# Assessment of the corporate governance efficiency of joint stock companies listed on the Algerian Stock Exchange during the period 2015-2019

تقييم كفاءة حوكمة شركات المساهمة المدرجة في بورصة الجزائر خلال الفترة من 2015–2019

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**Abstract**

This study aims at attempting to assess the governance efficiency of joint stock companies listed on the Algerian Stock Exchange during the period 2015-2019. In order to achieve the objectives of the study, it was relied on the Data Envelopment Analysis method to measure the efficiency of corporate governance. Furthermore, to test the hypotheses, the Kruskal-Wallis test was adopted.

One of the most important results is that the efficiency level of the corporate governance system for joint stock companies listed on the Algiers Stock Exchange is inefficient, as the average efficiency of the corporate governance system during the last five years was 38%.

**Keywords** : Corporate governance system efficiency, Joint stock companies listed on the Algerian Stock Exchange, Data Envelopment Analysis.

**ملخص**

تهدف هذه الدراسة إلى محاولة تقييم كفاءة حوكمة الشركات المساهمة المدرجة في بورصة الجزائر خلال الفترة 2015–2019، ومن أجل تحقيق أهداف الدراسة تم الاعتماد على أسلوب التحليل المغلف للبيانات لقياس كفاءة حوكمة الشركات، ولاختبار الفرضيات تم الاعتماد على اختبار Kruskal–Wallis.

ومن أهم النتائج المتوصل إليها أن مستوى كفاءة نظام حوكمة شركات المساهمة المدرجة في بورصة الجزائر غير كفؤ حيث أن متوسط كفاءة نظام الحوكمة خلال خمس سنوات الأخيرة بلغ 0.38%

**الكلمات المفتاحية:** كفاءة حوكمة الشركات، شركات المساهمة المدرجة في بورصة الجزائر، التحليل المغلف للبيانات.

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## 1. INTRODUCTION

A successful corporation requires efficient and successful management, as development of good practice in corporate governance is a sine qua non for corporations aiming to prosper on the market (Matić & Papac, 2014, p. 784). Furthermore, One of the major challenges of corporate governance (CG) research since its inception has been the definition of measures of 'good corporate governance', i.e. of corporate governance mechanisms that lead to financial efficiency, social legitimacy or more generally goal attainment (Schnyder, 2012, p. 1).

In this regard, different paths have been taken by attempts to measure corporate governance, either through standards and principles of good corporate governance or corporate governance mechanisms (Redondo Miró & Bilbao Calabuig, 2018). Whereby the assessment of corporate governance is important that cannot be measured or developed, as corporate governance measurement provides a clear overview of the strengths and weaknesses of the corporate governance system, as indicators for measuring corporate governance have been developed by many agencies, the best known is the GMI Rating scale, Standard & Poor's. Furthermore, there are various researchers who have developed indicators such as Klapper and Love (2004), Kim (2005) & Durnev, 2006) Black et al. (2006) Brown and Caylor, as the most of the studies which assessed corporate governance used a set of governance mechanisms as inputs. Moreover, most of these studies used financial performance measures as outputs for instance the return on equity, Tobin's Q as evidence of the efficiency of the corporate governance system. Despite the acknowledged importance of these indicators and measures which are used to assess corporate governance, there is no globally accepted measure of corporate governance so far, as many studies have demonstrated that there is a broad consensus that good corporate governance practices increase shareholder value. However, how to measure the quality of corporate governance is still under discussion (Anurag, 2011). Besides, these indicators cannot be used in the developing environment, as they are not valid for measuring governance in developing countries such as Algeria, considering that the environment in which companies are operating in these countries is worse legally, economically or socially. As each country has its own features that make it difficult to assess their governance using a global indicator

This present study measures the efficiency of corporate governance listed on the Algerian Stock Exchange, as the latter is the reflective mirror of the economy of any country in the world. Moreover, the companies listed in it should improve their governance if they would like to activate and

revitalize the Algerian financial market. Accordingly, our problematic began. Through this study, we will attempt to answer the following question:

**What is the efficiency level of the governance system in joint stock companies listed on the Algerian Stock Exchange, and what are the governance mechanisms affecting the efficiency of corporate governance?**

- **Hypotheses Study**: In view of the study objectives which we endeavor to achieve, based on previous studies, the following study hypotheses were formulated:
- **The first hypothesis**: "The system of governance for joint stock companies listed on the Algiers Stock Exchange is considered inefficient".
- **The second hypothesis:** The board size, the board meetings, the ownership structure, and the number of members of the audit committee are among the determinants of the efficiency of the corporate governance system for joint stock companies in the Algiers Stock Exchange.
-**The objectives of the study**: Through this study we sought to achieve the following objectives:
-Addressing the various theoretical concepts related to corporate governance as well as the mechanisms determining the efficiency of corporate governance.
-Identifying a range of mechanisms in which the level of efficiency of corporate governance can be assessed for companies listed on the Algerian Stock Exchange.
- Accessing to the level of efficiency of governance of joint stock companies listed on the Algerian Stock Exchange.
- Identifying the governance mechanisms which contribute to the efficiency of the governance of joint stock companies listed on the Algerian Stock Exchange.
-**Methodology of the study**: To handle this topic aiming to gain familiarity with its most important aspects, the theoretical side has been adopted on the descriptive approach to present the various concepts related to corporate governance. In addition to the analytical approach to study the relationship between corporate governance mechanisms and financial performance . Concerning the practical side, we relied on the Data Envelopment Analysis method in order to measure the efficiency of corporate governance, as well as to test the hypotheses we adopted the Kruskal-Wallis test
- **Review of literature**: There are many studies that have received much intention on assessing and measuring the efficiency of corporate governance in Algeria. However, we did not reach a study that focused on measuring the

efficiency of the corporate governance system for companies listed on the Algiers Stock Exchange, the following are the most important studies related to our topic:

**- Chiboub (2015)**, examined governance systems across the world and then concluded the type of governance system for the Algerian companies.In order to answer the problematic of the study, the researcher relied on several methods, including the descriptive and analytical methods, in addition to the historical and the comparative methods in the theoretical aspect. Whereas the applied method relied on multiple statistical and mathematical methods, most importantly is the Data Envelopment Analysis and Multiple Linear Regression.Furthermore, The researcher measured the efficiency of the governance system by applying her study to a sample of 16 joint-stock companies in the state of Setif during the period from 2010 to 2013 by adopting the governance system as inputs which consists of the internal mechanisms of governance (the board of directors, internal audit, ownership structure). While the outputs of the system depend on financial and economic profitability as one of the determinants of financial performance.Therefore, the researcher concluded that the average efficiency of the governance system in the companies under study over four years reached to 92% during the four years.Besides , The study found that the efficiency of the corporate governance system positively affects the economic profitability, while it does not affect the financial profitability.

- **Zitouni (2016),** this study aimed atassessing the corporate governance practices of a sample of 205 American companies during the period 2007-2012, by using the Data Envelopment Analysis.Where the researcher made a corporate governance indic ator that constitutes governance mechanisms (ownership structure, board of directors structure, audit committee structure, remuneration committee, compensation committee, appointments committee, governance committee) inputs and standards of governance including codes of good practices which constitute outputs (financial transparency, information dissemination and administrative accountability).However , nalysis of the results revealed that, on average, the sample companies are subject to relatively good governance with some sectoral variances with an average score above 80% during the period 2007-2012. Thus, this confirms the fact that American companies are adopting corporate governance standards

- **Ouelaa and Ghouali (2019)**, aimed at measuring the efficiency of the corporate governance system by applying it to seven Algerian joint-stock companies, where the researchers studied the mechanisms that identify the efficiency of the corporate governance system.Besides,In order to measure

the efficiency of the corporate governance system, the researchers adopted the internal mechanisms of (the board of directors, concentration of ownership, internal audit) as inputs to measure efficiency, and profitability indicators represented in the return on assets as outputs.In order to achieve the objectives of the study, the researchers relied on the descriptive approach to present the theoretical framework of the study, while the practical sectionwas adopted through Data Envelopment Analysis Method.

One of the most significant results is that the corporate governance system in the study sample has a high degree of efficiency, as the average during the study period was 76%.Furthermore, The mechanisms of the independence of the board of directors and the concentration of ownership are considered among the determining factors for the degree of efficiency of the governance system in the Algerian shareholding companies, the study sample. Regarding the internal audit mechanism, it is not considered among the determinants of the degree of efficiency of a governance system in the Algerian shareholding companies for the study sample.

This study shares with (Ouelaa & Ghaouali, 19)and (chiboub, 2015) study, which was applied in the Algerian environment. However, it differs in terms of the type of companies. As our study focused on joint stock companies listed on the Algiers Stock Exchange, contrary to their study.Moreover, it differed with them in the mechanisms adopted in measuring the efficiency of corporate governance.

Our study is different from the study of (Zitouni, 2016) as it was applied in a various environment to listed American companies‹It also differed in the output measurement variables, as our study adopted the ROE rate, while the study of the latter relied on governance standards from good practice codes However.The two studies shared the use of the Data Envelopment Analysis method to measure the efficiency of corporate governance

## 2. the theoretical framework of the study

### 2.1 .The concept of corporate governance

The foundation of corporate governance can be traced to the pioneering work of Berle and Means (1932) who observed that once modern corporations have grown to very large sizes, they could establish a separate system of control from that of direct ownership (Ruparelia & Njuguna, 2016, p. 154) , Adolf Berle and Gardiner Means were the first to outline this separation of ownership and control in their 1932 book The Modern Corporation and Private Property (Goergen, 2012, p. 8). Therefore, the reason for the appearance of the term corporate governance is the separation

of ownership from management, which is known as the agency theory. Many researchers and organizations concerned with corporate governance have provided several definitions the most significant are the following

The Organization for Economic Co-operation and Development (OECD) defined corporate governance in 2004 as: "Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set and the means of attaining those objectives and monitoring performance are determined." (World Bank, 2005, p. 4)

Among the most well known definitions submitted for corporate governance are those presented by the researcher Adrian Cadbury in 1992 in his report on the financial aspects of corporate governance for the United Kingdom, he defined it as "Corporate governance is the system by which companies are directed and controlled" (Claessens, 2006).Furthermore , this definition focused on the importance of dominating and controlling the company and excluding external parties from the organization such as banks, suppliers, customers and others related to the organization.These parties affect and are affected by the company, as corporate governance cannot be seen by us without taking it into consideration

Through the definitions submitted previously, it can be defined as the system that monitors, follows up, advises, and clarifies the ways in which institutions operate and controls their work in a good way,in order to ensure the achievement of the objectives of all stakeholders in the institution, including shareholders, managers, lenders, and other stakeholders.In order to ensure the achievement of the objectives of all stakeholders in the institution, including shareholders, managers, lenders, and other stakeholders.

## 2.2.Corporate Governance Mechanisms

To apply corporate governance efficiently, it requires the availability of a set of internal and external mechanisms, as in this element we will focus on the internal mechanisms associated with the applied study.

**- Board size:** is responsible for the day-to-day business and management of the company, it plays a pivotal role in ensuring good governance. It also provides strategies, policies and guidelines for the organization for its orderly performance and growth.Besides, an effective board is the key to success and corporate discipline.Furthermore, the board of directors is appointed by the shareholders who invest in the capital of the company, it appoints some key employees of the company to manage its affairs. Thus, it acts as a link between the shareholders and the executive management.

Moreover, it appoints, manages and reviews the management of the company, and is accountable to its shareholders (Pahuja, 2011)، The board of directors is related to board operation and good practices generally recommended. It deals with key issues like board independence, its activities, its membership, training of administrators and executives (Louizi & Radhouane, 2016, p. 6)

**- Board meetings:** are an important element through which the governance role of the Board of Directors can be assessed.However, researchers disagree about the impact of board meetings on the financial performance of companies, as some them such as Godard & al (2004) concluded that the increase in the number of board meetings has a positive impact on financial performance. In the same vein, researcher Davidson & al (1998) found that there is a positive relationship between financial performance and the number of board meetings. Vafeas (1999) study also concluded that the increase in the number of board meetings is not an indication of a strong financial performance (Bouaziz & Modamed, 2012, p. 10).

**-Audit Committee:** is a committee pursuant from the Board of Directors whose membership is limited to non-executive members or the majority of them. Its responsibility must include reviewing the accounting principles and policies applied within the company, as well as meeting and discussing with the external auditor about the outcome of the audit process.Furthermore, the emphasis on the appropriateness of the company's financial control systems (Slimane, 2008, p. 89) was highlighted because of its important role in internal control, the reliability of financial reports and the quality of financial information communicated to the market (Louizi & Radhouane, 2016, p. 6).

**-Ownership Structure**: is an important mechanism of corporate governance, it is how the company's capital is distributed among shareholders.It is classified into two types: a concentrated ownership structure and a dispersed ownership structure (chiboub, 2015, p. 49).Besides, The literature suggests a number of compelling reasons why concentrated ownership structure may reduce agency costs. First, family firms with concentrated ownership have an increased incentive to reduce agency costs because the more concentrated is ownership, the greater the degree to which benefits and costs are borne by the same owner. Second, the controlling family's special technical knowledge in relation to the firm's operations may put it in a better position to influence  and monitor  the firm (Biswas, 2012, p. 54) .In this regard, the researcher (Nanka-Bruce, 2011, p. 29) also believes that concentration of ownership is a source of power that can be used to support or oppose management. Owners support management

in decisions that act in their interest to maximize efficiency and oppose decisions that act to maximize management utility

## 3. the methodological framework of the study

### 3.1. The study sample

The community under study consists of four joint stock companies listed on the Algiers Stock Exchange during the period from 2015 to 2019, namely (Saidal company, Biopharm company, El Aurassi Hotel company, Alliance Insurance company).

### 3.2. Sources for obtaining study data

We obtained the data represented in the financial statements and the reports of the board of directors from the websites of these companies as well as the website of the Algerian Stock Exchange (SGBV). In addition to field visits to the headquarters of this company. Due to the Covid 19 pandemic, there are companies that responded to us, while others abstained. Thus, this gets us to be satisfied with a few variables according to the information given.

### 3.3. Method of data analysis study

In this study, we used Data Envelopment Analysis (DEA), which is a linear programming-based technique to measure the performance effectiveness of organizational units called decision-making units. This technique aims at measuring the efficiency of the decision-making unit's use of the available resources to generate a set of outputs (Ramanathan, 2003, p. 25)The method was first used in 1978 with a doctoral student, Edwardo. Rhodes, who was working on an educational program in America to compare the performance of a group of struggling minority students in similar school districts (Ahmed, Mohannad, & Adel, 2017).Besides,one of the advantages of this method is to determine the efficient administrative unit which aims to maximize its outputs, or those inefficient units that do not improve the employment of its inputs.Furthermore, it is possible to figure out the improvements required for the inputs, in addition to their correct employment to obtain the highest level of outputs for those units.As well as diagnosing reference administrative units for inefficient units as a basis for comparison for the purpose of improving performance (Madhar, 2017, pp. 7-8). However, one of the disadvantages of this technique is the assumption that there is no measurement error in constructing the limits. Thus, any deviation from the limit is attributable to inefficiency (Obama, 2013, p. 25).

The primary efficiency measure used in Data Envelopment Analysis is the output-to-input ratio. However, this measure is applied only to cases of both single input and output (Banker, Emrouznejad, Bal, Alp, & Cengiz,

2013). (Banker, Emrouznejad, Bal, Alp, & Cengiz, 2013, p. 36). The efficiency index is confined between the value (1), which represents complete efficiency, and the index with the value (0), which represents complete inefficiency (Mansouri & Razeen, 2010, p. 4).

There are two main models for Data Envelopment Analysis method: the model of Constant Returns to Scale (CCR) which is based on the assumption of constant returns to scale. The CCR model can be input or output oriented.The input-oriented model reduces the use of inputs for a given level of output. Furthermore, an output-oriented model increases output for a given level of input. Whereas the second is the Variable Return Scale (BCC) model. It was developed in 1984 by Banker et al (Banker, Emrouznejad, Bal, Alp, & Cengiz, 2013).. Morever, This model enables calculating its efficiency indicators, either by input or output orientation, and the type of models depends on the degree of managers' control over their inputs or outputs. As they have more control over their inputs (Banker, Emrouznejad, Bal, Alp, & Cengiz, 2013). If the decision maker has the ability to change the inputs, the orientation is considered internal, even if he has the ability to change the outputs when going externally (chiboub, 2015, p. 147). In this research paper, we have chosen the output-oriented CCR model because the decision-making units cannot control the inputs of corporate governance mechanisms, as these mechanisms are chosen by the General Assembly, that is to say the general manager / president and general manager as a decision maker does not have to change the system governance (chiboub, 2015, p. 148). as they have more ability to control the outputs of the financial performance system.

## 3.4. Study variables and their measurement

The variables of the study were selected in the light of previous studies related to the assessment of corporate governance, where we seek to choose the most accurate variables that reflect the quality of corporate governance.Besides,corporate governance is assessed in two ways, either through the input to the principles of corporate governance or through the input to the mechanisms of corporate governance.In this study we will use the input to the mechanisms of corporate governance, as they consist of internal and external mechanisms. However, according to studies which are interested in assessing corporate governance in Algeria, they have adopted internal mechanisms (chiboub, 2015), (Ouelaa & Ghaouali, 19) Moreover, internal mechanisms are considered as the first influence on the work of managers, unlike the external ones, As the policies pursued by them are often revealed by internal mechanisms before the intervention of external ones, which is a reflection of what is occurring inside (Hamoudi & Chiboub,

2019). Therefore, our study focused on the internal mechanisms only. According to (Ouelaa & Ghaouali, 19), the latest studies are no longer concerned with studying the extent to which companies are committed to the principles of governance and the application of its mechanisms, or to identify the level of good corporate governance only. Thus, if the governance system in any company is good, it must affect the performance of the company, as this prompted us to link corporate governance with financial performance indicators (the rate on equity ROE) Table No. (01) shows the study variables and their measurement.

**4.The applied study**

**4.1.Descriptive statistics for the study variables**

In this component, the results of the descriptive statistics related to the inputs and outputs of the study will be presented, by calculating the mean, median, highest and lowest value, as shown in Table No. 02, in which we notice that the number of board members ranges between 11 and 7 members.While the average size of the board of directors for companies listed on the Algerian Stock Exchange is estimated at 8 with a standard deviation of 1.38, which is an ideal ratio.As for the meetings of the board of directors, on average, the board of directors of companies listed on the Algiers Stock Exchange meets 6 meetings annually and with a standard deviation estimated at 1.22, that is, it meets every two months a year. Whereas, the largest number is 9, it belongs to Saidal Company in 2017.With regard to the ownership structure, the average percentage of ownership concentration for the study sample was 0.76 with a standard deviation of 0.06, which means that almost all companies approach the average concentration of ownership, which also indicates that companies have a high percentage of ownership concentration.As the largest percentage of ownership is attributed to Saidal, Biopharm and El-Aurassi Companies at 0.8, while the lowest value belongs to Alliances with a ratio of 0.65. This means that ownership is not dispersed much and is concentrated in a small number of members, this is due to the composition of Algerian companies.As for the number of members of the audit committee, the average members of the study sample amounted to 1.90, that is, approximately two members with a standard deviation of 0.64, this ratio is close to the ideal size of the audit committees limited to two and five members.Furthermore, the largest number of members of the Audit Committee was 3, belonging to Biopharm Company in 2015, 2016 and 2018, while the lowest number is 1 belongs to El-Aurassi Company in all years. As for the output variable represented by ROE, we note that the average return on equity for the study sample was 0.12 with a standard

deviation of 0.11, which is A small percentage which affects the decisions of investors to invest in these companies.Given that these companies are listed on the stock exchange, they must improve this ratio to allow them to have better investment prospects. The largest return belonged to Biopharm Company in 2018 by 0.5, while the lowest return was due to Al-Aurassi Company in 2019 with 0.004.

**4.2.The study of the efficiency of the corporate governance system for joint stock companies listed on the Algerian Stock Exchange**

**4.2.1.Testing the first main hypothesis:**

In this element, we confirm or disprove the validity of the first main hypothesis, which states**"The governance system of joint stock companies listed on the Algiers Stock Exchange is inefficient"** by applying the Data envelopment analysis method, the output-oriented CCR model.Besides, Table No. 03 shows the results of the corporate governance efficiency test. in which we note that the average efficiency of the governance system in joint stock companies listed on the Algiers Stock Exchange during the last five years amounted to 38%, a percentage that reflects a relatively weak level of governance efficiency with a standard deviation of 0.26, that shows the degree of variation in the efficiency level of the study sample companies.Further,the number of systems that achieve efficiency is only one out of 20 governance systems belonging to Biopharm companies in 2018, and the lowest degree of governance efficiency belongs to El-Aurassi company in 2019. Figure 01 shows the average efficiency of the corporate governance system during the period،(2019-2015) . As figure No. 02 shows the level of efficiency of the corporate governance system for each year. Through it, the efficiency of corporate governance can be classified into categories from 0-0.25, weak efficiency at 35%, from 0.5-0.25, medium at 35%, from 0.5-0.75, good at 20%, and from 0.75-0 very good at 10%،Through the above, we confirm the validity of the first hypothesis that **the corporate governance system of joint stock companies listed on the Algiers Stock Exchange is considered inefficient**, as 70% of companies rate their efficiency between weak and medium.

**4.2.2 .Testing the second main hypothesis:**

In this element, we test the second main hypothesis which states that "**the size of the board of directors, the meetings of the board of directors, the ownership structure, and the number of members of the audit committee are among the determinants of the efficiency of the corporate governance system in the Algerian Stock Exchange".**

In order to test this hypothesis, we divide it into sub-hypotheses as follows:

- The board size is one of the determinants of the efficiency of the corporate governance system for joint stock companies listed on the Algerian Stock Exchange at the level of morality of 0.05.

-The number of board meetings is one of the determinants of the efficiency of the corporate governance system for joint stock companies listed on the Algerian Stock Exchange at the level of morale of 0.05.

-The ownership structure is one of the determinants of the efficiency of the corporate governance system for joint stock companies listed on the Algeria Stock Exchange 0.05.

 -The size of the audit committee is one of the determinants of the efficiency of the corporate governance system for joint stock companies listed on the Algerian Stock Exchange at the level of morale of 0.05.

To test these hypotheses and identify the mechanisms of corporate governance contributing to the efficiency of the corporate governance system, we divide the study sample companies into two groups: the first group includes companies which have a governance system with average efficiency.Whereas the second group includes companies in which the corporate governance system has weak efficiency, as this is based on the average efficiency of the corporate governance system in the study sample in order that:

• **Weak efficiency governance system:** the efficiency rate is less than 0.38 and a value of 0 is given;

•**Average efficiency governance system**: the efficiency rate is greater than 0.38 and a value of 1 is given;

The non-parametric test (Kruskal-Wallis Test) was used in order to prove or disprove the second main hypothesis that the study variables do not follow a normal distribution.This is according to the results of the KolmogorovSmirnov test, which showed that the probability Sig is smaller than the level of significance (0.05), therefore the variables of the study The study does not follow a normal distribution, see Appendix 1.

**-The results of testing the first partial hypothesis about the variable of the size of the board of directors in identifying the degree of efficiency of the corporate governance system**

**Hypothesis H1$_0$**: There are no statistically significant differences between companies which have a governance system with an average efficiency and companies that have a weak efficient governance system depending on the variable of the size of the board of directors at the significance level of 0.05

**Hypothesis H1$_1$**: There are statistically significant differences between companies which have a governance system with an average efficiency and companies that have a governance system with a weak efficiency depending on the variable of the size of the board of directors at the significance level of 0.05

**Decision**: We notice from Table No. 04 that the probabilistic value (0.036) is smaller than the level of significance (0.05), therefore we disprove the hypothesis **H1$_0$**. Thus, there are statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency. Depending on the size of the board of directors

**-The results of testing the second partial hypothesis about the variable number of board meetings in identifying the degree of efficiency of the corporate governance system**

**Hypothesis H2$_0$**: There are no statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency according to the variable number of board meetings at the significance level of 0.05

**Hypothesis H2$_1$**: There are statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency according to the variable number of board meetings at the significance level of 0.05

**Decision**: From Table No. 04 we note that the probabilistic value (0.60) is greater than the level of significance (0.05). Thus, we accept the null hypothesis **H2$_0$**. Thus, there are no statistically significant differences between the companies that have a governance system with an average efficiency and the companies that have a weak efficient governance system according to the variable number of board meetings at the significance level of 0.05.

**-The results of testing the third partial hypothesis about the variable of the ratio of the largest contributor in identifying the degree of efficiency of the corporate governance system**

**Hypothesis H3$_0$**: There are no statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency according to the variable of the largest shareholder percentage at the significance level of 0.05

**Hypothesis H3$_1$**: There are statistically significant differences between companies that have a governance system with an average and companies that have a governance system with a weak efficiency according to the

variable of the largest shareholder percentage at the significance level of 0.05

**Decision**: From Table No. 04 we note that the probabilistic value (0.615) is greater than the level of significance (0.05), we accept the null hypothesis **H3₀. Thus**, there are statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency According to the variable percentage of the largest contributor at the significance level 0.05

**-The results of testing the fourth partial hypothesis about the variable number of members of the audit committee in identifying the degree of efficiency of the corporate governance system**

**Hypothesis H4₀**: There are no statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency according to the variable number of members of the audit committee at the significance level of 0.05

**Hypothesis H4₁**: There are statistically significant differences between companies that have a governance system with an average efficiency and companies that have a governance system with a weak efficiency according to the variable number of members of the audit committee at the significance level of 0.05

**Decision**: From Table No. 04 we note that the probabilistic value (0.31) is greater than the level of significance (0.05), we accept the null hypothesis **H4₀**:Thus, there are no statistically significant differences between companies that have a governance system with an average efficiency and companies that have a system of governance Governance with a weak efficiency according to the variable number of audit committee members at the significance level of 0.05

As revealed from the Kruskal-Wallis test that the statistically significant differences are due only to the size of the board of directors. Accordingly we can partially accept the second main hypothesis and its formulation is as follows: **The size of the board of directors is one of the determinants of the efficiency of the governance system of joint-stock companies in the Algiers Stock Exchange.**

**5. CONCLUSION**

Corporate governance assessment helps in determining the level of companies' application of the rules and the best practices of governance, it also contributes to the development of the corporate governance system by identifying the shortcomings, attempting to find their solutions and determining the factors contributing to raising the efficiency of the

governance system and working to improve it, as assessment is very important, especially if it means companies listed on the stock exchange. **Therefore, through our study, we reached the following conclusions:**
-The efficiency level of the governance system for joint stock companies listed on the Algiers Stock Exchange is considered inefficient, as the average efficiency of the governance system during the last five years amounted to 38%, a percentage that reflects a weak level equivalent to 70% of companies whose efficiency is between weak and average. Thus, the result we reached differs with those of the study (chiboub, 2015) and (Ouelaa & Ghaouali, 19), (Zitouni, 2016), where the average governance efficiency reached 92%, 76%, and 80%, respectively.
-The board size is one of the characteristics that contribute to the efficiency of corporate governance, as the number of board members contributed to the efficiency of the governance system, Thus, we reached a different result from the study (chiboub, 2015). The study also concluded that the meetings of the board of directors did not contribute to the efficiency of the corporate governance system. Therefore, this is the same conclusion reached by the study (chiboub, 2015).
-The study concluded that the ownership structure and the size of the audit committee did not contribute to the efficiency of the corporate governance system.
-Despite the availability of governance indicators in joint stock companies listed on the Algerian Stock Exchange, most of them do not contribute to the efficiency of the corporate governance system, except for the size of the board of directors. Thus ,this is due to the fact that these mechanisms are not applied according to the optimal rules of governance.

**Based on the results, the following recommendations can be made:**
-This study is very significant, because it is concerned with assessing and measuring the efficiency of the governance system for companies listed on the Algerian Stock Exchange, which suffer from a lack of companies listed therein. Therefore, the stock exchange must be revitalized by encouraging companies to enter the stock market.
-It is not sufficient to apply governance mechanisms only. However, it is necessary to search about the efficiency of applying these mechanisms and their reflection on the performance of the institution as a whole. Thus, studies should focus on this point**.**
-Encouraging researchers to carry out studies on assessing the efficiency and quality of the governance systems of Algerian companies in all their forms, whether joint stock companies or partnerships.. etc, listed or unlisted,

in order to know the reality of the application of governance mechanisms and principles and attempt to make suggestions for improvement.

-Fostering the role of the Algerian Corporate Governance Center in providing assistance to companies in assessing the level of efficiency of their governance

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## 6. Appendices

**Table 1.** Study variables and their measurements

| Variable type | variable name | Measurement |
|---|---|---|
| **Inputs** | Board size | Board of directors number |
| | Board meetings | Broad meetings  number per year |
| | Audit committee size | Audit committee number |
| | Ownership  Structure | The percentage of ownership of the largest shareholder in the capital of the company |
| **Outputs** | return on equity | Shareholder equity / Net result |

**Table .2** Descriptive statistics of the study's inputs and outputs during the study period

| Data | Inputs | | | | Outputs |
|---|---|---|---|---|---|
| | **BS** | **BM** | **OS** | **ACS** | **ROE** |
| **Mean** | 8,3 | 6,65 | 0,76 | 1,90 | 0,12 |
| **Standard deviation** | 1,38 | 1,22 | 0,06 | 0,64 | 0,11 |
| **Maximum** | 11 | 9 | 0,80 | 3 | 0,51 |
| **Minimum** | 7 | 5 | 0,65 | 1 | 0,004 |

**Source:** Prepared by the researchers based on the outputs of SPSS V 25

**Table .3** The efficiency of the corporate governance system during the period (2019-2015)

| Minimum | Maximum | Standard deviation | Mean | Number of systems achieved efficiency |
|---------|---------|--------------------|------|----------------------------------------|
| 1 | 2.34 | 0.26 | 0.38 | 1 |

**Source**: Prepared by the researchers based on the outputs of the PIM-DEA Ver3.2  software

**Fig.1.** The average efficiency of the corporate governance system during the period(2019-2015)
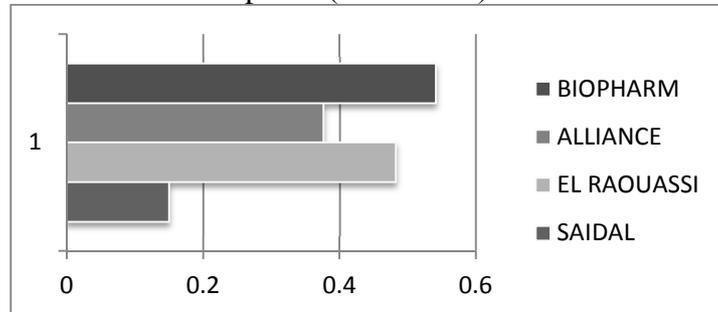


**Source:** Prepared by the researchers based on Excel

**Fig.2.** Efficiency of a corporate governance system during the period (2019-2015)
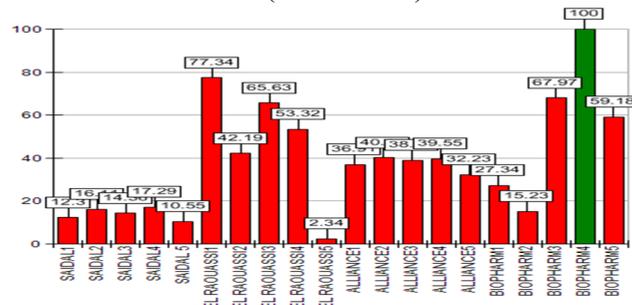


**Source:** From the outputs of PIM-DEA Ver3.2 software

| Efficiency Determining Factors | Test type | significance level | Decision |
|--------------------------------|-----------|--------------------|----------|
| **Board size** | Kruskal-Wallis | 0.036 | Significant |
| **Broad meetings** | Kruskal-Wallis | 0.605 | Not Significant |
| **Ownership structure** | Kruskal-Wallis | 0.615 | Not Significant |
| **Audit committee size** | Kruskal-Wallis | 0.31 | Not |

| | | | Significant |
|---|---|---|---|

**Table .4** Results of the second hypothesis test

**Source**: Prepared by the researchers based on the outputs of SPSS V 25

## Normal distribution test results

| Test Kolmogorov-Smirnov pour un échantillon | | BS | BMF | OS | ACS |
|---|---|---|---|---|---|
| N | | 20 | 20 | 20 | 20 |
| Paramètres normaux[a,b] | Moyenne | 8,3000 | 6,6500 | ,7625 | 1,9000 |
| | Ecart type | 1,38031 | 1,22582 | ,06664 | ,64072 |
| Différences les plus extrêmes | Absolue | ,236 | ,202 | ,463 | ,312 |
| | Positif | ,236 | ,202 | ,287 | ,288 |
| | Négatif | -,191 | -,165 | -,463 | -,312 |
| Statistiques de test | | ,236 | ,202 | ,463 | ,312 |
| Sig. asymptotique (bilatérale) | | ,005[c] | ,032[c] | ,000[c] | ,000[c] |

a. La distribution du test est Normale.
b. Calculée à partir des données.
c. Correction de signification de Lilliefors.

## Kruskal-Wallis test results

| Tests statistiques[a,b] | Efficiency |
|---|---|
| Khi-deux | 10,260 |
| ddl | 4 |
| Sig. asymptotique | ,036 |

a. Test de Kruskal Wallis
b. Variable de regroupement : BS

| Tests statistiques[a,b] | Efficiency |
|---|---|
| Khi-deux | 2,723 |
| ddl | 4 |
| Sig. asymptotique | ,605 |

a. Test de Kruskal Wallis
b. Variable de regroupement : BMF

| Tests statistiques[a,b] | Efficiency |
|---|---|
| Khi-deux | ,253 |
| ddl | 1 |
| Sig. asymptotique | ,615 |

a. Test de Kruskal Wallis
b. Variable de regroupement : oss

| Tests statistiques[a,b] | Efficiency |
|---|---|
| Khi-deux | 2,343 |
| ddl | 2 |
| Sig. asymptotique | ,310 |

a. Test de Kruskal Wallis
b. Variable de regroupement : ACS