Measuring the Degree of the Effect of the Financial and Operating Leverages on the Earning per Share in the Energy Companies

قياس أثر درجة الرفع المالي والتشغيلي على ربحية السهم في شركات الطاقة

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Abstract:

The aim of this research is to determine the extent to which financial and operating leverages affect earnings per share (EPS) in companies. We selected the energy industry owing to its significance in the Omani economy. The sample of the study included 09 energy companies listed in Muscat financial market during 2015-2021. In addition, we used the descriptive analytical method to achieve the objectives, analyze and interpret the results, as well as reach conclusions and recommendations. As for hypotheses testing, we used Panel Data analysis with Eviews 12. Results of the statistical analysis and the hypotheses testing showed no statistically significant effect for the degree of the financial and operating leverages on EPS in the Omani energy companies. Furthermore, the study recommends that understudied companies take advantage of investment opportunities by obtaining long-term loans from the financial sector in order to achieve the basic goal of using financial and operating leverages.

Keywords: *Degree of the financial leverage; Degree of the Operating leverage; EPS; Muscat financial market; Energy Companies.*

ملخص:

هدفت هذه الدراسة للتعرف على أثر درجة الرفع المالي والتشغيلي على ربحية السهم في الشركات، وقد تم اختيار قطاع الطاقة للدور المهم الذي يلعبه هذا القطاع في الاقتصاد العماني، وتمثلت عينة الدراسة في 9 شركات للطاقة المدرجة في بورصة مسقط للفترة 2015 – 2021. استخدمت الدراسة المنهج الوصفي التحليلي لتحقيق أهداف الدراسة ولتحليل البيانات وتفسيرها للوصول إلى استنتاجات وتوصيات. ولاختبار الفرضيات تم استخدام تحليل السلاسل المقطعية (Panel Data) وفق البرنامج الإحصائي Eviews 12. أظهرت نتائج التحليل الإحصائي واختبار الفرضيات إلى عدم وجود أثر ذو دلالة إحصائية لدرجة الرفع المالي ودرجة الرفع التشغيلي على ربحية السهم في شركات الطاقة العمانية. وأوصت الدراسة بضرورة أن تقوم شركات الطاقة محل الدراسة باستغلال الفرص الاستثمارية من خلال الحصول على القروض طويلة الأجل التي تمنح من القطاع المالي لتحصل على الهدف الأساسي من استخدام الرفع المالي والتشغيلي.

الكلمات المفتاحية: *درجة رفع مالي، درجة رفع تشغيلي، ربحية سهم، سوق مسقط للأوراق المالية، شركات طاقة.*

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1. Introduction:

The study of financial leverage (the mix of financial and operating leverages) developed and exceeded the growth in the field of financial administration. Thus, it became one of the main factors that affect the companies' returns and their risks either due to the structure of the assets (the operating leverage) or the liabilities to use the fixed cost funding in the structure of the financial leverage funding or through the use of the fixed costs and the funding costs in a financial structure (mix with the financial leverage). It is clear that the stability and survival of the companies are only possible if they understand the returns and the risks they face and the effect of the financial and operating leverages and the leverage mix on the global returns and risks.

The topic of linking the degree of financial leverage and the degree of the operating leverage from one side with EPS from another side is among the complicated topics for specialists in financial thought. There are many studies that tried to incarnate the relationship either between the degree of financial leverage or the degree of the operating leverage, or both, with the effect on EPS. The findings of these studies differed regarding the nature of the relation between the variables of leverage and EPS.

Problematic of the study:

Energy corporations are crucial to Oman's economic life due to their significant involvement in investments and the promotion of the economy, energy corporations are crucial to Oman's economic life. Therefore, there is a focus on providing the necessary funds to achieve their aims in the light of the scarcity of the resources. This requires the companies to balance the resources of the internal and external funding that include the loans for their effect on the average of the financial leverage from one side and the average of the operating leverage from another. In this context, the increase of the financial leverage leads to an increase in the risks and maximizes the earnings, while the increase of the operating leverage leads to an increase of the company risks because it increases the degree of the sensitivity of the earnings to change in the sales or the indebtedness. Thus, the problem of the study lies in knowing the effect of the degree of the financial and operating leverages on EPS in the energy companies in Oman. As a result, the problem of the study can be stated in the following question:

- Is there an effect of the financial and operating leverage together on EPS in the energy companies listed in the financial market of Muscat during 2015-2021?

The hypothesis of the study:

- There is an effect of the financial and operating leverage together on EPS in the energy companies listed in the financial market of Muscat during 2015-2021.

Importance of the study:

The importance of the study lies in the fact that it tries to shed light on the effect of the relation between the degree of the financial and operating leverages and EPS in the energy companies listed in the financial market of Muscat and the nature of this effect. In addition, the study:

- Investigates a topic that directly or indirectly links the benefits and advantages that can be provided by the financial and operating leverages such as reducing the funding costs, taking advantage of the taxation advents, controlling the sensitivity of the earnings to change in sales and their effect on reducing the expenditures and increasing the earnings in the companies under study.

- Determines the effects resulting from the use of the degree of financial leverage in funding and the degree of the operating leverage in the change in sales. This provides guidance for all the companies in the sector.

- Determines the degree of the financial and operating leverages and the good ways for their management.

- Helps the decision makers in the energy companies take the funding decision that achieves the best benefits in the light of the findings of this study.

Aims of the study:

The general aim of the study is to know the relationship and the effect of the degree of the financial and operating leverages on EPS in the energy companies listed in the financial market of Muscat. In addition, there are sub-aims as such:

1- Showing the importance of the degree of the financial and operating leverages in funding, their risks, and their effect on EPS.

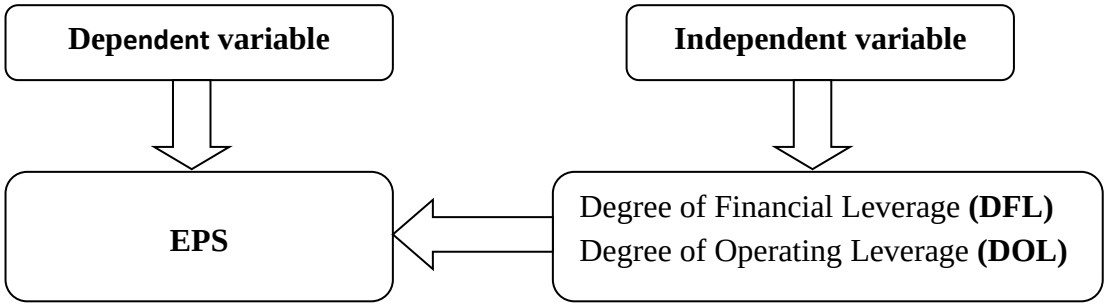
2- Testing the relation between the degree of the financial leverage and the degree of the operating leverage in the energy companies listed in the financial market of Muscat from one side, and EPS in these companies from another side.

3- Providing suitable recommendations about the best application of the degree of the financial and operating leverages in Omani energy companies.

Methodology of the study:

The study uses the analytical descriptive method that collects data and information about the topic of the study from books, magazines, and theses, and about the previous studies and the topics related to the content of the study. Moreover, the study tests the independent variables and shows their effect on the dependent variable by calculating the necessary financial ratios and processing them statistically through Panel Data using Eviews12 to know the effect of the degree of the financial and operating leverages on EPS of the energy companies listed in the financial market of Muscat during 2015-2021.

Model of the study:



Limitations of the study:

Following are some ways in which the study's limitations are apparent:

- The objectives limitations: The study is limited to measuring the expected effect of the degree of the financial leverage and the degree of the operating leverage on EPS in the energy companies listed in the financial market of Muscat.
- Spatial limitations: The energy companies listed in the financial market of Muscat.
- Temporal limitations: The study is limited to the financial reports published by the energy companies listed in the financial market of Muscat during 2015-2021.

2. Literature review:

Some studies mentioned the effect, or relation, of the degree of the financial and operating leverages on EPS. Then, many studies in different countries dealt with the variables related to the degree of financial leverage, the degree of operating leverage, and other variables. Moreover, there are many studies in various environments. We shall focus on the modern ones that are related to the topic of the study.

The study of (Medeiros, Lutosa, & Dantas, 2006) aimed at testing the relationship between the operating leverage and the returns of the shares. The study was applied to 81 non-financial companies listed in the financial market of Sao Paolo in Brazil between January 2001 and September 2004. Findings showed a positive important relation between the operating leverage and the returns of the shares. Moreover, (Grrita, 2006) conducted a study on the US aviation companies between 1990 and 2003 by studying the financial and operating leverages and their effect on the earnings due to the increase of the fixed costs in the airline companies and their use of big debts in the structure of the capital. Findings showed a negative relation between the financial leverage and the average return on the rights of the shareholders in the studied companies, except in the Western South regions where the relationship was positive. Moreover, findings showed that the risks of the operating leverage were very high mainly after the 11 September attacks due to the increase of the fixed costs and decrease of the changing ones.

Furthermore, the study (Garcia-Feijoo & Jorgensen, 2010) aimed at examining the correlation between the book to the market value, the degree of the operating leverage, and a cross-section of the shares return. The study was on a sample of companies listed in the New York financial market between 1981 and 2002. Findings showed a positive strong correlation between the degree of the

operating leverage and the book to market value, the degree of the operating leverage, and the shares returns. Moreover, it provided experimental support to the theoretical models that concluded that the emergence of the high regular risk is linked to the activity of investment of the company (the high degree of the operating leverage) which explains the difference in value between the returns of the value shares and the growth shares. Moreover, findings showed an important positive correlation between the degree of financial leverage and the size expressing it with the market value of the company, in addition to an important positive correlation between the degree of financial leverage and the book-to-market value after controlling the size.

Additionally, the research by (Achuthan & Jasinthan, 2012) sought to understand the relationship between the degree of financial and operating leverages using the Operating Earnings Ratio, the Net Earnings Margin, ROE, and ROA in Orix Company for Rent in Sri Lanka. Moreover, it aimed at finding the main factors that determine the monetary and operating leverages during 2001-2012. The study used the statistical statistics to analyze data and test hypotheses such as ratios analysis that cover the financial and operating leverages and the financial performance of the company. In addition, the multiple regression analysis had been used all along with the correlation analysis to know the effects and relation between the main variables of the study. Findings showed an effect with a statistically important significance between the degree of the financial and operating leverages. In addition, it showed that there was no statically significant effect between the degree of the operating leverage and the financial performance of Orix Company for rent in Sri Lanka.

The study by (Negi, Sankpal, Mathur, & Vaswani, 2012) demonstrated the impact of financial leverage on the shareholder returns measured via Return on Equity ROE and EPS, as well as the market share measured with Dividend Payout and a price-earnings ratio of 50 industrial Indian companies listed in the NSE of New Delhi's financial market between 2003 and 2008. The study used linear regression to measure the relationship between the variables. The author divided the companies under study into companies with high financial leverage and companies with low financial leverage. Findings showed no effect of the financial leverage on the EPS of the companies with high financial leverage. Moreover, the study showed that there is an effect of financial leverage on the EPS of companies with low financial leverage. Besides, there is an effect of financial leverage on ROE in companies with high and low financial leverages. In addition, there is no effect of the financial leverage on the Dividend Payout in the companies with high financial leverage contrary to the companies with low financial leverage. Furthermore, there is no effect of the financial leverage on the price-earnings ratio for the companies with high and low financial leverages.

Nevertheless, the study conducted by (Saleem, Rahman, & Sultana, 2013) demonstrated the impact of the level of financial and operational leverage on the profits (ROE, ROI, and ROA) of the gas and oil sector in the South Asian Association for Regional Cooperation. In addition, the study tried to understand and analyze the effect of the financial leverage on the chosen oil and gaz companies in South Asia countries (Sri Lanka, Bhutan, India, Maldives, Nepal, Pakistan, Bangladesh, and Afghanistan). It used many statistical styles such as the arithmetic mean, standard deviation, and skewness to understand the distribution of the data. Moreover, it used the analysis of

the correlation, the importance test, and ANOVA. In addition, it used some financial ratios to calculate the degree of the financial and operating leverages. Data had been collected from the annual reports of the under-study companies in 2001-2010. Findings showed a statistically significant relationship between the degree of financial leverage and the operating leverage and earnings (REO, ROI, and ROA). The effect of the leverage is positive when the other earnings of the company are bigger than the fixed funds that must be paid to the lenders and the other financial companies.

The study of (Toms, Salama, & Nguyen, 2015) aimed at deriving the measures of the financial and operating leverages and testing the correlation of each with the risks. Besides, it aimed at testing the relative importance of the financial leverage and the operating leverage in this correlation. The study was applied to 156 non-financial companies listed in the British financial market in 1998-2003. Findings showed the importance of the operating leverage and its positive important correlation with the regular risk. This supports the existence of a mutual reflexive relation between the variables of the financial and operating leverages.

Regarding the Arabic context, there are numerous studies on the extent of financial leverage and the extent of operating leverage. One such study is that of (Al Khalayla, 2002) which tested the relationship between the scale of the extent of operating leverage used in the accounting and funding literature in order to determine the strength of the correlation between these scales and whether they were strong proxies. The study used the correlation coefficient and regression to test the hypotheses. Contrary to the results of most of the studies, this study did not find any significance between the market and any of the scales of the degree of operating leverage. The results of the analysis of the correlation and regression of the relation between the scales of the degree of the operating leverage and the variance in the returns of the shares showed convergent results because all the correlation coefficients were low without statistical significance except the correlation coefficient of the 2nd scale of the financial leverage (the ratio of the fixed assets to the total assets). The ratio of the changes in the values of the variance in the shares returns reached 17%. The study did not find any statistical relationship between the levels of operating leverage and the levels of financial leverage.

The study of (Nacer Dine, 2011) aimed at revealing the effect of the operating and financial leverages on the earning per ordinary share in the Jordanian general joint-financial companies listed in the financial market of Amman. In order to achieve the objectives, the study relied on the financial data published by a set of Jordanian general joint-financial companies listed in the financial market of Amman in 2005-2009. The variables of the study included operating leverage, financial leverage, and earnings per ordinary share from the data obtained. The sample of the study was distributed in the three economic sectors and covered 05 banks, 27 industrial companies, and 18 service companies. The study used descriptive statistical styles such as the arithmetic means, the percentages, the analysis of the regression and the correlation, and ANCOVA to test the hypotheses. After the analysis of the data and testing the hypotheses, findings showed no statistically significant effect of the operating and financial leverages on the earning per ordinary share in the Jordanian banks. Moreover, there is statistical significance in the operating and financial leverages on the earning per ordinary share in the Jordanian general joint-financial industrial and services companies.

The primary objective of the study carried out by (Hassanine, 2012) was to determine how the funding structure (financial leverage), operating structure (operating leverage), as well as the financial structure of the companies, affected the financial performance of their shares during crises. The study was applied to a sample of 95 non-financial companies listed in the Saudi financial market in 2009. Findings showed a statistically significant relation between the indexes of the financial structures, the indexes of the funding structure, and the indexes of the operating structure from one side, and the performance of the shares of the companies in the markets during crises from another side. Moreover, the increase in the degree of operating leverage and the degree of financial leverage negatively affects the performance of the shares during crises.

The study of (AL Qudah, 2012) evaluated the relationship between the degree of financial leverage, the degree of operational leverage, the financial risks, and the effect of the value of the company. The study used a sample of 35 companies during 2002-2010 and relied on the analytical method to analyze the financial lists of the sample companies and the results of estimating the regression coefficients using Panel Data Analysis. Findings showed a variance between the degree of operating leverage, the degree of financial leverage, the financial risks, and the value of the industrial companies in the study sample. Moreover, findings showed a positive statistically significant effect between the degree of the operating leverage and the value of the company, and that the regular risks have a negative statistically significant effect on the value of the company. In addition, the size of the company has a positive effect on the value of the company and is statistically significant.

Additionally, the research conducted by (AL-Qudah & Laham, 2013) sought to determine the impact of financial leverage and ongoing risks on the annual return of the shares of industrial businesses, particularly those listed on the Amman financial market. The sample included 48 Jordanian industrial companies listed in the financial market of Amman from 2000-2009. The researcher used SPSS and some statistical styles such as the arithmetic mean, standard deviation, correlation coefficient, skewness, kurtosis, adjusted R2 value, and F distribution model. Moreover, to find the degree of financial leverage, the study used the total of the liabilities divided by the total of the assets. To measure the regular risks, the Beta coefficient and the equation of the annual return of the share were used. Findings showed a statistically significant effect of the degree of the financial leverage on Beta and a statistically significant effect of the financial leverage on the annual return of the share. Finally, the study found no important statistically significant effect for Beta on the annual return and that the independent variables explained 4% of the variance that occurred on the dependent variables.

(AL-Qudah A. , 2013) conducted research to examine the correlation between the returns on shares of industrial enterprises, operating leverage, and benefit coverage intervals between December 2000 and January 2009, the research investigation was conducted on a sample of 48 industrial companies. Findings showed an important effect for the times of the benefits coverage on the annual returns of the industrial companies' shares and no important effect for the operating leverage on the returns of these shares. Moreover, the common effect of the operating leverage and

the times of the coverage of the benefits on the annual returns of the industrial companies' shares are statistically important.

What distinguishes this study from the previous ones:

Based on what has been said, we see that most of the previous studies studied the degree of the financial leverage or the degree of the operating leverage and the effect of each or both on ROI, ROE, or return on the company value, or another one dependent variable. However, few of these studies studied the effect of the degree of financial leverage and the degree of operating leverage together on the EPS of the company. Consequently, the significance of our study stems from the fact that it completes previous studies in addition to the fact that it is one of the few studies that discuss this mix of variables because the degree of financial and operating leverages combined is one of the main factors on which the financial manager relies in the financial function, along with the financial analyst, in making decisions. This study investigates the impact of the degree of financial and operating leverage as independent variables on EPS as a dependent variable in energy businesses listed on the Muscat financial market between 2015 and 2021.

3. Theoretical Framework

3.1 The Degree of the Financial Leverage (DFL):

The quantitative measure of the financial leverage is the degree of the financial leverage that measures the sensitivity of EPS in the company to the Earnings Before Interest and Tax EBIT because it links the percentage relative changes in EPS with the percentage relative changes in EBIT (Van Horne & Wachowicz, 2008, p. 450). It is calculated as such:

$$DFL = \frac{\%\Delta \text{EPS}}{\%\Delta \text{EBIT}}$$

Here we can define DFL as the percentage change in EPS resulting from a 1% change of EBIT (Ibrahim, 2017, p. 47)

There is another law for the financial leverage that is more common and easier as such (Lasher, 2008, p. 341):

$$DFL = \frac{\text{EBIT}}{\text{EBIT} - I}$$

Where:

I: the interest rate

DFL indicates the percentage of change in the net return and net income NI as a result to the change of the percentage of the operating return (EBIT) (AL Amri, 2013, p. 320) as such:

$$DFL = \frac{\%\Delta \text{NI}}{\%\Delta \text{EBIT}}$$

This measure helps explain the change that occurs on the average of ROE resulting from the use of the financial leverage in the financial structure. When the financial leverage is not used, the above ratio equals 1. When using it, the ratio must exceed 1 which means an increase in the average

of the return resulting from the financial leverage. On this basis, DFL measures the coefficient of maximization of the average ROE (AL Amri, 2013, p. 320).

3.2 The Degree of Operating Leverage (DOL):

One of the effects of operating leverage is the maximization of the operating earnings/losses resulting from a certain change in the size of the sales. The quantitative measure for this sensitivity to the operating earnings/losses of the change in the company sales is called DOL (Van Horne & Wachowicz, 2008, p. 448). DOL is calculated according to many inputs. However, there are two common ones that are:

3.2.1 DOL for two levels of sales:

DOL is calculated using the formula of the change in the ratio of the levels of the sales Q and the operating income EBIT as such (AL Amri, 2013, p. 158):

$$DOL = \frac{\Delta \text{EBIT}}{\Delta \text{Sales}} = \frac{\%\text{EBIT}}{\%\text{Q}}$$

$$= \frac{\Delta \text{EBIT}/\text{EBIT}}{\Delta \text{Sales}/\text{Sales}}$$

$$= \frac{\Delta \text{EBIT}/\text{EBIT}}{\Delta \text{Q}/\text{Q}}$$

Where:
DOL: The degree of operating leverage
EBIT: Earnings before the interests and taxes
ΔEBIT: Change in earnings before the interests and taxes
ΔQ: Change in the sales (produced and sold units)

3.2.1 DOL for two levels of sales:

The second way of calculating DOL is regarding the linear break-even, i.e., using the determinant variables through analyzing the break-even. Thus, we can calculate DOL at any sales level Q (Van Horne & Wachowicz, 2008, p. 448)

$$DOL = \frac{Q(P-V)}{Q(P-V)-FC} = \frac{\text{Q}}{\text{Q} - \text{QEB}}$$

This equation is used to calculate DOL of a company that produces one product

Where:
DOL: The degree of the operating leverage in units
Q: the quantity of sales
Q_{EB}: The quantity of break-even sales.

4. Method and Tools:

Following a review of the literature, the present investigation relies on the analytical descriptive method that best corresponds to the research objectives. We conducted the appropriate financial and statistical analyses for the variables based on the financial data of the companies under study during the study period according to the nature of the study data. The researcher then used Eviews to determine the major conclusions and recommendations by examining the effect of the independent variables on the dependent variables.

4.1 Study Population and Sample:

The population of the study includes the energy companies listed in the financial market of Muscat where the listed companies reached 13 at the end of 2021. To choose the sample, we excluded the companies where there is a shortage of financial data between 2015 and 2021. Thus, we ended up with 09 companies. We chose the energy sector because it is among the most important sectors of the Omani economy. In addition, this type of study shows its importance in such sectors. Therefore, the sample is chosen on purpose. It represents 70% of the study population.

4.2 Data collection tools and sources of the study:

We relied on secondary sources in data collection. Moreover, we used the following tools to get data:

- The reports and statements issued by the financial market of Muscat between 2015 and 2021.
- The annual financial lists issued by the Omani energy companies during 2015-2021.

4.3 The econometric model and analysis of the results:

In order to estimate the parameters of the studied model, we relied on Eviews 12 and the Ordinary Least Squares OLS because they are among the best styles to estimate the time-series data with the other cross-data through the use of three statistical styles for financial data analysis as follows:

- The Pooled Regression Model (PRM).
- The Fixed Effects Model (FEM).
- The Random Effects Model (REM).

To study the effect of the degree of the financial and operating leverages on EPS in the energy companies listed in the financial market of Muscat during 2015-2021, we used the cross time-series after 63 views NT= 07*09. The following are the variables we relied on to build the study model:

4.3.1 The independent variables:

- DFL: It has been calculated using the relation that measures the ratio of change in NI divided by the ratio change of the operating return (EBIT) for the 09 companies under study in the 07 years of study (2015-2021). Thus, we get (7*9=63) views or values.

- DOL: It has been calculated using the relation that measures the ratio of change in the operating income on the ratio change of the sales for the 09 companies under-study in the 07 years of study (2015-2021). Thus, we get (7*9=63) views or values.

4.3.2 The dependent variable:

EPS: It represents the net earnings after the tax from which the excellent shares distributions are subtracted and divided on the weighted mean of the number of ordinary shares. It represents the return achieved by the shareholder from each share he holds in the company. The values were obtained from the annual financial lists of the under-study companies (09) and their manuals available in the financial market of Muscat during 2015-2021. Thus, we get (7*9=63) views or values.

4.4 Stability of the time-series that form the study models:

Stability has a big importance because its absence may lead to fake conclusions. The unit root tests of Panel Data differ because they contain cross and time-series informational content. The unit root tests are based on testing the following hypotheses at a significance level of 5%:

- **The null hypothesis:** There is a unit root; it means the instability of the time-series.
- **The alternative hypothesis:** There is no unit root; it means the stability of the time-series.

Thus, the following table summarizes the results of these tests:

Table 01: Time-series Stability Tests

UNIT ROOT TEST TABLE (PP)

		At Level		
		EPS	DFL	DOL
With Constant	t-Statistic	0.5750	0.0234	0.1705
	Prob.	*0.5654*	*0.1377*	*0.4017*
		n0	n0	n0
With Constant & Trend	t-Statistic	0.1058	0.0193	0.1373
	Prob.	*0.1332*	*0.0152*	*0.8660*
		n0	**	n0
Without Constant & Trend	t-Statistic	0.9137	0.0136	0.0397
	Prob.	*0.9576*	*0.0182*	*0.0766*
		n0	**	*

		At First Difference		
		d(EPS)	d(DFL)	d(DOL)
With Constant	t-Statistic	0.0278	0.0110	0.0452
	Prob.	*0.0247*	*0.0063*	*0.2454*
		**	***	n0
With Constant & Trend	t-Statistic	0.0706	0.2619	0.1161
	Prob.	*0.0351*	*0.0002*	*0.5225*
		**	***	n0
Without Constant & Trend	t-Statistic	0.0068	0.0003	0.0017
	Prob.	*0.0050*	*0.0008*	*0.0187*
		***	***	**

UNIT ROOT TEST TABLE (ADF)

		At Level		
		EPS	DFL	DOL
With Constant	t-Statistic	0.5750	0.0234	0.1821
	Prob.	*0.5654*	*0.1377*	*0.3578*
		n0	n0	n0
With Constant & Trend	t-Statistic	0.3292	0.0630	0.3750
	Prob.	*0.3298*	*0.0702*	*0.7210*
		n0	*	n0
Without Constant & Trend	t-Statistic	0.8194	0.0126	0.0397
	Prob.	*0.8492*	*0.0001*	*0.0662*
		n0	***	*

		At First Difference		
		d(EPS)	d(DFL)	d(DOL)
With Constant	t-Statistic	0.0743	0.0360	0.1061
	Prob.	*0.0549*	*0.0063*	*0.2952*
		*	***	n0
With Constant & Trend	t-Statistic	0.2387	0.3467	0.2946
	Prob.	*0.1530*	*0.0076*	*0.6494*
		n0	***	n0
Without Constant & Trend	t-Statistic	0.0068	0.0015	0.0069
	Prob.	*0.0050*	*0.0004*	*0.0370*
		***	***	**

Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant
*MacKinnon (1996) one-sided p-values.

This Result is The Out-Put of Program Has Developed By:
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Source: *Eviews 12*

From the table, we see that all the variables are stable at the first variance in the tests **(ADF, PP)**

4.5 Measuring the effect of the financial and operating leverages on EPS in the financial market of Muscat:

We shall try estimating the model of measuring the effect of the degree of the financial and operating leverages on EPS in the energy markets listed in the financial market of Muscat through Panel Data as follows:

$$EPS = f(DFL, DOL)$$

5.4.1 Estimating the parameters of the model:

The parameters of the studied model had been estimated using the three Panel Data models that are: PRM, FEM, and REM. The results were as such:

Table 02: the Results of Estimating the Effect of the Degree of the Financial and Operating Leverages on EPS

REM

Dependent Variable: EPS
Method: Panel EGLS (Period random effects)
Date: 04/19/22 Time: 17:37
Sample: 2015 2021
Periods included: 7
Cross-sections included: 9
Total panel (balanced) observations: 63
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DFL	0.008374	0.012760	0.656246	0.5142
DOL	0.081998	0.130144	0.630054	0.5311
C	4.533380	0.789334	5.743296	0.0000

Effects Specification	S.D.	Rho
Period random	0.000000	0.0000
Idiosyncratic random	6.071277	1.0000

Weighted Statistics

Root MSE	5.746019	R-squared	0.014324
Mean dependent var	4.356984	Adjusted R-squared	-0.018532
S.D. dependent var	5.834108	S.E. of regression	5.887918
Sum squared resid	2080.055	F-statistic	0.435975
Durbin-Watson stat	0.691055	Prob(F-statistic)	0.648666

Unweighted Statistics

R-squared	0.014324	Mean dependent var	4.356984
Sum squared resid	2080.055	Durbin-Watson stat	0.691055

FEM

Dependent Variable: EPS
Method: Panel Least Squares
Date: 04/19/22 Time: 17:37
Sample: 2015 2021
Periods included: 7
Cross-sections included: 9
Total panel (balanced) observations: 63

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DFL	0.010772	0.013634	0.790036	0.4330
DOL	0.050177	0.132849	0.377698	0.7071
C	4.528249	0.791435	5.721571	0.0000

Effects Specification

Period fixed (dummy variables)

Root MSE	5.620910	R-squared	0.056780
Mean dependent var	4.356984	Adjusted R-squared	-0.082957
S.D. dependent var	5.834108	S.E. of regression	6.071277
Akaike info criterion	6.576579	Sum squared resid	1990.462
Schwarz criterion	6.882741	Log likelihood	-198.1622
Hannan-Quinn criter.	6.696994	F-statistic	0.406334
Durbin-Watson stat	0.657664	Prob(F-statistic)	0.912082

PRM

Dependent Variable: EPS
Method: Panel Least Squares
Date: 04/19/22 Time: 17:36
Sample: 2015 2021
Periods included: 7
Cross-sections included: 9
Total panel (balanced) observations: 63

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DFL	0.008374	0.012375	0.676682	0.5012
DOL	0.081998	0.126213	0.649675	0.5184
C	4.533380	0.765495	5.922152	0.0000

Root MSE	5.746019	R-squared	0.014324
Mean dependent var	4.356984	Adjusted R-squared	-0.018532
S.D. dependent var	5.834108	S.E. of regression	5.887918
Akaike info criterion	6.430130	Sum squared resid	2080.055
Schwarz criterion	6.532184	Log likelihood	-199.5491
Hannan-Quinn criter.	6.470268	F-statistic	0.435975
Durbin-Watson stat	0.691055	Prob(F-statistic)	0.648666

Source: *Prepared by the author based on the outputs of Eviews 12*

Before carrying out the statistical tests to trade-off the 3 models, we notice that the parameters of the variables are not significant. This differs a bit from the economic analysis and some of the previous studies.

4.5.2 The results of the tests of the trade-off between the models:

After estimating the three studied models, we shall move to use the styles of choosing from these three models through two styles: the Fisher test and the Hausman test. In order to trade-off between PRM and FEM, we shall make Fisher test where we shall test one of these two hypotheses:

- H0: PRM.
- H1: FEM

The following table shows the results of the test:

Table 03: Tests of trade-off between PRM and FEM

Redundant Fixed Effects Tests
Equation: EQ01
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	0.405099	(6,54)	0.8725
Period Chi-square	2.773730	6	0.8367

Period fixed effects test equation:
Dependent Variable: EPS
Method: Panel Least Squares
Date: 04/20/22 Time: 12:34
Sample: 2015 2021
Periods included: 7
Cross-sections included: 9
Total panel (balanced) observations: 63

Source: *Outputs of Eviews 12*

From the table we notice that the result of the Fisher test is not significant at the significance level 0.05. Thus, we accept the hull hypothesis and the fact that PRM is the suitable model.

The Trade-off between PRM and REM:

To do this, we shall carry out the Hausman test where we shall test one of the following hypotheses:

- H0: REM.
- H1: PRM

The following table shows the results of the test:

Table 04: Tests of the trade-off between REM and PRM

Correlated Random Effects - Hausman Test
Equation: EQ01
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	1.565345	2	0.4572

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
DFL	0.010772	0.008374	0.000023	0.6176
DOL	0.050177	0.081998	0.000712	0.2329

Period random effects test equation:
Dependent Variable: EPS
Method: Panel Least Squares
Date: 04/20/22 Time: 13:36
Sample: 2015 2021
Periods included: 7
Cross-sections included: 9
Total panel (balanced) observations: 63

Source: *Outputs of Eviews 12*

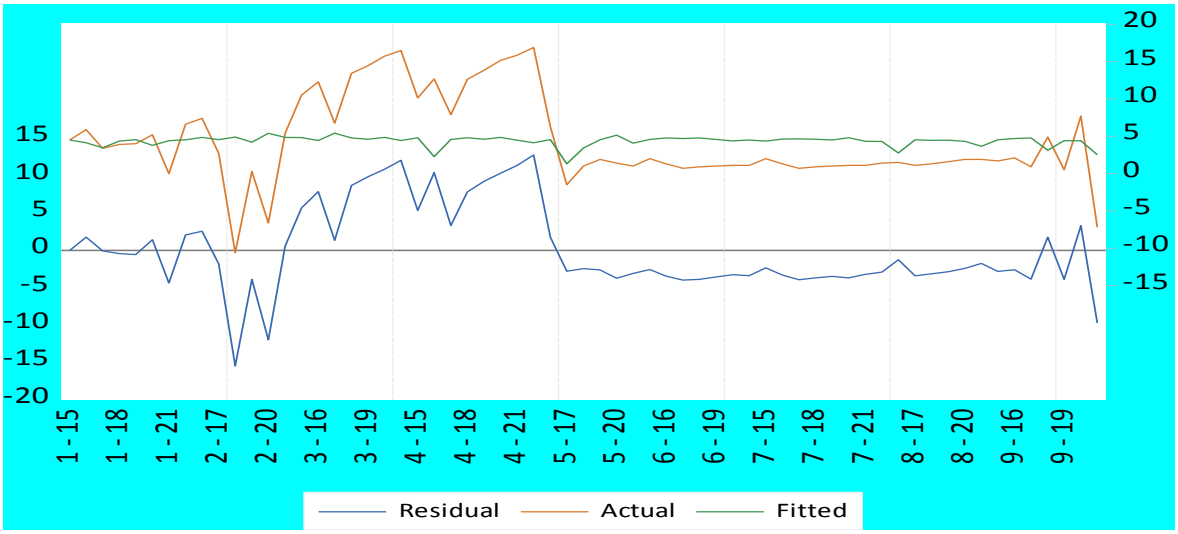
From the table we notice that the result of the Chi-square test is not significant at the significance level 0.05. Therefore, we accept the null hypothesis and that REM is suitable for the studied data.

4.5.3 Testing the model quality:

We must make sure of the quality of REM through the following tests:

- The model quality: in order to study the model quality, we must compare the actual values with the fitted through the following figure

Figure 01: the Actual and Fitted Values and the Residuals (Model Quality)

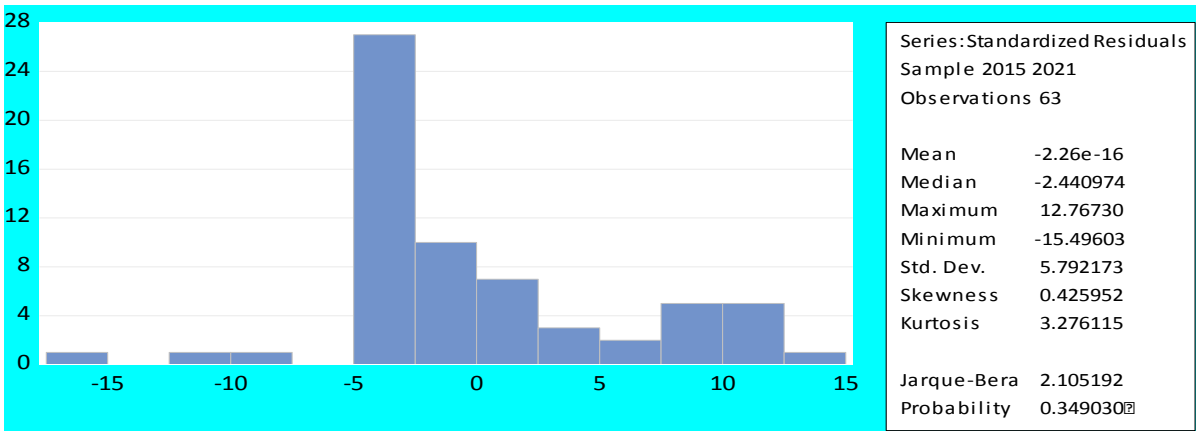


Source: *Outputs of Eviews 12*

From the test, we notice the convergence of the estimated values to the real ones which indicate the quality of the estimated model. Therefore, we can rely on it in interpreting and analyzing the results.

- The natural distribution of the residuals: In order to check the natural distribution, we use the Jarque-Bera test. Thus, we found that the result of the test was not significant ($\alpha>0.05$) which supports the fact that the residuals undergo a natural distribution. The value J-B= 2.10 which is less than χ^2=5.99 confirms that the residuals of the model undergo a natural distribution as shown in the figure:

Figure 02: the Natural Distribution of the Residuals



Source: *Outputs of Eviews 12*

- The residual cross-section dependence test: To make sure of the absence of dependence, we use the residual cross-section dependence test as shown in the table.

Table 05: results of the test of the self-correlation of the errors

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: EQ01
Periods included: 7
Cross-sections included: 9
Total panel observations: 63
Note: non-zero cross-section means detected in data
Cross-section means were removed during computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	48.39643	36	0.0812
Pesaran scaled LM	1.460933		0.1440
Pesaran CD	2.189391		0.0286

Source: *Outputs of Eviews 12*

From table 05, we notice that all the significant tests are more than 0.05. Thus, we accept the null hypothesis that says that there is no self-correlation.

4.6 Analyzing the results of the estimation of REM:

Based on the results of table 02 and REM, we notice that:

- The determination coefficient R^2 was 0.01432 which confirms that each of DFL and DOP does not affect EPS in the study sample except with 1.43% which means that the changes in EPS are due to other variables outside the model. This is interpreted with the fact that during 2015-2021, many economies witnessed fluctuations and total instability mainly in the financial sector due to the oil

crisis in the mid-2014. In addition, the period witnessed negative effects on the financial markets due to Covid-19. The financial market in Muscat witnessed the same thing and the Omani energy companies resorted to borrowing. This explains the increase of DFL and the absence of the effect of DOL on EPS in the study period. This may mean that the Omani energy companies could not affect the structure of their fixed and changing costs which indicates the absence of new investments by the under-study companies. We can also attribute this to the effects of Covid-19 on all the sectors and companies listed in the financial market mainly in the last years.

- DFL: It has a direct and statistically insignificant effect, i.e., DFL does not affect EPS. We see that the main cause of this result is that the administrations of some companies may not increase DFL in order to find a solution to the needed liquidity for operating due to the increase in the short and average terms liabilities to maintain the wealth of the owners. This may lead to the unemployment of the external funding sufficient to purchase new assets and investments that increase the sales and the achieved earnings.

The studies of (Achuthan & Jasinthan, 2012), (Negi, Sankpal, Mathur, & Vaswani, 2012), and (Nacer Dine, 2011) are in agreement with the results of this study as they showed the absence of a statistically significant effect of DFL on EPS. On the other hand, the studies of (Garcia-Feijoo & Jorgensen, 2010), (Saleem, Rahman, & Sultana, 2013), and (Hassanine, 2012) had different results than this study as they showed the existence of a statistically significant effect between DFL and EPS.

- DOL: has a direct and statistically insignificant effect, i.e., DOL does not affect EPS. We can interpret this as saying that the Omani energy companies could not affect the structure of their fixed and changing costs during the study period which indicates the absence of new investments by the under-study companies. In addition, we can speak about the potential of a decrease in the productivity of the fixed assets in generating revenues and the unemployment of the assets in a big way in the operating actions. Moreover, the under-study companies did not take advantage of the advents of financial leverage such as borrowing that is based on the fact that the loans used in funding the assets of the company are considered as a cost and tax before the earning that is subject to tax.

The results of the studies of (Achuthan & Jasinthan, 2012), (Negi, Sankpal, Mathur, & Vaswani, 2012), (Al Khalayla, 2002), (Nacer Dine, 2011), and (AL-Qudah A. , 2013) were in agreement with this study as they showed the absence of a statistically significant effect of DOL on EPS. However, the studies of Medeiros, (Medeiros, Lutosa, & Dantas, 2006), (Grrita, 2006), (Saleem, Rahman, & Sultana, 2013), (Toms, Salama, & Nguyen, 2015), and (AL Qudah, 2012) had different results as they showed a statistically significant effect between DOL and EPS.

5. Conclusion and recommendations:

The investigation yielded numerous findings from which we can make recommendations. The conclusion is as follows:

5.1 Findings of the study:

From the study of the effect of the degree of the financial and operating leverages on EPS in the Omani energy companies, we found that:

- REM is suitable for the studied data.
- Each DFL and DOP do not affect EPS in the studied companies except with 1.43%. This means that the changes in EPS are due to other variables outside the study.
- DFL has a positive statistically insignificant effect, i.e., DFL does not affect EPS in the studied companies.
- DOL has a positive statistically significant effect, i.e., it does not affect EPS in the studied companies.
- Findings show that there is no statistically significant effect of DFL on EPS due to the weak administrative financial decisions or the influence of Covid-19 on the Omani energy companies because it led to recession.
- Findings show that there is no statistically significant effect of DOL on EPS due to the unsteadiness of the number of the shares in the equity rights and the steadiness of DOL in the study period that led to such null relation, i.e., the Omani energy companies could not affect the structure of their fixed and changing costs in the study period. This indicates the absence of new investments by the studied companies.
- Findings show that DFL and DOL explain the changes in EPS in the energy companies with a low ratio. This indicates that the independent variable affects slightly the dependent variable; it is generally statistically insignificant.

5.2 Recommendations of the study:

In light of the findings of the study, we recommend that:

- It is necessary for the Omani energy companies to study and evaluate the funding structure in order to reach the best ratio of financial leverage that achieves a positive effect on EPS.
- We see from the results that the under study companies did not make new investments and, thus, their EPS did not increase. Therefore, we recommend the energy markets increase the investments to change the structure of the costs of the produced goods and find new markets to maximize their sales and avoid the share of one unit of the fixed costs. In addition, they must enlarge the range of their actions to increase the growth opportunities and EPS as the owners want.
- It is necessary for the energy companies under study to take advantage of the investment opportunities through getting long-term loans granted by the financial sector to get the main objective of using the financial and operating leverages.
- From the literature review, we found many studies about the degree of the financial and operating leverages and EPS. The study recommends that researchers and analysts make studies about the average of the needed return using modern models and study the relation with the degree of the financial and operating leverages to evaluate the investment projects correctly in the light of the dominance of the funding structure of the companies due to the lack of studies that tackled this issue in the Omani market.

- It is necessary to make more studies and researches about the topic under study in other sectors in other Arab financial markets.

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7. Appendices

Appendix 1: the companies under study

N°	Company
01	ALBATINAH POWER
02	AL SUWADI POWER
03	SEMBCORP SALALAH
04	SMN POWER HOLDING
05	SHARQIYAH DESALIN
06	SOHAR POWER
07	PHOENIX POWER
08	AL KAMEL POWER
09	BARKA DESALINATION

Appendix 2: calculating the indexes and variables of the study

Company	Years	DOL	DFL	EPS	Company	Years	DOL	DFL	EPS
ALBATINAH POWER	2015	0,04	33,30	10,5	AL SUWADI POWER	2015	0,05	31,30	10,14
	2016	-0,38	-9,74	12,29		2016	-0,02	-269,76	12,69
	2017	9,93	7,89	6,75		2017	-0,56	12,13	7,91
	2018	0,75	20,88	13,44		2018	0,45	28,34	12,61
	2019	-0,03	7,18	14,44		2019	1,28	-2,85	13,86
	2020	0,08	38,60	15,73		2020	0,05	36,85	15,17
	2021	-0,18	-9,65	16,48		2021	-0,16	-5,20	15,86
Company	**Years**	**DOL**	**DFL**	**EPS**	**Company**	**Years**	**DOL**	**DFL**	**EPS**
SEMBCORP SALALAH	2015	-0,15	-24,83	1,4	SMN POWER HOLDING	2015	-0,08	-1,50	4,5
	2016	-0,02	-210,97	1,5		2016	0,03	-47,69	5,9
	2017	-0,58	3,70	1,1		2017	0,06	-127,22	3,4
	2018	0,06	-11,32	1,3		2018	-2,12	-0,99	3,9
	2019	0,31	-9,76	1,6		2019	0,37	-0,20	4
	2020	-2,87	5,16	1,9		2020	-9,50	2,58	5,2
	2021	-10,66	0,02	1,9		2021	-1,75	0,80	-
Company	**Years**	**DOL**	**DFL**	**EPS**	**Company**	**Years**	**DOL**	**DFL**	**EPS**
SHARQIYAH DESALIN	2015	-5,15	2,61	16,9	SOHAR POWER	2015	-0,25	1,77	1,7
	2016	-0,37	4,69	6,3		2016	1,79	2,01	2,1
	2017	-38,70	-5,68	-1,5		2017	1,12	17,91	0,9
	2018	0,69	-136,51	1		2018	-16,22	-8,64	4,9
	2019	-1,32	13,35	1,9		2019	-1,06	-3,51	0,52
	2020	7,22	1,34	1,4		2020	0,13	-15,43	7,7
	2021	-5,63	2,22	1		2021	0,49	-243,94	-7,2
Company	**Years**	**DOL**	**DFL**	**EPS**	**Company**	**Years**	**DOL**	**DFL**	**EPS**
PHOENIX POWER	2015	0,40	0,09	2	AL KAMEL POWER	2015	0,38	-24,16	2

	2016	-0,08	28,41	1,3		2016	-0,07	10,59	1,3
	2017	-0,23	21,02	0,7		2017	1,17	1,74	0,7
	2018	0,22	27,63	0,9		2018	0,26	4,93	0,9
	2019	-0,80	12,61	1		2019	0,18	-6,34	1
	2020	-1,46	-4,76	1,1		2020	2,32	9,42	1,1
	2021	-0,35	-1,05	1,1		2021	-1,56	-9,52	1,1
Company	**Years**	**DOL**	**DFL**	**EPS**					
BARKA DESALINATION	0,16	-1,13	6,6	0,16					
	3,79	1,51	7,4	3,79					
	1,02	-8,56	2,7	1,02					
	1,08	32,77	-10,6	1,08					
	-0,29	-37,29	0,3	-0,29					
	3,13	71,29	-6,6	3,13					
	0,23	35,14	5,4	0,23					