

## Days inventory outstanding and firm performance: Empirical investigation from manufacturers

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### CHRONICLE

### ABSTRACT

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This study investigates the association between Days Inventory Outstanding (DIO) and firm performance of energy industry in Saudi Arabia, from 2013-2019. The sample comprises of 21 firm-year observations. The Pooled OLS Regression results indicate that DIO was negatively associated with firm performance. The results of this study are important for energy companies' managements in Saudi Arabia in making decisions related to managing their inventories. Further, the results of this study can be used for future research to gain a deeper understanding of the issues of inventory management and firm performance.

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## 1. Introduction

Inventory that is well managed can have some great impact on the profits of a company due to the ability of the company to recognize areas for reducing the cost of storage of tock and ensure that there is a smooth flow in production activities (Cheung et al., 2004). Bourne and Walter (2005) state that there is a direct relationship between proper management of inventory and the performance of a company (Lambert et al., 2005; Marota et al., 2017). When companies practice inadequate inventory management techniques it is obvious that the result there is an increase in waste due to the increase in the cost of storing inventory and the pronounced risk of exposing the inventory to damages or losses (Lwiki et al., 2013). Therefore, effective performance can be achieved if companies can develop strategies for attaining the maximum possible revenue within the minimum cost. For instance, in some cases attaining the best solutions for managing inventory can have a direct influence on the company's layout and in turn influence the profitability and performance (Fullerton & Wempe, 2003; Swamidass, 2007; Koumanakos, 2008; Steven & Britto, 2016; Lin et al., 2018). Of note is that, since there is a direct relationship between inventory management and the return on assets (ROA) (Eroglu & Hofer, 2011; Sahari et al., 2012; Nguyen, 2020). Companies are usually encouraged to keep the inventory within optimal levels if they expect to attain significant improvements in managing the performance of financial resources (Abd Karim et al., 2018). Some areas where inventory management has a direct impact on company performance include supply chain management. Supply chain management is a crucial activity that usually involves all activities surrounding the transferring of goods and raw materials from the producer to the consumer. In this case, inventory management allows smooth flow of supply chain activities by ensuring the proper selection of resources and supplies, clarity if production scheduling, efficient order processing, the seamless management of inventory by facilitating the transfer and storage activities, and finally ensuring valuable customer service is delivered (Burgess et al., 2006). The impact of proper inventory

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management is that it can guarantee better control over the company's cash management. Companies that have succeeded in their business by implementing proper inventory management tend to grasp better techniques for attaining efficiency of cash management. The problem that lies with the unsuccessful companies is that they embrace poor cash management techniques or sometimes experience consistent shortages in cash budget that usually cause significant consequences such as loss of cash discount, attaining bad reputation due to delays in meeting payment demands on time and sometimes insolvency of a company in case of absolute bankruptcy that could easily provoke the company's shutdown (Tuller, 2008; Jarrad, 2000). Therefore, it is important to have a good cash management system in place that can guarantee a company to have better control of financial risks, exploit opportunities for making profits, and facilitate a better balance sheet for the company. If all this can be achieved through proper cash management then a company should have confidence that the chances of improving operational efficiency are high (Abioro, 2013; Gallagher, 2002). Some ways of measuring if the inventory management is contributing to the efficiency of a company's financial performance are by monitoring the days of inventory outstanding (DIO). Evaluating the DIO can help to assess the level of inventory control attained in a company. It does so by illustrating the level of inventory required for storing at a given time and also provides a record of inventories available within a given period (Mauchi et al., 2011). Therefore, if a company experiences reduction in DIO it is an indication that the company is improving in managing its working capital that also translates positively to the company's profitability margins (Tradecko, 2020; Warrad & Khaddam, 2020). Empirically, Abioro (2013) and Mauchi et al. (2011) found that there is a positive relationship between the efficiency of cash management policies and the overall business performance. Abioro (2013) and Platt (2003) found that there is a positive relationship between the level of cash flow and the profitability of the company.

The aim of this study is to examine empirically the association between Days Inventory Outstanding and firm performance among energy listed companies in Saudi Arabia for the period ranging from 2013 to 2019. To the best of our knowledge that a study linking DIO with firm performance in Saudi Arabia does not exist. This study expects that there is a negative association between DIO and firm performance as follows:

H<sub>1</sub>: There is a negative relationship between DIO and firm performance ROA.

H<sub>2</sub>: There is a negative relationship between DIO and firm performance ROE.

The following sections of the paper are organized as follows. The data collection and research design are highlighted in Section 2. The results and discussions are illustrated in Section 3. Conclusions and implications were discussed in the final section, Section 4.

## 2. Data collection and research design

### 2.1 Sample selection and data collection

The sample of this study encompasses of 21-year observations of the energy industry. The data were collected from the energy listed companies in Saudi Stock Exchange (Tadawul) for the years ranging from 2013 to 2019. The data were collected manually from the annual reports of the companies as depicted in Table 1.

**Table 1**

*Sample Selection from 2013 to 2019*

Companies	Totals
Total listed companies	5 firms
Number of years observed	7 years
Total observation	35
Missing data	(14)
Final sample	21

### 2.2 Regression model and definition of variables

Ordinary-Least Square OLS regression is used to estimate the associations between DIO and firm performance of energy listed companies in Saudi Arabia for the period ranging from 2013 to 2019. The functional equation of the OLS model is as follows:

$$ROA = \beta_0 + \beta_1 DIO + \beta_2 FSIZE + \beta_3 LEV + e \quad (1)$$

$$ROE = \beta_0 + \beta_1 DIO + \beta_2 FSIZE + \beta_3 LEV + e \quad (2)$$

where *ROA* and *ROE* are the dependent variables and represent Return on Assets and Return on Equities, respectively. In addition, *DIO*, *FSIZE* and *LEV* are Days of Inventory Outstanding,  $\text{Log}_{10}$  of total assets and Total assets/total liabilities, respectively. Finally, *e* represents error term.

### 3. Results and discussions

#### 3.1 Summary statistics

Table 2 predicts the mean, standard deviation, minimum and maximum of each variable in the sample data set.

**Table 2**

*Descriptive statistics*

<b>Panel A: Independent variables</b>				
<b>Continuous Variables</b>	<b>Mean</b>	<b>Std.Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
DIO	20	12	4	37
FSIZE	12083001698	20639349496	228699	74029648000
LEV	10.154	18.931	.000	65.890
<b>Panel B: Dependent variable</b>				
ROA	1.9189	3.923	-3.360-	12.560
ROE	2.624	7.635	-16.77-	23.25

In Table 2; panel A shows that the mean of the days' inventory outstanding *DIO* is 20 days and the range is between 4 and 37 days with a standard deviation of 12. The average of the firm size *FSIZE* is S.R 12083001698 and it ranges from S.R 228699 to S.R 74029648000 with a standard deviation of 20639349496. As for the leverage *LEV*, the average is 10.154 and it ranges from .000 to 65.890 with a standard deviation of 7.635. In Table 2; panel B illustrates that the mean of the *ROA* is 1.9189 and it ranges from -3.360 to 12.560 with a standard deviation of 3.923. As for the *ROE*, the average is 2.624 and it ranges from -16.77 to 23.25 with a standard deviation of 7.635.

#### 3.2 Correlation analysis

As for the Variance Inflation Factor (VIF), Table 3 reports the results as follows:

**Table 3**

Variance Inflation Factor (VIF)

<b>Variables</b>	<b>Tolerance</b>	<b>VIF</b>
DIO	.269	3.718
FSIZ	.154	6.481
LEV	.374	2.674

Table 3 illustrates that the largest VIF value belongs to the firm size *FSIZE* which is 6.481, implying that the sample has no multicollinearity, since none of the VIF values is up to 10 (Hair et al., 2006).

#### 3.3 Regression results and discussions

For the purpose of examining the association between *DIO* and firm performance, Ordinary-Least Square (OLS) was utilized. As shown by Tables 4 and 5, the  $R^{2s}$  for the Models 1 and 2 are .823 and .591, respectively. This implies that Model 1 has explained 82.3% and Model 1b has explained 59.1% of the total variance in the firm economic value.

**Table 4**

Model Summary – Model 1- ROA

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.922	.849	.823	.251

**Table 5**

Model Summary – Model 2- ROE

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.808	.653	.591	.375

Tables 6 and 7 depict that the *F*-values for the Models 1 and 2 were statistically significant at the 1% level which means that the overall models can be interpreted.

Table 6

ANOVA Analysis – Model 1- ROA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.052	3	2.017	31.979	.000
	Residual	1.072	17	.063		
	Total	7.125	20			

**Table 7**

ANOVA Analysis – Model 2-ROE

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.500	3	1.500	10.642	.000
	Residual	2.396	17	.141		
	Total	6.897	20			

Tables 8 and 9 display the Pooled OLS regression results. Tables 8 and 9 show that there is a significantly negative association between *DIO* and ROA ( $\beta = -.666$ ,  $t = -3.673$ ,  $P = .002$ , one-tailed significance). This result demonstrates that the largest the *DIO* value, the lower the firm's performance. Therefore, hypothesis  $H_1$  is supported.

**Table 8**

Pooled OLS regression – Model 1- ROA

Variables	Expected sign	Coeff.	<i>t</i>	<i>p</i> -value	Tolerance	VIF
(Constant)			5.083	.000		
<b>Test variable</b>						
<i>DIO</i>	-	-.666	-3.673	.002	.269	3.718
<b>Control variables</b>						
<i>FSIZE</i>		.217	.906	.377	.174	6.481
<i>LEV</i>		-.616	-4.006	.001	.374	2.674

**Table 9**

Pooled OLS regression – Model 2- ROE

Variables	Expected sign	Coeff.	<i>t</i>	<i>p</i> -value	Tolerance	VIF
(Constant)			2.833	.011		
<b>Test variable</b>						
<i>DIO</i>	-	-.700	.021	.021	.269	3.718
<b>Control variables</b>						
<i>FSIZE</i>		.252	.694	.497	.174	6.481
<i>LEV</i>		-.481	-2.058	.055	.374	2.674

Tables 8 and 9 display a significantly negative association between *DIO* and ROE ( $\beta = -.700$ ,  $t = -.021$ ,  $P = .021$ , one-tailed significance). This result demonstrates that the largest the *DIO* value, the lower the firm's performance. Therefore, hypothesis  $H_2$  is accepted. These results indicate that the energy companies incorporating in Saudi Arabia were not been able to translate their inventory into sales quickly and were keeping obsolete inventory.

#### 4. Conclusions and implications

The study was an assessment of the impact of improving the days of inventory outstanding against the performance of a company. The focus of the study was on energy companies within Saudi Arabia. From the region, a total of 21 companies was identified with 21 companies' participants involved and their databases were examined from 2013 until 2019. Based on a Pooled OLS Regression analysis, it was identified that DIO has a negative relationship with the company's financial performance. As such, from the results, it is possible to conclude that energy companies within the said region are expected to make significant improvements for their inventory management by implementing various techniques. Some of the techniques include establishing proper planning and forecasting strategies for inventory, developing innovative marketing strategies, improving the pricing strategies, establishing the best product mix, and at the same targeting the top-selling products.

In the process of conducting the study, some limitations were noted. The model employed for the study has been limited to Saudi Arabia, however, it can also be applied in another GCC and Middle East nations to establish for validity. In fact, it can help to discover several opportunities by considering the corporate governance and firm-level characteristics such as the influence of the board of directors' characteristics and ownership structures. In fact, using the model to expand research to this evidence base can provide financial experts, investors, account regulators and companies among other stakeholders with an in-depth insight of the associations between DIO and a company's performance.

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