2.08	0.79	5.55	0.788	9.27	2.64	10.14	5.29	8.38	1.66835
12	0.00	1.19	1.87	1.187	7.59	0.71	4.40	0.67	0.11	0.38821
13	2.43	1.41	6.25	0.833	4.24	0.56	2.79	0.46	3.55	0.21236
14	4.75	0.72	6.24	0.715	7.35	0.49	8.03	0.83	11.90	0.9213
15	2.34	1.24	1.68	2.15	3.97	3.03	1.75	1.38	0.57	1.14524
16	0.04	1.22	0.06	1.18	1.06	0.199	2.21	1.46	1.22	0.52109
17	3.11	0.94	0.93	0.75	3.85	0.72	3.99	0.84	5.02	0.6527
18	3.43	0.22	3.39	0.22	3.94	0.199	5.92	0.27	8.49	0.36543
19	4.32	1.10	2.85	0.906	5.67	0.99	4.41	1.77	7.10	1.14142
20	13.85	0.73	-11.20	0.716	0.86	0.917	1.91	0.73	2.73	0.75693
21	2.57	0.36	1.00	0.374	-14.14	0.486	0.23	0.35	6.35	0.17965

According to the two tables (7) and (6), the DEA efficiency score ratio and the CCC ratio are also known.

Table (8): Rank of units based on DEA super efficiency score and ROA ratio.

Super efficiency score DEA	Name of Company	Rank	ROA	Name of Company	Rank
10.40	Iranian Reinsurance	**1**	**23.63**	Iranian Reinsurance	**1**
1.41	Saman Insurance	**2**	**16.27**	Amin Reinsurance	**2**
1.24	Sinai Insurance	**3**	**4.75**	Sarmad Insurance	**3**
1.22	Entrepreneur Insurance	**4**	**4.32**	Nation Insurance	**4**
1.19	Razi Insurance	**5**	**3.43**	Our insurance	**5**
1.16	Cooperative insurance	**6**	**3.11**	Kosar Insurance	**6**
1.16	Hafiz Insurance	**7**	**2.60**	Pasargad Insurance	**7**
1.10	Nation Insurance	**8**	**2.57**	New insurance	**8**
0.94	Kosar Insurance	**9**	**2.43**	Saman Insurance	**9**
0.79	Insurance is	**10**	**2.34**	Sinai Insurance	**10**
0.73	Homeland Insurance	**11**	**2.08**	Parsian insurance	**11**
0.72	Sarmad Insurance	**12**	**2.08**	Insurance is	**12**
0.71	Alborz Insurance	**13**	**2.01**	Alborz Insurance	**13**
0.64	Amin Reinsurance	**14**	**1.32**	Cooperative insurance	**14**
0.60	Parsian insurance	**15**	**1.18**	Hafiz Insurance	**15**
0.47	Dana insurance	**16**	**1.02**	Dana insurance	**16**
0.37	Asia Insurance	**17**	**0.99**	Asia Insurance	**17**
0.36	New insurance	**18**	**0.04**	Entrepreneur Insurance	**18**
0.22	Our insurance	**19**	**0.00**	Razi Insurance	**19**
0.21	Pasargad Insurance	**20**	**8.86-**	Arman Insurance	**20**
0.14	Arman Insurance	**21**	**13.85-**	Homeland Insurance	**21**

Table (8) shows the rank of companies, DEA super efficiency score and ROA ratio of each company in 1397. As can be seen, Iranian insurance has the first rank in both methods and Alborz Insurance, Dana Insurance and Asia Insurance have maintained their rank in both methods and have the rank of 14, 17 and 18 and for other companies The rating is different and this is not unexpected with a small standard correlation coefficient between ROA and DEA.

5- Conclusion

In this paper, the measurement of investment management efficiency based on the super-efficient DEA model is presented, in which returns to descending scale in the nature of input are used. This paper shows that the new model is able to overcome many traditional constraints (cash conversion cycle and net trade cycle). In addition, the paper presents the superiority of the model over other methods, due to the inhuman nature of the unit, the type of data output data, the ability to perform sensitivity analysis and measurement criteria. In addition, the present study shows that the model can be extended to consider different types of scale returns, to place conditions on the weights of inputs and outputs, and to include the effect of external uncontrollable variables. Studying the efficiency of working capital management in a completely new perspective, the insurance industry will open the way for a new path of research in working capital management in Iran.

Finally, those who are interested in research in this field can benefit from the following topics:

A: This article refers to the insurance industry in the stock market, dear researchers can study petrochemical companies, etc. in this field to have a great help to investors and company managers in dealing with working capital management.

B: The model can be extended to regression patterns to be able to examine external or uncontrollable factors in these models.

Table (8) shows the rank of companies, DEA super efficiency score and ROA ratio of each company in 1397. As can be seen, Iranian insurance has the first rank in both methods and Alborz Insurance, Dana Insurance and Asia Insurance have maintained their rank in both methods and have the rank of 14, 17 and 18 and for other companies the rating is different and this is not unexpected with a small standard correlation coefficient between ROA and DEA.

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