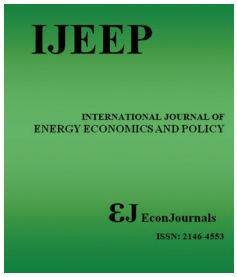

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Corporate Financial Performance and the Intervening Role of Energy Operating Costs: The Case of Jordanian Electricity Sector

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ABSTRACT

This paper analyzes the impact of financial performance reported data on market value. The study was conducted on electricity companies for the period from 2011 to 2021. The study also empirically analysis the intervening role for oil and gas as operating costs on this relationship. The empirical analysis involved testing the direct effect for company size (total assets [TA]), profitability (return on equity [ROE]), debt (debt ratio [DR]), liquidity (CR) and oil and gas price (OG-P) as independent variables on market value measured by price to book value as dependent variable. Several statistical test were used in the study comprise correlation, simple and multiple regression through Ordinary Least Square in order to verify the effect of independent and mediating variables on the dependent variable. The main findings based on correlation, simple and multiple regression can be summarized as follows: independent variables namely ROE, CR and the mediating variable OG-P were found statistically significant and justified the change in market value; other factors TA and DR failed to prove any effect on market value of companies. The oil and gas costs confirmed their impact on market value as single variables effect and joint variable effect.

Keywords: Oil and Gas Costs, Corporate Performance, Return on Equity, CR, Debt Ratio, Total Assets, Mediation
JEL Classifications: G03, M41, G04

1. INTRODUCTION

After the oil crisis in 1973, many countries in the world suffered from the high costs of oil, which was externally imported for production and service purposes, and similar to all countries developed countries suffered from this rise in oil prices. Worldwide, countries are divided into two parts, countries that export energy sources such as oil and gas and other countries that import oil and gas, but for rich countries, even with the rise in prices globally, they were able to cover these costs, while for poor countries, especially third world countries, the cost of obtaining oil and gas has become one of their major challenges. In order to minimize the effect of risen prices many countries succeeded to find alternatives to oil and gas such as atomic energy coal and solar energy; but many other countries, especially third world countries were unable to find alternative sources for energy that is vital for continuous of industry, production and transportation, thus they remained trapped to the control of oil and gas exporting countries.

Traditionally, oil and gas were regarded as the main sources of energy for companies that works on electricity generation. Due to the continuous rise in oil and gas costs for these companies they obligated to increase in electricity prices on citizens and other companies that operates on electricity; the increase in electricity prices continues year after year in order to cover the worldwide increase in oil. The local increase electricity prices for all production element put a great pressure on government officials and electricity companies to control this increase that which became a daily burden to both community and industry. Despite of government supports to cover a portion of the costs for

imported oil and gas electricity generating companies this support did not solve the problem which forced electricity companies to decrease the prices of electricity citizens and industry and hence bear a large part of the costs; the reduction of electricity prices led to a decrease in the electricity companies revenues and weaken the financial performance of these companies, and thus confronted by large deficit and high indebtedness that affected their efficiency in providing electricity or improving their operations. Although in many countries electricity companies have adopted new and different means to produce electricity, such as solar or wind power but oil and gas remains the main source that generate electricity.

Many of studies and research around the world have discussed this problem that faced electricity companies and the negative impact for the imported energy on the performance of electricity generation companies. Therefore, this study is an attempt to bring more highlight on problem in emerging countries and provide suggested solutions to it. Similar to many countries, the electricity generation sector in Jordan confronted by the crisis of high costs for oil and gas as power generation resources from the nineteenth of the last century, which makes companies in this sector bears several financial difficulties represented in the decline in their financial results and increase in their indebtedness, the deficit in these companies in 2021 has touched 14 billion dollars. Consequently, our aim is to shed more light on the financial results of electricity generation companies in Jordan and whether there is actual impact for oil and gas prices (OG-P) on performance of these companies. The study is motivated by the limited studies that undertaken on this subject; thus, the study is complementary to any previous studies on the performance of these companies and try to provide more recent results on the developments that have been occurred on performance of these companies. Moreover, the originality of the study stems from the employment of new financial indicators in measuring performance in addition to investigating the joint role of oil and gas as a mediating factor that strengthen or weaken the relationship among performance metrics and market value. It is expected that the study will produce results of great benefit to power generation companies and official authorities and provide conclusions and solutions that help these companies adopt future strategies that improve their financial performance.

The study consists of the following sections: After the introduction, the second section for the literature review, in the third section the methodology of the study, its tool and measurement of variables, the fourth section will be devoted to the results and their discussion, while the fifth and final section will be for the conclusions and recommendations.

2. LITERATURE REVIEW

The ultimate goal that companies are founded for is continuity or survival, this can only be only achieved by realization of satisfactory revenues for owners and investors, such revenues are mirrored in the value of the company by its share market prices; Therefore, companies with high market value gratifies the existing owners and attracts potential investors (Setiawan et al., 2021). Moreover, appropriate market returns and reassure to lenders the stable financial position of these companies and encourages them to provide loans to these companies for growth purposes and to pay their obligations (Saleem and Rehman, 2011; Endri, 2019).

Historically, previous studies (Son and Lestari, 2016; Paramitha, 2020; Mahendra et al., 2012; Fadli et al., 2017; Amijaya et al., 2016; Puspita and Siswanti, 2021; Fajaria, 2018; Hirdinis, 2019; Thuraisingam, 2015; Fachrudin and Ihsan, 2021; Thinagar et al., 2019; Alghifari et al., 2022) have proven that there are many factors that affect the value of the company, from these factors the profitability of the company, which is the profit that the company achieves annually as a result of their regular operation after utilization of their available resources in normal course of action; from the another factors that greatly impact market value is the level of liquidity of the company represented in monetary resources that enables business to meet its short and long term commitments. Other important factor that influence the value of the company is the size of its assets, measured by its financial and non-financial resources that the company possesses. Another significant element that affect the value of the company is the percentage of capital structure, which represents how efficiently a company uses debt to raise its financial results, which is known as financial leverage.

The market assessment of business is recognized as the real value of the company's price in the market from the point of view of the owners (Tarus et al., 2014). Market value of the business can be measured by the total value of the company's shares in the financial market, thus in efficient markets any a rise in the company's shares indicates an increase in its value and on the contrary, the decrease in these prices indicates a decrease in the value of the company.

In accounting and finance literature researchers and financial analysts have employed different measures to determine the value of the company in the market, some of them used the market share price, others used the market value of the share compared to the book share price, some researchers also suggested the use of return per share, while other researchers have used other values such as the value of sales. In this study, price to book value (P-BV) will be applied as the measure of market value because market share price data were not available for all the companies under study.

Globally, numerous studies have been conducted in several countries to examine the influence of financial indicators on the value of firms, some studies used one determinant for market value, while other studies used other determinants or several determinants to quantify market value.

In a study conducted by (Paramitha, 2020) on the Indonesian market to measure the impact of capital structure and liquidity on the value of company and the mediating role of profitability, the study found that the structure of capital has a negative impact on the value of the company as well as liquidity appeared with a negative impact on the value of the company while profitability was found to have a positive impact. A similar study steered by (Rompas, 2014), approved that liquidity has optimistic influence on the value of company, and with the same result, the study of Son and Lestari (2016) appeared, where there found a positive impact of liquidity on the company's financial performance and market

value; equally Fadli et al. (2017) confirmed the that there is an important positive impact for liquidity on the value of the company. Other studies such as Mahendra et al. (2012) reported negative effect for liquidity on firm value; also Sudiani and Darmayanti (2016) did not find any positive effect for liquidity on firm value. Grounded on the analysis of preceding studies and poetry, the first hypothesis can be formulated as follows:

H1: There is no association between liquidity and market value of Jordanian electricity generation companies.

Profitability indicators such as (ROA) and (return on equity [ROE]) ratios are amongst the main ratios that are used to measure the improvement of financial performance, profitability is the net income accumulated at the end of the financial period and regarded from the values that quickly redirected in the value of the company. From the view point of owner's profitability indicate the extent to which the company was able to exploit its resources in various activities to generate returns. Several studies have recognized the importance of this ratio in to market value of business, examples of studies that have found this positive evidence (Hermuningsih, 2012; Amijaya et al., 2016); thus, in order to establish an evidence for the association between profitability and market value, the second hypothesis of the study is:

H2: There is no association between profitability and market value of Jordanian electricity generation companies.

Plenty of preceding studies have shown a strong correlation between capital structure and market value of company. Capital structure is figured by the percentage of debt to equity, in ideal investment world companies to borrow money at low interest rates to increase the amount of investment so as to raise their profitability; this additional source of funding from outside the company boosts profitability to higher by utilizing the money of others and its known as financial leverage (Amijaya et al., 2016; Hermuningsih, 2012; Paramitha, 2020; Paminto et al., 2016; Komala and Nugroho, 2013; Atidhira and Yustina, 2017; Alghifari et al., 2022). Nowadays, the high competition in market led efficient companies to employ any possible sources to promote its profitability ratios particularly ROE. Regardless the benefit of such policy, borrowing money convey high risks this policy must be taken in to consideration such as the increase of debt ratio (DR) to more than one. Due to the importance of financial leverage in increasing the value of company our third hypothesis is as follows:

H3: There is no association between capital structure and market value of Jordanian electricity generation companies.

One of the factors that suggested by many studies for its effect on market value is the size of the business represented by the total assets (TA), this factor is one of the indicators quantify the growth that the company has reached in total resources, although part the size could include obligations or debts on company, investors typically feel satisfied whenever the size of the company increases with reasonable and acceptable risks in liabilities side. Many of studies have revealed a positive impact for the size of company on its market value or on the market share price (Amijaya et al., 2016; Hermuningsih, 2012; Son and Lestari, 2016; Fajaria, 2018; Siswanti et al., 2015; Fachrudin and Ihsan, 2021; Alghifari et al., 2022; Setiawan et al., 2021). Most of companies always seek to upsurge their assets that consequently increase the size of working capital which viewed as the primary source for generating income that increases the profitability ratios and hence increase dividends to owners, based on this argument the fourth hypothesis of this study is as follows:

H4: There is no association between firm size and market value of Jordanian electricity generation companies.

Many economic sectors, whether productive or service, depend almost entirely on oil and gas that used as energy for their operatation. The electricity generation sector is no exception to these sectors, as electricity generation companies rely mainly on oil or gas or both to produce electricity in their stations (Bilal et al., 2021; Zaabouti et al., 2016; Alamgir and Amin, 2021; Alaali, 2020; Okodua et al., 2022). The costs of purchasing oil or gas are amongst the most crucial costs annoys these companies, especially if these companies operate in oil and gas importing country (Aoki and Kawamiya, 2019). The variability of OG-Ps globally fundamentally affects these companies' financial results, including the market value of these companies (Abdulkarim et al., 2020; Agbo and Nwankwo, 2019; Levent and Acar, 2011). There is no doubt that whenever OG-Ps rise, the operating costs rise, and thus negative impact is witnessed in the company's financial performance especially in revenues and profitability. In many countries and in light of the inability of these companies to reflect this rise in electricity prices for consumers they endure a large portion of this surge as nonrefundable costs that consequently negatively impact financial performance (Thinagar et al., 2019; Gao et al., 2018; Wiryono et al., 2020; Aye et al., 2014; Guidi, 2009). Furthermore, this rise in oil or gas prices obligates companies to give up a larger part of their revenues to cover the purchase costs and hence negatively effects the level of profitability, liquidity and in some situations pushes these companies to cover these additional costs through borrowing in high interest rates (Mahboub and Ahmed, 2017; Nasir et al., 2018). The presence of all these negative effects for the fluctuation of energy prices will undoubtedly affect the market value of these companies. Based on prior argument our fifth hypothesis can be formulated as follows:

H5: There is no association between energy costs and market value of Jordanian electricity generation companies.

In order to measure the collective impact for all previous factors together on market value our sixth hypothesis is:

H6: There is no association between financial indicators and market value of Jordanian electricity generation companies.

2.1. Electricity Sector in Jordan

Jordan is one of the countries of the Middle East and is located in an important area in the region it linking North Africa and West Asia, and from the closest areas to Europe. Jordan had suffered for more than seven decades from the increase in the size of the population

density due to the continuous migrations from neighboring countries. The population in Jordan increased from 1950 to 2023 from 300,000 to more than 11 million, the population increased more than 30 times. As a result of this increase in population density besides the economic growth in all sectors, the volume of electricity consumption has increased to high rates, and in order to fulfill this necessity of electricity usage. Ministry of energy (MOE) reported that the electricity generation has enlarged about 200%, it increased from 1.2 megawatts in 2000 to 2.65 megawatts in 2010 and reached 31.68 in 2021 (MOE, 2021).

In Jordan the last statistics reported that there are 13 companies that contribute in generating electricity; 4 old traditional companies established after the year1935, the other nine companies recently established to produce electricity by wind or solar. The main production of electricity comes from the four old companies that mainly depend on oil and gas as a source of energy to produce electricity; these companies produce and distribute electricity to all Jordanian cities by its distributed stations over many areas near the consumption sources. In recent years there has become a diversity of sources for electricity generation to reduce the operating costs for traditional stations that depend on oil and gas, these new sources of electricity generation only began after the year 2010 to generate electricity through solar and wind, but despite this support from this new types for electricity production the percentage of electricity generation from solar and wind energy do not produce more than 5% of the total electricity generated.

The global increase for prices of oil and gas internationally, this has led to a rise in the costs of electricity production for all companies that rely on this source to generate electricity. However, although these companies are supported by the government, but the large deficit that confronted Jordan's budget caused a decline for the amount of funding from government to electricity companies, this problem required an urgent solution or reduction the costs to electricity sector to assist these companies for production of electricity to citizens and all business types at reasonable prices. The recent financial reports have shown that electricity generation companies suffer from a large deficit and high indebtedness that threaten their existence and threaten the economy as a whole, many of economist suggested that these companies must start to switch its sources of energy from oil and gas to alternative energy sources such as Oil shale to operate these stations and increase reliance on electricity produced from solar and wind.

The statistics of the MOE in Jordan, as shown in Figure 1, indicated that there was an increase in electricity generation in Jordan from 2000 to 2020 due to the increase in consumption, which donated to the population increase and migrations from neighboring countries, especially due to the first and second Gulf wars and the war in Syria. This population increase has led to an increase in market demand for goods, services and water that which mandated government institutions and companies in the private sector to increase their demand for electricity to meet this increase in electricity consumption. This increase in electricity generation prompted government agencies and companies to import more oil and gas that enlarged the costs to country budget and to amounts of operating costs for electricity companies (MOE, 2021; REA, 2021).

Other statistics that obtained from the MOE that appears in Table 1, also indicated that there is an annual increase in imported gas by at least 18% annually, the gas imports from 2000 to 2020 had increased to about 245%, similarly the imported fuel for operating power stations increased at an annual rate of by at least 8%, the statistics also show that the imported fuel increased from 2000 to 2020 by about 260% (the trend of this increase is exhibited in Figures 2 and 3).

Data in Table 2 show MOE statistics on population consumption for electricity from 1998 to 2018. When reviewing the evolution of consumption per capita compared to the average annual income per capita, the statistics reveals that there is a stability in the annual consumption per capita despite of the steady rise in annual income; the annual consumption per capita of electricity fluctuated between minus and plus 2%, and this indicates that the population's attempt to rationalize their electricity consumption in order to avoid the electricity prices increase which inflated by more than 200% over

Figure 1: Development of demand on electricity from 2000 to 2020 (source: MOE)

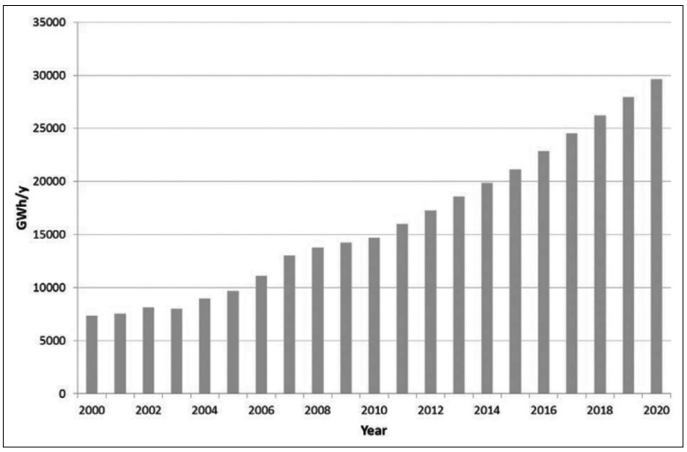


Table 1: Oil and gas imports for electricity from 2000 to 2020

Year	Oil	Gas
2020	1012	357
2019	940	432
2018	953	409
2017	885	327
2016	877	368
2015	848	335
2014	720	282
2013	685	280
2012	703	288
2011	674	288
2010	307	219
2009	305	234
2008	417	196
2007	380	233
2006	364	182
2005	315	178
2004	100	179
2003	570	171
2002	758	155
2001	647	138
2000	626	133

Source: Author collection from annual bulletins for MOE 2008-2021 . MOE: Ministry of energy

20 years (MOE, 1998-2018). Moreover, the need for adaptation to current situation by community to electricity inflated prices, this mandated household to conserve their consumption level despite of household income increase by more than 280% from 1998 to 2018, as table show the electricity consumption almost remained constant, the trend for this adaptation is exhibited in Figures 4 and 5.

Table 2: Annual income versus electricity share per capita from 1998 to 2018

Year	Annual income per capita	Electricity share per capita (KW)
2018	2909	942
2017	2830	996
2016	2801	981
2015	4089	1373
2014	3825	1272
2013	3652	1249
2012	3432	1247
2011	3276	1193
2010	3194	1204
2009	2979	1294
2008	2574	1245
2007	2048	1299
2006	1785	1283
2005	1647	1284
2004	1526	1213
2003	1356	1110
2002	1248	994
2001	1208	996
2000	1173	1015
1999	1168	970
1998	1187	1006

Figure 2: Imports of oil and gas. Source: Authors

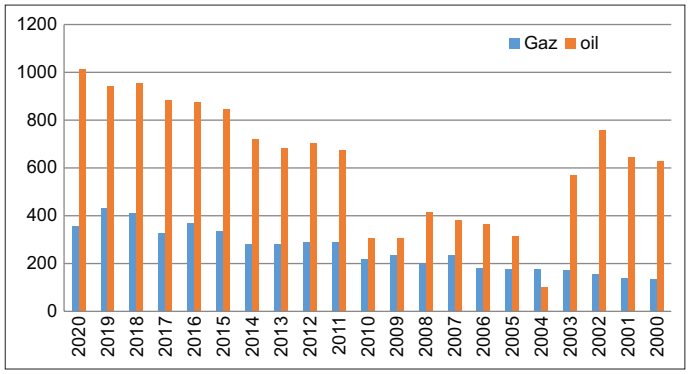
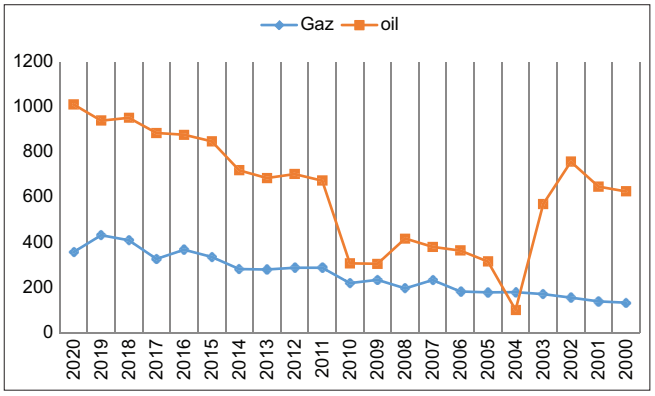


Figure 3: The trend for importing oil and gas. Source: Authors



Historically, most of generation for electricity in the Middle East in general and Jordan in particular began since the forties of the last century where the only source of energy for electricity generation was oil that was imported from the Arab Gulf countries; the dependency for generating stations on oil continued until the nineties of the last century where the oil prices increased dramatically to high levels, many of middle income countries started to use another sources for generation of electricity such as natural gas because gas prices were less than oil. Moreover, the quality requirements and environmental issued imposed high standards for the use of oil therefore many countries worldwide adopted mixed sources of energy where they used both oil and

Figure 4: Trend of annual income versus electricity per capita (1998-2018). Source: authors

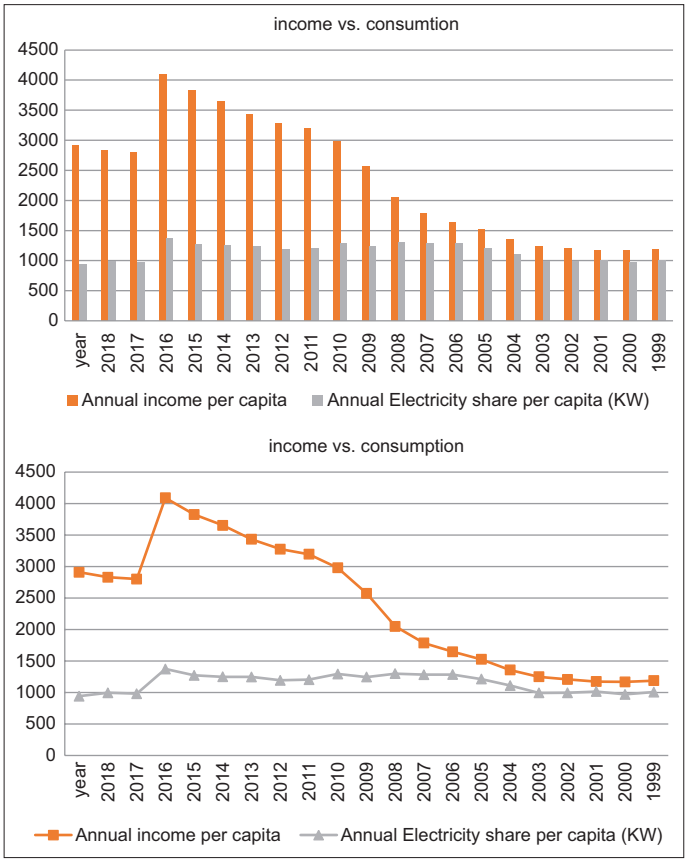
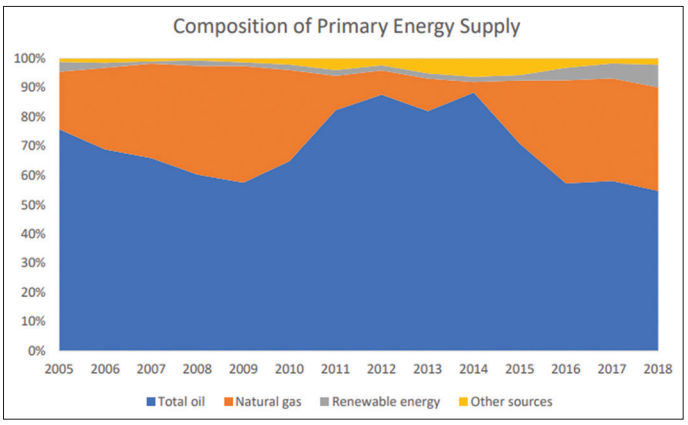


Figure 5: Composition of primary energy supply in Jordan between 2005 and 2018 (source: Sandri et al., 2020)



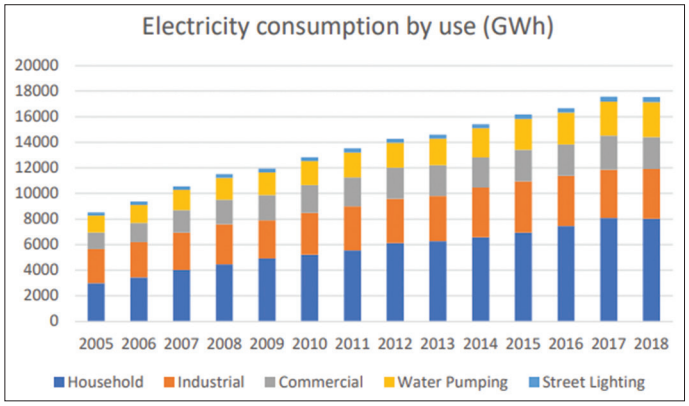
gas. The information for the use of different types of sources to produce electricity is presented in Figure 5; as the figure show the use of oil in electricity generation constitutes about 78% of the total electricity produced companies from 2005 to 2018, in second place comes the natural gas, where 15% of electricity is generated by natural gas whilst renewable energy from solar and wind only participated in approximately about 8% of the total energy produced in Jordan (Sandri et al., 2020, REA, 2021).

As for the electricity consumption in Jordan; this use was distributed amongst several sectors, as shown in Figure 6, the household sector in Jordan consumes 46% of electricity production, the industrial sector consumes 22% of electricity production where water sector consumes about 16% of the electricity produced, the commercial sector consumes 14%, and the remaining 2% is used to illuminate streets, public areas and parks (Sandri et al., 2020; Alrwashdeh, 2022).

3. MODEL AND METHODOLOGY

The methodology of the study follows both qualitative and quantitative analysis with the focus on the quantitative approach; in the previous sections statistics and a detailed discussion were given on electricity generation were information was discussed and analyzed; in the following sections we will verify the impact of financial performance indicators on the market value of electricity companies and the mediating role of OG-Ps on this relationship. The data for the following examinations was collected from the companies' bulletins, annual reports and financial statements reported in the Amman Stock Exchange on these companies; the analyzed figures encompassed the available data for the periods from 2010 to 2021.

Figure 6: Jordan's electricity consumption by use between 2005 and 2018 (source: Sandri et al., 2020)



3.1. Sample

The study sample entailed the four main traditional companies that produce electricity in Jordan and the sample consisted of the financial statements of these companies for a period of 12 years, where the total observations were totaled to 48 observations.

3.2. Method, Model and Variables

To order to achieve the objective of the study, that is to verify the effect of corporate financial performance on market value and the mediating role of OG-Ps on this relationship, the following sequenced methodology steps will be followed:

First: An analysis will be conducted for the descriptive statistics on the study variables.

Second: A simple regression test will be applied to verify the individual impact of each independent variable on the market value of companies.

Third: The simple regression test will be repeated after mediating the oil and gas role in the simple regression equations.

Fourth: A multiple regression test will be employed to measure the collective impact for all independent variables together on the market value of companies.

Fifth: The multiple regression test will be repeated after the oil and gas variable is entered into the multiple regression equation.

Figure 7 represents the framework of the study.

3.3. The Variables of the Study Measurement

The variables of the study and measurement are presented in Table 3. The simple regression for validating the individual correlation between independent, control and mediating variables with the dependent variable is assembled in equations from 1 to 5.

Equations from 1 to 4 for simple regression test of study variables:

$$P\text{-}BV\ t = \alpha + \beta 1\ ROE\ t + Et \quad (1)$$

$$P\text{-}BV\ t = \alpha + \beta 1\ Log.\ TA\ t + Et \quad (2)$$

$$P\text{-}BV\ t = \alpha + \beta 1\ DR\ t + Et \quad (3)$$

$$P\text{-}BV\ t = \alpha + \beta 1\ CR\ t + Et \quad (4)$$

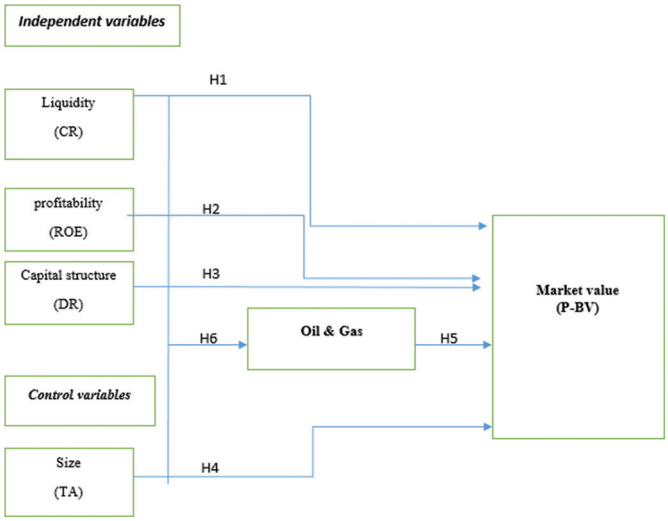
$$P\text{-}BV\ t = \alpha + \beta 1\ OG\text{-}P\ t + Et \quad (5)$$

AQ3 **Table 3: Variables of the study and measurement**

Variable name	Type of variable	Donation	Representation	Measurement
P-BV	Dependent	P-BV	Corporate financial performance	Market price per share\book value per share
ROE	Independent	ROE	Profitability	Net income\total equity
TA	Independent (control variable)	Log. TA	Size of firm	Log. TA
DR	Independent	DR	Debt level	Total debt\TAs
CR	Independent	CR	Liquidity	Current assets\current liabilities
OG-P	Mediating	OG-P	Cost of oil and gas	The average cost for imported oil and gas

Source: authors. P-BV: Price to book value, ROE: Return on equity, DR: Debt ratio, CR: Credit ratio, OG-P: Oil and gas price, TAs Total assets

Figure 7: Framework of the study



These first four equations (1-4) after the first examination for individual effect will be repeated with the inclusion for the OG-P to the equation; this second run for the equations aims to investigate whether there is an effect for the mediating variable (oil and Gas) on the four variables, so the new assumed model will be as follows:

$$P\text{-}BV\ t = \alpha + \beta 1\ ROE\ t + \beta 2\ X\ t + Et \quad (6)$$

Where X is the OG-P that will intervene all individual relation for equation from (1 to 4).

The collective effect for all of independent and control variables on financial performance will be regressed in one formula as follows:

$$P\text{-}BV\ t = \alpha + \beta 1\ ROE\ t + \beta 2\ Log.\ TA\ t + \beta 3\ DR\ t + \beta 4\ CR\ t + Et \quad (7)$$

Similar to simple regression in order to identify the role for OG-P on the relationship between the collective effect of all independent variable and financial performance, the regression will be repeated for a second time after the inclusion of *OG-P in* the formula as seen in equation 8:

$$P\text{-}BV\ t = \alpha + \beta 1\ ROE\ t + \beta 2\ Log.\ TA\ t + \beta 3\ DR\ t + \beta 4\ CR\ t + \beta 5\ OG\text{-}P\ t + Et \quad (8)$$

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The review of descriptive statistics results can provide us with some useful facts, the presented results in Table 4 indicated distinctive information, for example, we find that the value of the market share compared to its book value (BV-P) ranged between the value of 1.17 and 4.63 with an average for all companies during the 12 years about 2.43, this result indicates that the average market value of companies' has notable increase during 12 years by 33%. The results of the size of companies (log. TA) did not approve any considerable growth during the 12 years, the average growth of companies did not exceed 6%; this result for the low increase in size of assets could be attributed to the high operating costs that companies bear. The other results for descriptive statistics display a significant increase in the ROE, the average return rate for these companies ranged between −11% and 63% with a general average of 23% annually, where the general increase in profitability was about 300% during the study period, but despite the presence of this high percentage of profits most of it goes to the government budget and dividends to investors whom did not translate this increase of return into more investments to increase the size of companies.

Table 4: The descriptive statistics of study variables (*n*=48)

Variable Name	Minimum	Maximum	Mean
BV-P	1.1750	4.6384	2.438239
log. TA	8.0403	9.0295	8.589562
ROE	−11.5414	63.4780	23.486703
DR	64.8018	94.9692	84.979568
CR	0.5689	1.6114	0.883183
OG-P	37.6700	110.5300	74.170426

TA: Total asset, DR: Debt ratio, CR: Credit ratio, OG-P: Oil and gas price, ROE: Return on equity, TA: Total asset

The descriptive results for capital structure (DR) in Table 4 demonstrate an increase in the obligation for companies, where the lowest value appeared by 64% and the highest value of 94%, and the rate of liabilities for all companies was 84%, which is a very high ratio, as we indicated in the theoretical framework that all generating electricity companies suffer from a large deficit and resort most of the time to borrow from banks to cover many of their operational costs not for investment purposes. The statistical results for liquidity of companies (CR) show that it is <2 to 1, the ideal ratio, the average of liquidity for all companies showed about 0.9, this ratio proves a continuous deficit in the liquidity for these companies. The statistics for the cost of oil and gas has risen by about 200% in 12 years, where the lowest cost rate was 37 with a general average of 74, this amount confirms the significant rise in oil and gas costs for these companies.

4.2. Correlation

Before performing simple and multiple regression tests, a correlation test was applied amongst the study variables to explore the initial relationships between these variables and their significance. In Table 5 that screen the results of correlation between these variables, we observe that there is no relationship between the size of the company measured (log. TA) with the market value of the company (P-BV), and even if this relationship exists, it is a negative relationship. On the contrary the correlation results showed a strong statistical positive correlation between the ROE and the market value of the company (P-BV), another significant positive relationship was approved between the company's liquidity (CR) and market value (P-BV). The results for DR and OG-Ps did not show any significant correlation with company's market value.

Among the other relationships shown in correlation results we notice a negative significant relationship between the ROE and the size of the company; furthermore, we find a positive significant correlation between the DR and the size of the company, also a significant positive relationship observed between the DR and the ROE.

4.3. Simple Regression Results

By reference to simple regression results between the dependent variable and independent variables in Table 6, we note the following: The results of the simple regression did not show any significant statistical effect for the company's size (log. TA) on its market value (P-BV), the value of Adjusted R^2 −0.016 while the value of T was −0.529 and the value of F was 0.280, where all are not significant, but after entering the price of oil and gas (OG-P) as a modified variable on the relationship, we find that the value of F has become 3.517 and significant, this indicates that the resulting change in the company's market value is due to oil and gas inclusion not because of the size of assets because the coefficient of log. TA remain insignificant.

The results of the impact of profitability (ROE) alone on market value (P-BV) showed an important strong association between the two variables, the results indicated that 21% of the change in market value is attributed to the ROE, where the value of Adjusted R^2 scored 0.217, but after the centering of OG-Ps, the explanatory ratio for the combined impact of the two variables on the market value increased by about 34%, the model was valid before including the (OG-P), but post the inclusion of (OG-P) in the modified model the validity decreased by about 14%, F value declined from 13.72 to 10.48, while deep observation in the model results we find that it has become more appropriate and this shows in the increase of statistical significance, which became 0.000, oil and gas has added 8% to the explanatory power the value of adjusted R^2 witnessed an increase from 0.217 to 0.292. These results confirm the significant positive impact of both variables on market value.

The results for the DR effect on market value were found insignificant similar to the size effect as its explanatory power was not statistically significant, but after intervening the oil and gas variable as another factor accompanying with DR, the model improved and the result for F value increased from 0.049 to 3.27, but when comparing these results to the values of T for the two variables in the model, we conclude that the oil and gas variable is the only variable that influenced the market value not the DR, and therefore the DR is excluded from the impact on the market value.

Also when look over the results related to the impact of the liquidity ratio (CR) on the market value, we find that liquidity

Table 5: Correlation matrix for variables of the study

Variable Name	P-BV	Log. TA	ROE	DR	CR	OG-P
P-BV						
Correlation coefficient	1					
Significant (two-tailed)						
log. TA						
Correlation coefficient	−0.191	1				
Significant (two-tailed)	0.199					
ROE						
Correlation coefficient	0.563**	−0.326*	1			
Significant (two-tailed)	0.000	0.025				
DR						
Correlation coefficient	0.043	0.299*	0.385**	1		
Significant (two-tailed)	0.772	0.041	0.008			
CR						
Correlation coefficient	0.557**	−0.091	0.231	−0.135	1	
Significant (two-tailed)	0.000	0.542	0.119	0.364		
OG-P						
Correlation coefficient	0.230	−0.044	0.038	−0.114	−0.042	1
Significant (two-tailed)	0.120	0.770	0.800	0.444	0.778	

*Significant at 5%, **Significant at 1%. P-BV: Price to book value, ROE: Return on equity, DR: Debt ratio, CR: Credit ratio, OG-P: Oil and gas price, TA: Total asset

Table 6: Simple regression results

Variable	Adjusted R^2	t	F	F-significant	ΔAdjusted R^2 (%)	Δt (%)	ΔF (%)	ΔF-significant
Impact of Log. TA on P-BV								
Before including OG-P	−0.016	−0.529	0.280	0.599	+600	−35	+1100	0.038
After including OG-P	0.099	−0.0715	3.517	0.038				
Impact of ROE on P-BV								
Before including OG-P	0.217	3.705	13.726	0.001	+34	−14	−23	0.000
After including OG-P	0.292	3.559	10.488	0.000				
Impact of DR on P-BV								
Before including OG-P	−0.021	−0.222	0.049	0.825	+65	−31	+6500	0.014
After including OG-P	0.090	−0.290	3.273	0.047				
Impact of CR on P-BV								
Before including OG-P	0.178	3.307	10.937	0.002	+76	+11	−1	0.000
After including OG-P	0.301	3.660	10.903	0.000				
Impact of OG-P on P-BV	0.108	2.568	6.596	0.014	-	-	-	0.014

P-BV: Price to book value, ROE: Return on equity, DR: Debt ratio, CR: Credit ratio, OG-P: Oil and gas price, TA: Total asset

Table 7: Multiple regression results (model 1)

Model 1	Unstandardized coefficients B	t	Significant	Adjusted R^2	F	Significant
Constant	−2.545	−0.744	0.461	0.340	6.926	0.000
log. TA	0.458	1.066	0.292			
ROE	0.025	3.604	0.001			
DR	−0.016	−0.941	0.352			
CR	2.062	2.618	0.012			

Dependent variable: P-BV. Source: Calculations. ROE: Return on equity, DR: Debt ratio, CR: Credit ratio, TA: Total asset

Table 8: Multiple regression results (model 2)

Model 2	Unstandardized Coefficients B	t	Significant	Adjusted R^2	F	Significant
Constant	−2.569	−0.804	0.426	0.424	7.779	0.000
log. TA	0.318	0.786	0.437			
ROE	0.022	3.317	0.002			
DR	−0.012	−0.752	0.456			
CR	2.198	2.981	0.005			
OG-P	0.011	2.672	0.011			

Dependent variable: P-BV. Source: Researcher calculations. P-BV: Price to book value, ROE: Return on equity, DR: Debt ratio, CR: Credit ratio, OG-P: Oil and gas price, TA: Total asset

Table 9: Validation of hypotheses

Hypotheses	H1	H2	H3	H4	H5	H6
Correlation	Accepted	Accepted	Rejected	Rejected	Rejected	-
Simple regression	Accepted	Accepted	Rejected	Rejected	Accepted	-
Multiple regression	Accepted	Accepted	Rejected	Rejected	Accepted	Accepted for three variables (ROE, CR and OG-P)

Source: Researcher calculations. ROE: Return on equity, CR: Credit ratio, OG-P: Oil and gas price

is one of the variables that have strong statistical impact on the company's market value, as the liquidity variable alone has explained about 18% of changes in market value, adjusted R^2 value=0.178; and after the inclusion of the mediating variable the OG-P we note that the explanatory power rose to 30%, adjusted R^2=0.301; this result endorses that both of variables liquidity and OG-Ps have significant positive impact on market value of companies.

Further results in simple regression table for determination of the single impact of OG-Ps on market value, we find that this effect is evidenced through the value of adjusted R^2 for (OG-P) that recorded 0.108, this means that oil and gas alone explained 11% of the change in the market value of these companies.

4.4. Multiple Regression Results

In order to accumulate more conclusive evidence for the combined effect of the independent variables on the market value before and after the influence of OG-Ps, a multiple regression test was performed. The results in Table 7 (model 1), before the inclusion for the OG-P; the multiple regression results show that the only factors that explain the change in the market value of companies are the profitability of company (ROE) and liquidity (CR), the other variables namely the size of the company's assets (log. TA) and the capital structure (DR) did not provide any observed effect on the market value. The explanatory power for the collective impact for all variables combined was 34%, but reviewing all of results especially T result we conclude that this percentage is donated only to the two variables with the statistical significance; other results such as F value validate the appropriateness of, where the value of F-value was 6.926 and statistically significant.

To measure the intervening effect for OG-Ps as an intermediate variable, the multiple regression was repeated and the oil and gas variable was included in the model. The new results in Table 8 (Model 2) indicate that the model improved in its explanatory power due to the addition of the oil and gas variable; the adjusted R^2 grown from 0.340 to 0.424 and the validity of the model F value has increased from 6.92 to 7.77. The inclusion for the oil and gas variable also caused a decrease in the significance of the ROE where T value declined from 3.60 to 3.31 and to an increase in the significance of the liquidity (CR), T value risen from 2.61 to 2.98. Therefore, it can be said that there is a direct impact of OG-Ps on market value where T value was 2.67 and sig. was 0.011, and there is also an impact of this factor on other independent factors (ROE and CR) that explains the change in market value. The other factors size (log. TA) and capital structure (DR) remain with no impact on market value of companies.

After reviewing and discussing the results of all statistical test we can summaries the results and the validation of hypotheses in Table 9.

5. CONCLUSION

The study was motivated by the need to examine the effect of reported financial data provided in financial statements and annual reports on market value, moreover, the study constructed to verify the effect for the mediating role of operating cost represented by oil and gas oil on the assumed relationship among financial metrics and market value of electricity generating companies. The empirical analysis involved testing the direct effect for company size (TA), profitability (ROE), capital structure (DR) and liquidity (CR) as independent variables on market value measured by P-BV.

The study was inspired by the insufficient research studies that directed on this issue in middle east countries and particularly in Jordan after the issuance of several reports on the deficiency of these companies to meet their obligations. The data of the study collected from several resources such as financial statements, annual reports and bulletins from several Jordanian public institutions such MOE and Electricity Regulatory Commission. The data covered the period from 2011 to 2021. The empirical methodology that followed included correlation, simple and multiple regression in addition to useful graphical charts on the issue of the study.

After the researchers conducted the necessary statistical tests to examine the relationships between variables, the results of these tests reached several important results; in correlation results; no relationship between was approved between the size of the company measured by TA with the market value of the company, while a strong positive and statistically significant relationship was found between the ROE, liquidity and market value of the companies; the DR and OG-Ps showed no impact on the company's market value in correlation results. the other statistical results for simple and multiple regression approved that the independent variables namely ROE, CR and the mediating variable OG-P were found statistically significant and explain the change in market value of companies; other factors such as TA and DR were unsuccessful to show their impact on market value of companies. The oil and gas costs as a mediating variable established an impact on sole variables direct effect and in joint variables effect on market value.

In the world of scientific research, there is no study devoid of determinants, and this study faced several limitations, including the time period on which the study was conducted, as this study covered only a period of 12 years and may be in the eyes of some professionals and researchers the period is too short and that this study may need longer periods of time. Also, one of the limitations of this study related to the number of companies in the study sample which was small, although we included all this type of companies in the study, but some might argue that if the number of companies was larger and the sample was greater, the results may differ and the results may be better generalized. The third limitation is related to the selected variables for the study; most market value research donates share price to measure market value, but due the lack of financial information for some companies, especially the market share price, we used market P-BV to measure the market value. Future research on this topic can develop the study through the use longer time periods for example more than 20 years, also future researchers can use other independent financial performance measures such as return on investment or quick liquidity ratio, and other dependent variables to measure market value such as, price of traded shares, market share or revenues.

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