

## Panel Data Approach of the Firm's Value Determinants: Evidence from the Jordanian Industrial Firms

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### Abstract

This study aimed to investigate the main determinants of the industrial firms' value in developing countries namely Jordan. To achieve this goal all 77 ASE listed industrial firms for the period from 2000 to 2014 were utilized resulting in 974 firm-year observations. Twelve firm specific variables, namely, firm's size; firm's age; firm's risk level; firm's sales revenue; firm's operating cost; firm's tax rate; firm's net margin; firm's capital expenditure; firm's book value; firm's earning per share; firm's dividend per share and firm's pay-out ratio, were tested as a possible determinates of the firm's value. After testing for Multicollinearity and Heteroscedasticity the result of the unbalanced panel data Multi-regression model approach shows that the joint effect of the twelve potential determinants interprets about 37% of the variation in the value of the Jordanian industrial firms listed at ASE (R-squares = 0.3682), therefore, firm's in developing countries like Jordan should concentrate on these specific variables of the firms in order to improve the value and thus the wealth of the shareholders .

Another finding of the study is that the firm's risk level and tax rate are not statistically significant drivers of the Jordanian industrial firm's value. The findings of the effect of firm's risk level and tax rate on the firm's value were contrary with Tiwari Ranjit et al (2015) and Rappaport (1998) respectively.

**Keyword:** panel data approach, firm value, Jordan

### 1. Introduction

Fund is considered as one of the most significant limited resources .In order to have these sources, firms shall market their selves on the investors individuals who are considered as net supplier of funds ,and within this context firms have the ability to create the value and increase the wealth of stakeholders.

Companies are considered favorable by investors, and therefore, if the firm was able to specify the variables that have a significant impact on the market value of the firm, it can positively affect shareholders' wealth through efficient management of these variables. This result is consistent with the view that the priority of corporate managers is to maximize the wealth of stakeholders (Rappaport (1986), Black et al. (2001), Chandra (2011).

Empirical evidence to measure and determine the determinants that affect the value of the firm and therefore Shareholders' wealth are not only few in developing countries, but are also with different results.

Therefore, the question that the study seeks to answer is: What are the determinants of the firm's value of the Jordanian Industrial Firms listed at ASE?

Given the importance of the subject to determine the firm's value, many researchers make great efforts to identify determinants of firm value and their nature that affects the firm. Despite these efforts, but there is no consensus so far on these determinants nor the nature of its impact on firms, in addition to that the empirical research on developing countries are few when compared to the developed countries what highlights the importance of the current study from being an attempt to bridge the gap in research on the determinants of the firms value in developing countries, specifically Jordan.

This study seeks to achieve several objectives, the most important are to analyze the expected determinants of the value of Jordanian industrial firms listed at Amman Stock Exchange (ASE) during the period between 2000 to 2014. The current study aims to determine the determinants that must be considered by firms' departments being determinants that mainly affect the firms' value and thus the wealth of the Shareholders. The current study

also seeks to bridge the gap in studies that seek to identify the determinants of firms' value in developing countries, specifically Jordan as one of the most growth and development developing country in the field of capital markets.

This study is based on the approaches of previous studies to conduct a comprehensive analysis of the determinants of the value of industrial firms listed at Amman Stock Exchange (ASE) during the period 2000-2014.

During the analysis of the determinants of the value of the firms listed at Amman Stock Exchange (ASE), the current study will focus on historical and experimental facts for the study of the relationship between the value and potential determinants.

Accordingly, to achieve the goals of the study, the null hypothesis that the study seeks to test can be formulated as follows:

$H_0$ : There is no statistically significant joint effect of the potential determinants *on the Jordanian industrial firms' value listed at ASE*.

## 2. Literature Review

Value determinants are the variables that might affect the value creation of a firm. The value determinants have been generally categorized into two dimensions. The first is grounded on the inside and outer perspectives. Inside worth determinants are variables identifying with the characteristic execution of the firm, while outer determinants are variables identifying with the large scale monetary environment. The second measurement is in type of qualitative and quantitative components of value determinants. Quantitative value determinants are variables concerned with the pool and analysis of data in numeric form, while qualitative value determinants raises images based on some quality or characteristic of the firm. Qualitative value determinants do have an important influence on firm's value but unfortunately, information on these qualitative determinants is naturally not existing and if available, its influence on value is hard to measure for its non-quantifiable nature Gross (2006).

Baye (2006) has defined firm's value as the current value of currently expected future net cash flow and according the following equation:

$$\text{Firms value} = CF_0 + \frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \dots + \frac{CF_T}{(1+k)^T} \quad (1)$$

Where  $CF_T$  = expected net cash flow at time T;  $T = 0, 1, 2, \dots, T$ ;  $k$  = discount rate.

Gold (2003) has concluded that although the equation gives good results for the firm's value, but accurate information on future net cash flows of the firm it should be available to be valued accurately, and since the life span of a firm may extend to infinity, it is no longer feasible to predict the value of net cash flows until infinity, as well as to predict the firm's value. Accordingly, Gold (2003) has concluded the possibility of the use of constant growth model to determine the fair share price and thus the firm's value according to the following equation:

$$P_0 = \frac{D_1}{k-g} \quad \dots \dots \dots \quad (2)$$

Where  $P_0$  = Stock price at time zero;  $D_1$  cash dividend at time 1;  $k$  = discount rate or the required return on the stock;  $g$  the growth rate in dividends; knowing that  $k$  should be  $>g$ .

Some of the studies have focused on examining the potential impact of past profits on the firm's ability to achieve future earnings and growth in the value of shareholder's equity, and thus the firm's value. Other studies, such as (Mancinelli & Ozkan, 2006), have focused on the impact of profitability and leverage on firm's value.

Michaely and Roberts (2007) have concluded that since the profits generated by the firm have an impact on share prices and the growth of the firm, any determinant that affects dividend pay-out ratio will have an automatic impact on the firm's share price and thus the firm's value, and the analysis and identification of these factors accurately are considered as the basis for appropriate action by firm. This is precisely the reason why Abdulrahman (2007) to say that the management of firms should carefully consider the various determinants and their impact before taking the dividend decision.

Kamunde, (2011) has carried out a study that aims at analyzing the determinants of firm's value in Kenya and which included earnings, operating costs and cost of capital, dividend payout and gearing ratio. This study has concluded that there was a significant negative effect of the dividend payout and gearing ratio on the firm's

value.

Gary et al. (2006) investigated the U.S. firms during the 90s and found that corporate venture capital was significantly related with Tobin's q a proxy of the firm's value.

The experimental results of the study carried out by Noor and Ayoub (2009) have concluded that corporate governance mechanisms play a role in influencing the firm's value in Malaysia. In spite of that board size and leadership structure affect the firm value for all companies but not all of the elements of corporate governance had a statistically significant effect, and the impact of the variables of corporate governance varies depending on the nature of the firm.

Samuel, et al. (2012) have carried out a study examining the impact of capital structure on the value of the firms listed in Ghana Stock Exchange (GSE) and concluded that in developing economies such as Ghana's economy, the capital structure and Long term debt had a statistically significant impact on the value of the firms under study.

Damodaran (2006) has concluded that individual characteristics of firm's such as cash flows, expected growth rate and discount rate are the determinants the most influential on the firm's value.

Kazlauskiene and Christauskas (2008) suggested that sorting of worth determinants is liable to the deterioration of company's quality built up by the strategy of discounted cash flows, due to the fact that all the elements that have an impact on the firm's value are included in the rates of free cash flows and discount rate. They have sort the determinants into five classification and proposed to set up the effect of determinants on association's worth through a basic system for economic factor analysis. Boyd (2010) built on his previous experiences recognized six elements value determinants include: management team, operating system, customer base, facilities and equipment's, growth strategy and financial controls. Boyd recommended that focusing on creating and improving each of these worth determinants will make esteem. Chandra (2011) has conceptualized the critical pedals that are existing to a firm to create value in a 'value octagon' that incorporates strategy and business model, capital allocation, strategic financial decisions, corporate risk management, and corporate governance.

### 3. Data and Methodology

#### 3.1 Data

All the needed data for this study were obtained from the official website of Amman Stock Exchange (ASE). We have taken all 77 ASE listed industrial firms for the period from 2000 to 2014. The result is 974 firm-year observations. Table 1 shows the potential determinants of the value of the Jordanian industrial companies listed at ASE, notation, and its expected impact based on the literature.

Table 1. Definition, notation and expected effect of potential determinants of the value of the Jordanian industrial companies listed at ASE

Variable	Description	notation	effect
Firm's Size	The nature logarithm of total assets of the firm.	SIZ	+
Firm's Age	The number of years firm has been engaged in exporting operations	AG	+
Firm's Risk	Beta the systematic risk which is the extent of the deviation between the firms and market returns.	BET	-
Sales Revenue	Income from sales of goods and services, minus the cost associated with the sales.	SR	+
Operating Cost	The expenses which are related to the operation of a firm. They are the cost of resources used by an organization just to maintain its existence.	OC	-
Tax Rate	Income tax rate of the firm	TR	-
Net Margin	The ratio of net profits to revenues	NM	+

		expressed as a percentage that shows how much of each dollar earned by the company is translated into profits.		
Capital Expenditure		The nature logarithm of the use of funds in order to obtain physical assets that is to be used for productive purposes.	CE	+
Book Value		The theoretical value obtained by shareholders in the case of liquidating the firm.	BV	+
Earnings per share	per	The amount of money each share of stock would receive if all of the profits were distributed to the outstanding shares at the end of the year.	EPS	+
Dividend per share	per	The annual dividends paid divided by the number of shares outstanding.	DPS	+
Pay-out ratio		The percentage of net income that a company pays out as dividends to common shareholders.	POR	-

### 3.2 Methodology

This study adopted the multi-regression model for unbalanced panel data approach, the unbalanced panel regression model can be specified as:

$$FV_{it} = \alpha + \beta_1 SIZ_{it} + \beta_2 AG_{it} + \beta_3 BET_{it} + \beta_4 SR_{it} + \beta_5 OC_{it} + \beta_6 TR_{it} + \beta_7 NM_{it} + \beta_8 CE_{it} + \beta_9 BV_{it} + \beta_{10} EPS_{it} + \beta_{11} DPS_{it} + \beta_{12} POR_{it} + \varepsilon \quad (3)$$

Where:  $FV$  is the market price per share a proxy of the firm's value;  $i$  and  $t$  are the  $i^{th}$  cross-sectional firm at  $t^{th}$  period where  $i = 1, 2, 3, \dots, 77$  and  $t = 1, 2, 3, \dots, 15$ ;  $\alpha$  is a constant term;  $\beta^{s}$  the slope coefficients to be estimated;  $SIZ$  is the firm's size;  $AG$  is the firm's age;  $BET$  is the firm's risk level;  $SR$  is the firm's sales revenue;  $OC$  is the firm's operating cost;  $TR$  is the firm's tax rate;  $NM$  is the firm's net margin;  $CE$  is the firm's capital expenditure;  $BV$  is the firm's book value;  $EPS$  is the firm's earning per share;  $DPS$  is the firm's dividend per share;  $POR$  is the firm's pay-out ratio;  $\varepsilon$  is the random error.

## 4. Empirical Results

### 4.1 Diagnostic test of Parametric Data

#### 4.1.1 Multicollinearity

Multicollinearity is the case in which two or more factors in the multi-regression model are highly correlated, meaning that one can be linearly estimated depending on the others with a significant amount of correctness. As a result the slope coefficient of the multi-regression could change unsteadily in reply to small changes in the model or the data. Variance Inflation Factors (VIF) is a proxy of Multicollinearity. Most of the time researchers crave low value of VIF since higher estimations of VIF are considered to unfavorably distress the outcomes of the regression analysis. The VIF values presented in table 2 shows that the data does not suffer from Multicollinearity as the values are  $< 5$  as it suggested that the VIF values should not be  $> 5$  else data will be considered to be multicollinear.

Table 2. Results of Multicollinearity

Firm's Size	SIZ	1.15
Firm's Age	AG	1.28
Firm's Risk	BET	1.59
Sales Revenue	SR	1.49
Operating Cost	OC	1.13

Tax Rate	TR	1.06
Net Margin	NM	1.17
Capital Expenditure	CE	1.79
Book Value	BV	2.04
Earnings per share	EPS	1.89
Dividend per share	DPS	1.74
Pay-out ratio	POR	1.09
Mean VIF		1.45

#### 4.1.2 Heteroscedasticity

A pool of random variables is heteroscedastic if there are sub-populations that have not the same variabilities from others. Therefore Heteroscedasticity is the lack of homoscedasticity. The presence of Heteroscedasticity is a main fear in the application of regression analysis, as it can overturn statistical tests of significance that assume that the modeling errors are uncorrelated and uniform. For example, while the ordinary least squares estimator is still unbiased in the existence of Heteroscedasticity, it is inefficient due to the fact that the true variance and covariance are undervalued. Using the Modified Wald Test, Heteroscedasticity test was applied in order to test whether the error terms are correlated across observation in the data. The null hypothesis which stated that the data does not suffer from Heteroscedasticity was fail to reject at p-value < 0.05 since the reported value (0.00148) is way less than the critical value.

#### 4.2 Regression Results

The results of the unbalanced panel data approach regression model are presented in Table 3. The results show that the joint impact of the twelve potential determinants interpret about 37% of the variation in the value of the Jordanian industrial firms listed at ASE as the Adj. R-squares is 0.3682, which indicate that about 63% of the variation in the value of these firms is due to other determinants not part of the study. Though, the F-value of 73.06 is statistically significant at p-value = 0.000 which indicate that at least one of the potential determinants tested in this study has a significant effect on the Jordanian industrial firms' value listed at ASE. Thus, we reject the null hypothesis which states that there is no statistically significant joint effect of the potential determinants on the Jordanian industrial firms' value listed at ASE.

Table 3. Results of the unbalanced panel data approach regression model

Variable	$\beta$	t- value
$\alpha$	11.235	1.257
SIZ	0.727*	1.701
AG	1.400*	1.692
BET	-2.562	1.314
SR	0.028***	4.125
OC	-0.217***	2.758
TR	-0.853	0.254
NM	0.289**	1.851
CE	0.004*	1.617
BV	0.709**	2.198
EPS	3.034**	1.845
DPS	9.106**	1.947
POR	-0.323*	1.697

<i>df</i>	<i>Regression</i>	12
	<i>Residual</i>	961
	<i>Total</i>	973
	<i>R-Square</i>	0.367
	<i>Adjusted R2</i>	0.3682
	<i>F-value</i>	73.06
	<i>p-value</i>	0.000
	<i>N.</i>	974

Where; \*\*\*,\*\* and\* indicate significant at 1%, 5% and 10% respectively;  $\alpha$  is a constant term;  $\beta$ 's the slope coefficients to be estimated; SIZ is the firm's size; AG is the firm's age; BET is the firm's risk level; SR is the firm's sales revenue; OC is the firm's operating cost; TR is the firm's tax rate; NM is the firm's net margin; CE is the firm's capital expenditure; BV is the firm's book value; EPS is the firm's earning per share; DPS is the firm's dividend per share; POR is the firm's pay-out ratio; t test critical value for 1%, 5%, and 10% are 2.680, 1.782, and 1.356 respectively.

While all determinants have had the theoretically expected signs, results in table 3 shows that not all the determinants have statistically significant impact on the value.

## 5. Conclusions

This study aimed to investigate the main significant determinants of the industrial firms' value in developing countries namely Jordan. To achieve this goal all 77 ASE listed industrial firms for the period from 2000 to 2014 were utilized resulting in 974 firm-year observations. Twelve firm specific variables, namely, firm's size; firm's age; firm's risk level; firm's sales revenue; firm's operating cost; firm's tax rate; firm's net margin; firm's capital expenditure; firm's book value; firm's earning per share; firm's dividend per share and firm's pay-out ratio, were tested as a possible determinates of the firm's value. After testing for Multicollinearity and Heteroscedasticity the result of the unbalanced panel data Multi-regression model approach shows that firm's size; firm's age; firm's sales revenue; firm's operating cost; firm's net margin; firm's capital expenditure; firm's book value; firm's earning per share; firm's dividend per share and firm's pay-out ratio, have a statistically significant impact on the value of the Jordanian industrial firms listed at ASE. Thus, these variables are considered drivers of the value of the Jordanian industrial firms. This result is consistent with the results of (Wright and Davies (2001), Baye (2006) and Samuel et al (2013)).

Results also shows that the joint effect of the twelve potential determinants interprets about 37% of the variation in the value of the Jordanian industrial firms listed at ASE (R-squares = 0.3682), therefore, firm's in developing countries like Jordan should concentrate on these specific variables of the firms in order to improve the value and thus the wealth of the shareholders.

Another finding of the study is that the firm's risk level and tax rate are not statistically significant drivers of the Jordanian industrial firm's value. The findings of the effect of firm's risk level and tax rate on the firm's value were contrary with Tiwari Ranjit et al (2015) and Rappaport (1998) respectively.

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