FACTORS AFFECTING PRICE TO EARNINGS RATIO (P/E): EVIDENCE FROM THE EMERGING MARKET

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Abstract

The purpose of this study is to investigate the factors that have an impact on price to earnings (P/E) ratios in Jordanian industrial public shareholding companies listed on the Amman Stock Exchange and to help investors determine their investment value by using P/E ratio. The study also aims to help stock issuers with pricing initial public offers using a more scientific model base.

In Jordan, only few studies have investigated the factors that affect the P/E ratio in the industrial sector. Therefore, this study contributes significantly to the limited literature on this topic in relation to developing countries. For this purpose, we used a quantitative approach to study data for the whole study population, which consists of sixty firms, during the period 2011–2016. Data on variables were collected over the 2011–2016 period from annual financial reports of industrial companies; market capitalization data were collected from the Amman Stock Exchange; and interest rate data were collected from the Central Bank of Jordan.

An empirical study was conducted using panel data regression analyses random effects model to examine the effects of dividend payout ratio, market capitalization (which is a proxy for firm size), leverage ratio, interest rate, and annual growth rate of companies' net income (a proxy for growth rate) on P/E ratio.

This study found that there is a significant positive impact of dividend payout ratio and size on P/E ratio, whereas leverage, earnings growth, and interest rate have no impact on P/E ratio.

These results imply that an increase in dividends and large firm size is required to attract investors' attention and increase their confidence about choosing such firms in their portfolios.

Keywords: P/E, Industrial Companies, Jordan, Dividend Payout, Size, Leverage, Interest Rate, Earnings Growth

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1. INTRODUCTION

Price to earnings (P/E) ratio is vital because it is significantly connected to equity prices. P/E ratio has long been a prevalent area of research interest to academics, relevant research have existed since at least Graham and Dodd (1934), Gordon and Shapiro, (1956), Gordon (1962).

P/E ratio demonstrates how much investors are eager to pay per dollar of stock profits. This is why it is known as the multiple of a stock. It has long been considered one of the most useful common financial parameters for assessing the value of both stock markets and company shares. Financial Analysts utilize this ratio as a tool when valuing and pricing new issued stocks in initial public offerings (IPOs).

P/E ratio measures the current market value of a firm's stock in relation to its earnings, which can be used as a comparison tool between entities and as a measurement tool to compare entities'

performance relative to others. Moreover, it is used in predicting future growth opportunities because a low P/E ratio proposes that share investors are predicting greater net income rise within the subsequent few financial periods, whereas companies with a higher P/E ratio are expecting smaller earnings increase (Gottwald, 2012). Indeed, a firm with a low P/E implies either a firm is currently having underestimated value, or that it is working outstandingly well compares to its previous trends (Goodman & Peavy III, 1986).

With respect to Jordan, Table 1 and Figure 1 below present the yearly average P/E ratio for the publicly listed companies on the Amman Stock Exchange for the years 2004–2016.

Table 1 and Figure 1 demonstrate that the average P/E ratio for Jordanian companies has moved up and down over the last 13 years. P/E ratio reached the maximum (44.203) in 2005 and started fluctuating and dramatically dropped to reach the minimum (14.028) in 2015. Then, in 2016, P/E increased by 17.9% compared to 2015 to reach 16.55. One more fact to be observed from the above table and figure is that when the market P/E ratio is comparatively high, this does not indicate that the good performance period will go on forever, and when it is low, this does not imply that the poor trend will go on forever (French & Poterba, 1991).

This study investigated factors that may drive P/E ratio for industrial companies publicly listed on the Amman Stock Exchange during the period 2011–2016 using panel regression test.

Table 1. Yearly average P/E ratio of Jordanian companies from 2004 to 2016

Year	*P/E Ratio*
2004	31.108
2005	44.203
2006	16.747
2007	27.986
2008	18.820
2009	14.363
2010	26.345
2011	22.564
2012	15.575
2013	14.742
2014	15.307
2015	14.028
2016	16.550

**Source: Amman Stock Exchange 2016 annual reports*

Figure 1. The average P/E ratio of Jordanian companies from 2004 to 2016

The study's significance arises from the increasingly important role the P/E ratio play as an indicator of the financial performance of the Jordanian capital market shares particularly industrial sector, and consecutively the significant function in enhancing emerging economies specifically in Jordan. Accordingly, the outcomes of this study are proposed to help investors get real insights for taking effective and rational decisions in the stock market. Additionally, the results can be used as a foundation for other applied researches in the same area and can help in adding benefit to this field. Finally, the current study will identify the effect of dividend payout ratio, market capitalization (which is a proxy for firm size), leverage ratio, interest rate, and annual growth rates for companies' net income (a proxy for growth rate) on P/E ratio for the Jordanian industrial sector.

As regarding the purpose of this study, the specific objectives of the study are as follows:

- To reveal the factors that affect P/E ratios for industrial public shareholding companies listed on the Amman stock exchange for the period 2011–2016.
- To determine the type of relationship that exists between the influencing factors and the P/E ratio for industrial public shareholding companies listed on the Amman stock exchange.
- To help investors judge their investment value by using P/E ratios and help stock issuers in pricing IPOs by relying on a more scientific model base.

2. THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

2.1. P/E ratio as a predictor of future returns

The concept of P/E ratio was first introduced by Graham and Dodd (1934) in their famous text, "Security Analysis." They view P/E ratios as an indicator of past performance and the future growth of companies (Graham, 1999). This was confirmed by Nicholson (1960) when he observed that companies that have low P/E ratio subsequently make a higher earning than higher P/E companies. This difference is known as the value premium.

2.2. Fundamental determining factor of P/E ratio

The Gordon constant dividend discount model has basically used by researchers to investigate the determinants that have an effect on P/E ratio. Theoretically, two different types of income flows are expected by shareholders: dividend distribution for those who hold the shares and projected capital gain when the investor sells the shares. P/E ratio can be stated as follows:

$$\text{P/E} = \text{stock price } (P_0)/\text{earnings per share } (\text{EPS}_1) \quad (1)$$

where P_0 may be denoted by a dividend discount model, $P_0 = D_1 / (r - g)$, and where D_1 represents the projected dividend distribution next year, r measures the amount of return requires by investors or the investor's discount rate, and g represent the growth rate of the estimated dividends. Following Brealey and Myers, P/E may be restated as follows:

$$P/E = \frac{P0}{EPS1} = \frac{D1}{EPS1} \times \frac{1}{r-g} \quad (2)$$

Thus, a company's P/E ratio relies upon the estimated dividends growth rate, the risk associated with the firm, which connected directly with the investors' required discount rate, and the payout ratio (D_1/EPS_1) the company can attain while still keeping the dividends growth rate forever. Therefore, the dividends discount model proposes that the P/E ratio is influenced by three key basic elements: payout ratio, the rate of return asked by investors, and the estimated dividends growth rate. Based on the above, the P/E ratio has a negative correlation with the rate of return and a positive correlated to payout ratio and expected dividends growth.

2.3. Other determining factor of P/E ratio

Besides the above mentioned basic factors, several researches identify a number of factors that affect P/E ratio such as dividend yield, net income growth, financial leverage ratio, companies market value (Market capitalization), Book-to-Market Ratio, risk free rate of investment, market risk premium, and investor sentiment (Chua et al., 2015; Sum, 2014).

According to Bagella et al. (2005) and Campbell (2000), several studies use the income per share yearly change rate as a substitute than the rate of growth for dividends to forecast stock valuation. In other words, the P/E ratio is positively associated with the growth rate of earnings.

As denoted by the dividends growth model, the investors required rate of return, represents one predominant component of that model. In that setting, and from the viewpoint of the capital asset pricing model (CAPM), that rate of return is divided into two elements: rate of return with zero risks and equity risk premium, and both have a negative impact on P/E ratio (Anderson & Brooks, 2006; Jain & Rosett, 2006; Amoako-Adu & Smith, 2002; Cho, 1994).

With regard to company size, Huang and Wirjanto (2011) and Anderson and Brooks (2006) argued that bigger companies usually have a larger P/E ratio causing institutional investors to invest in large firms.

Regarding financial leverage which is usually measured by total debt to total asset ratio, Beaver and Morse (1978), Ramcharran (2002), Arslan, Iltas and Kayhan (2017) confirmed that the more debt a business enterprise makes use of the greater financial distress cost will incur, consequently the greater leverage leads to an increase in the required rate of return by investors and declines P/E ratio.

As regards the growth opportunities as one of determining factors that impact the P/E ratio. Researchers frequently have used the market to book ratio to measure the growth opportunities. Those researchers confirmed that P/E ratio is positively associated with growth represented by the market to book ratio (Huang & Wirjanto, 2011; Basu, 1977; Gaver & Gaver, 1993).

Concerning dividend yield ratio, Kane et al. (1996) and Fama and French (1988) stated that higher dividend yield ratio leads to increases in the expected rate of return, which, consecutively, negatively impact and lower P/E ratio.

Finally, with regard to investor sentiment, Baker and Wurgler (2006) argued that if sever optimism pushes share prices beyond fundamental values, a harmonization should be kept between the duration of both the good investor feeling and the length of the excessive P/E ratios. Furthermore, (Rahman & Shamsuddin, 2019) found that after controlling for the effects of fundamental factors, the P/E ratio generally increases with an improvement in investor sentiment.

2.4. Previous studies

Some researchers have discussed the factors that influence firms' P/E ratio in developed countries. Fairfield (1994) investigated American data from 1970 to 1984 and confirmed that high P/E ratio is a good indicator to a high future earnings growth and is also a good indicator of future stock price.

In a more focused study on the determining factors of P/E ratio conducted by Loughlin (1996) using the American stock market S&P 500 index data for the periods spanning between 1968 to 1993, he found that there is a positive correlation between dividend payout ratio and future earnings growth rate from one facet and P/E ratio from another side.

Anderson and Brooks (2006) investigated the correlation between P/E ratio and stock returns for UK companies between 1975 and 2003 using regression analysis. They showed that the difference

in return between portfolios of low and high P/E ratios was doubled.

Regarding the effect of debt ratio on P/E ratio, Martin and Stanley (2006) found that increasing debt loads lead to only moderate valuation shifts in corporation performance. Thus, the existence of leverage can change firms' P/E ratios. The authors found that P/E ratios are always lower for firms with higher leverage ratios. This result was supported by Uddin and Alam (2007) and Mahmood and Zakaria (2007), who conducted research on the association between P/E ratio and capital structure in the construction sector in Malaysia. The authors found that increasing leverage ratio leads to a decline in P/E ratio because companies with high leverage tend to pay a higher amount of interest on debts, which in turn lowers the P/E ratio.

Johan and Fillip (2007) investigated the factors that affect P/E ratio. Their study was conducted on the Swedish market over the 1998–2007 period. The outcomes revealed that the debt to equity ratio and dividend yield have a negative effect on P/E ratio. At the same time, the company growth rate measured by market-to-book value is positively related to P/E ratio.

Wenjing (2008) confirmed that the payout ratio has a positive impact on P/E ratio. He argued that a higher dividend payout ratio leads to higher return and investors estimated share price will also increase, in turn, accordingly resulting in a higher P/E ratio. This result was supported by Sezgin (2010), who found a positive association between dividend yield and P/E ratio in a study conducted over the period 2000–2009 on the Istanbul Stock Exchange.

Nayaata (2009) studied the impact of capital structure and earnings growth on P/E ratio for the companies listed on the Nairobi stock market over the period 2002–2007. The study results showed that the earnings growth rate has a negative impact on P/E ratio and no association were found between P/E ratio and the capital structure of a firm.

Azam (2010) examined the factors influencing the P/E ratio for companies publicly traded on the Karachi Stock market for the period 2000–2008. The results showed that there is a positive impact for dividend payout ratio and earnings growth rate on P/E ratio. However, a negative relation was found between interest rate and P/E ratio.

In Pakistan, Afza and Tahir (2012) studied the influencing factors on P/E ratio for the publicly listed chemical firms listed on the Karachi stock exchange for the period 2005 to 2009. The study results showed that dividend payout ratio and growth opportunities have a positive effect on P/E ratio, which means that investors are more attracted to buy large investments in companies that pay greater dividends to their shareholders. Furthermore, the outcomes revealed that there is a negative impact of firm leverage is on P/E ratio, indicating that high leverage increases the distress cost, resulting in a lower P/E ratio. Finally, the study found a negative correlation between firms size and P/E ratio.

In Iran, Divanbeygi and Tehrani (2013) investigated the impact of growth rate and the payout ratio on P/E ratio for public shareholding companies traded on the Tehran Stock Exchange for the 2006–2010 period. The results showed that no association was found between payout ratio, growth rate, and expected P/E ratio. Regarding the historical P/E ratio the study outcomes indicated that also no correlation was found between growth rate and historical P/E. However, a significant relationship was found between the payout ratio and the historical P/E ratio.

In Indonesia, Lutfi and Arsitha (2016) investigated the factors affecting P/E ratio for firms registered in the Jakarta Islamic Index for the 2010-2013 period. The results showed that firm size negatively correlated to P/E ratio and that financial leverage positively related to P/E ratio, whereas dividend payout had no significant effect on P/E ratio.

In the United States, Krishnan and Chen (2017) studied the impact of dividend payout ratio on P/E ratio for all S&P Composite 1500 Index firms for the period from 1995 through 2016. The study results found that current-year payout ratio is significantly and positively associated with next-year P/E ratio for large firm size (measured by market capitalization) and is significantly negatively associated with next-period P/E ratio for large potential growth (measured by book-to-market ratio).

In Bangladesh, Dutta, Saha, and Das (2018) examined the determinants of P/E ratio for manufacturing public shareholding firms traded on the Dhaka share market for the 2011–2015 period. The study outcomes revealed that dividend yield ratio, financial leverage ratio, companies' size, and net asset per share are noticeably influenced P/E ratio. More specifically, he found that dividend yield and companies size have a negative impact and financial leverage and net asset per share have a positive impact on P/E ratio.

In a recent study in Indonesia, Sari and Hermuningsih (2018) studied the impact of financial leverage and foreign ownership on P/E ratio for non-financial firms traded on the Indonesia Stock market for the 2012–2016 period. The results showed that financial leverage with debt to equity as a proxy, foreign ownership, inflation, and firm size proportion have a significant positive effect on P/E ratio.

3. RESEARCH METHODOLOGY

3.1. Study population and sample

The population for this study consisted of all Jordanian publicly traded manufacturing companies listed on the Amman Stock Exchange for the 2011–2016 period. The sampling frame was the Companies Guide database maintained by the Amman Stock Exchange. The Amman Stock Exchange Companies Guide contains financial and corporate information on all Jordanian publicly trade and listed companies.

The reason for choosing this sector is that the industrial sector is the second largest sector in Jordan based on the number of listed firms on the Amman Stock Exchange. Further, according to the Companies Guide for 2016, which is available on the Amman Stock Exchange website, the cumulative total assets of industrial firms was 3,783,628,444 JD. The traded volume for this sector in 2016 was 701,859,524.41 JD, and the market capitalization was 3,530,527,171 JD.

Each company (to be included in the sample) had to meet the following criteria: first, its accounting information needed to be available to compute the study variables, and second, the company stock had to be listed on the Amman Stock Exchange for the duration of the study period. Third, the company could not be involved in a merger or acquisition during the study period. The final number of companies that met the above conditions and could, therefore, be included in the analysis came to 60.

Industrial public shareholding companies are a part of ten sub-sector industries (Table 2).

Table 2. Final sample classified by industry sub-sector

Sub-sector name	*No. of companies*	*Number of observations*	*Percentage of the sample*	*Cum. (%)*
Chemical	8	48	13.33	13.33
Electrical	4	24	6.67	20
Engineering and construction	6	36	10	30
Food and beverages	10	60	16.67	46.67
Mining and extraction	15	90	25	71.67
Paper and cardboard	2	12	3.33	75
Pharmaceutical and medical	6	36	10	85
Textiles, leathers, and clothing	6	36	10	95
Tobacco and cigarettes	2	12	3.33	98.33
Printing and packaging	1	6	1.67	100
Total	60	360	100%	

3.2 Collection of primary data

Data that were necessary to compute P/E ratio and other ratios constituting the independent variables were collected over the 2011–2016 period from annual financial reports of industrial companies; market capitalization data were collected from the Amman Stock Exchange, and interest rate data were collected from the Central Bank of Jordan. A range of statistical tests available in the Stata statistical software package was used to analyze the collected data.

3.3. Study hypotheses

Based on the above literature review and on other previous studies, and for the purpose of this study, the following hypotheses were proposed:

H1: There is a significant relationship between dividend payout ratio and P/E ratio for Jordanian industrial public shareholding companies.

H2: There is a significant relationship between financial leverage ratio and P/E ratio for Jordanian industrial public shareholding companies.

H3: There is a significant relationship between interest rate and P/E ratio for Jordanian industrial public shareholding companies.

H4: There is a significant relationship between earnings growth and P/E ratio for Jordanian industrial public shareholding companies.

H5: There is a significant relationship between size and P/E ratio for Jordanian industrial public shareholding companies.

3.4. Panel data regression model

This study is based on a variety of factors that influence P/E ratio. P/E ratio is the widest valuation method used to value a company's stock and thus enable us to compare entities of different sizes that operate in different industries. This study used panel data regression analysis. Different variables were analyzed to determine their effect on P/E ratio. The study used five factors about which it was possible to gather information. The chosen variables had two characteristics: the first set of characteristics consisted of macro variables and the second set of characteristics consisted of corporate-specific ones.

These independent variables were dividend payout ratio, size, leverage, interest rate, and growth rate. P/E ratio was the dependent variable. We used the panel data regression model to testify the relation between these variables and the P/E ratio. The purpose of using panel data regression is that our data were collected over time and from the same companies.

To use the panel data model, we had to run the Hausman test to determine which model to use to determine fixed effect or random effect and to explore the fundamental determinants of P/E ratio. The fixed effect model can be represented by the following equation:

$$(PE)_{it} = \alpha_i + \beta_1 DP_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 Int_{it} + \beta_5 E\_Growth_{it} + e \quad (3)$$

where, I = 1……N;
t = 1……T

In the fixed effects model, the intercepts αi, 1…N were constant coefficients specific to each respective company, and this intercept was time invariant.

The random effect model can be represented by the following equation:

$$(PE)_{it} = \alpha_i + \beta_1 DP_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 Int_{it} + \beta_5 E\_Growth_{it} + u_{it} \quad (4)$$

where, I = 1……N;
t = 1……T

In the random effects model, the αi were treated as random variables rather than fixed constants. The α_i were assumed to be independent of the errors $u_{it.}$

3.5. Description of study variables

3.5.1. Dividend payout ratio (DP)

Corporation net income is divided into two elements distributed to shareholders and retained by the company. The distributed portion by the corporation

to its investors is referred to as the dividend. For this study, the dividend payout ratio was measured by dividing the total distribution by net income. The Gordon constant growth dividend discount model (1962) has been used by various studies as a framework to investigate and study the association between dividend payout ratio and P/E ratio. These studies concluded that P/E ratio is positively associated with dividend payout ratio (Cho, 1994; Kane et al., 1996; Loughlin, 1996; Ramcharran, 2002; Anderson & Brooks, 2006; Wenjing 2008; Azam, 2010; Huang & Wirjanto, 2011; Afza & Tahir 2012). This is consistent with the Gordon model as one of the key influencing parameters in P/E ratio. At the same time, a significant negative relationship was found in other studies such as Johan and Fillip (2007), and no relation was found in Lutfi and Arsitha (2016).

3.5.2. Financial leverage (Lev)

Leverage is the amount of obligation a company makes use of to finance its assets. Therefore, it represents a company-specific factor. In this study, this variable was expressed as a debt to asset ratio. According to Martin and Stanley (2006), Mahmood and Zakaria (2007), Johan and Fillip (2007), Afza and Tahir (2012), P/E ratio is usually lower in firms with a higher leverage ratio, which indicates a negative relation between leverage and P/E ratio. However, Lutfi and Arsitha (2016) showed that the debt to equity ratio significantly correlated positively to P/E ratio.

3.5.3. Interest rate (Int)

The interest rate is an important macroeconomic variable, which was denoted by governmental T-bond rates that have a maturity period of twelve months (Jordanian Treasury Bill 12 months). According to Gacheri (2014), the cost of serving the debt will be higher as the interest rate increases and consecutively reduce corporation net income and the distribution it pays shareholders. As a result, a company's stock price may fall, resulting in a lower P/E ratio.

A negative relationship between interest rate and P/E was found in several studies (Uddin & Alam, 2007; Mahmood & Zakaria, 2007; Azam, 2010; Gacheri, 2014).

3.5.4. Earnings growth (E_Growth)

Earnings growth is the net income yearly change rate. It is proposed that the higher the earnings growth, the greater will be the share prices and the higher the P/E ratio. Previous studies showed that growth rate has a significant positive impact on P/E ratio (Loughlin, 1996; Azam, 2010; Afza & Tahir, 2012; Johan & Fillip, 2007). At the same time, a significant negative relationship was found in Nayaata (2009), and no relation was found in Divanbeygi and Tehrani (2013).

3.5.5. Size, market capitalization (Size)

The size of the company should be one of the major driving factors in P/E ratio. For the purpose of this study, we used market capitalization of companies to represent their size (Krishnan & Chen, 2017). The relationship between P/E ratio and size is positive, where investors expect large companies to generate more cash flow and therefore a high P/E ratio. Regarding company size, Huang and Wirjanto (2011) and Anderson and Brooks (2006) argued that larger firms usually have a higher P/E ratio where institutional investors invest in large firms.

The variables and their symbols and the methods to measure each variable are shown in Table 3.

Table 3. Research variables and their measurements

Variables	*Symbol*	*Measurements*
Dependent variable		
P/E ratio	*PE_Ratio*	Share price/earnings per share
Independent variables		
Dividend payout ratio	*DP*	Dividends per share/earnings per share
Size, market value	*Size*	Natural logarithm of the company market capitalization
Financial leverage	*LEV*	Total debt/total assets
Interest rate	*Int*	Interest paid on Treasury Bill 12 months (governmental bond).
Growth rate	*E_Growth*	Average annual growth rates for the company's net income

4. RESULTS AND DISCUSSION

4.1. Descriptive statistics and correlation coefficients

Table 4 reports the descriptive statistics of all the variables, including the number of observation, mean value, and standard deviation. P/E ratio shows a mean value of 30.54% and high standard deviation of 303.14. Earnings growth has the highest standard deviation (994.75), which indicates high volatility. Interest has the lowest standard deviation among all the variables. This indicates that the treasury interest rate during the study period was around the average (3.66), indicating minimum volatility. Leverage has a mean of 37.53%, which implies that the companies did not rely heavily on debt to finance their assets. The earnings growth shows a negative means, which implies the company's performance during the study period was unhealthy. Finally, firm size on average was 16.28, with a standard deviation of 1.49.

Table 4. Descriptive statistics

Variable	*Obs*	*Mean*	*Std. Dev.*
PE_Ratio	360	30.54	303.14
DP	360	60.09	364.41
LEV	360	37.53	27.78
Int	360	3.66	1.36
E_Growth	360	-72.49	994.75
Size	360	16.28	1.49

Correlation evaluation was once carried out to take a look at the relationship amongst all the variables over the 2011–2016 period. Table 5 affords the correlation coefficients; it suggests that there used to be no multicollinearity in the data because all variables had a correlation coefficient value of less than 0.27. The table further suggests that the P/E ratios of industrial corporations have been positively associated with firms' income growth, dividend payout ratio, financial leverage, and firms size, whereas they were negatively associated with interest. The table indicates the largest significant positive association was found between payout ratio and P/E ratio, indicating that high payout ratio raises investors' self-belief to buy shares and invest in Jordanian industrial sector firms.

Table 5. Correlation matrix

	PE_Ratio	*DP*	*LEV*	*Int*	*E_Growth*	*Size*
PE_Ratio	1.000					
DP	0.273	1.000				
LEV	0.050	-0.034	1.000			
Int	- 0.024	0.131	-0.030	1.000		
E_Growth	0.014	0.018	-0.012	0.0605	1.000	
Size	0.093	0.074	-0.171	0.001	-0.082	1.000

4.2. Panel data regression fixed effects vs. random effects

The panel data regression model was utilized to determine the factors the explaining the P/E variations. The Hausman test usually runs to decide which model to use a fixed effect or random effect. The decision base is that; the fixed effects model is the appropriate model if the p-value is small, [less than 0.05], whereas the random effects are the preferred model if the p-value is large, [more than 0.05]. Table 6 presents the results of the Hausman test. The results of the Hausman test suggest that the *chi2* is (0.55), and the significance is (0.9903) which is greater than 0.5. Therefore the test results imply that the random effect model was the appropriate model for the study.

Table 6. The Hausman test

	Coefficients			
	(b) *(B)*		*(b-B)*	*sqrt(diag(V_b-V_B))*
	Fixed	*Random*	*Difference*	*S.E.*
DP	.223	.225	-0.002	0.018
LEV	.648	.798	-0.150	1.139
Int	-2.435	-2.360	-0.074	1.534
E_Growth	.006	.005	0.000	0.006
lnMkt_Cap	44.517	17.799	26.717	38.808
chi2(5)	0.55			
Prob>chi2	0.9903			

5. DISCUSSION

5.1. Hypotheses testing and discussion and evaluation of results

Table 7. Results of panel data regression for the industrial sector

R2: within	0.079	Number of obs.	360
R2: between	0.115	Number of groups	60
R2: overall	0.085	Wald chi2(5)	32.68
		Prob > chi2	0.000
	Coef.	***z***	***P>z***
DP	0.225*	5.25	0.000
LEV	0.798	1.35	0.177
Int	-2.360	-0.21	0.834
E_Growth	0.005	0.34	0.732
lnMkt_Cap (size)	17.799**	1.70	0.09
_cons	-293.725	-1.53	0.125

*Note: Significant levels, * P>0.01, ** P>0.1*

Panel data regression was used to measure the effect of dividend payout ratio, leverage, interest rate, earnings growth, and size on P/E ratio for industrial public shareholding companies.

Table 7 presents the regression results of using random effects panel data analysis, based on 360 observations for 60 companies in the industrial sector. The findings revealed that the model was efficient according to the Wald test. Therefore, the explanatory variables in the model were significant.

Table 7 indicates that the dividend payout ratio has a positive impact on P/E ratio and is found to be significant at the one percent level. Dividend payout coefficient value is 0.225, indicating that when industrial companies' dividend payout changes one unit, their P/E ratios will change by 0.225 units. Therefore, the research hypothesis was supported and confirmed that there is a positive relationship between dividend payout ratio and P/E ratio.

These results suggested that dividends payout are a significant determinant of the P/E ratio of industrial public shareholding companies in Jordan. Therefore, investors in Jordan are willing to pay high for companies that pay large dividends to their shareholders. This result is consistent with the Gordon constant dividend growth model and with the results of several studies (Loughlin, 1996; Wenjing, 2008; Azam, 2010; Afza & Tahir, 2012; Divanbeygi & Tehrani, 2013; Krishnan & Chen, 2017).

As for the impact of the independent variable size on P/E ratio, the natural logarithm of market capitalization was used to measure firms' size. The regression results indicate that firms' size has a positive impact on P/E ratio and is statistically significant at the ten percent level. The coefficient of the size is 17.799 positive and very high, indicating that when industrial companies' size changes one unit, their P/E ratios will change by 17.799 units. This result is supported theoretically because the denominator of P/E ratio is the major component for calculating market capitalization. Therefore, the research hypothesis was supported, which suggested that there is a positive relationship between the size of the company and P/E ratio. These results imply that investors in Jordan are more willing to invest in the shares of large and stable firms; therefore, investors may believe that large size firms may earn higher returns than small firms do. This result is consistent with Huang and Wirjanto (2011) and Anderson and Brooks (2006) and is inconsistent with Afza and Tahir (2012) and Dutta, Saha, and Das (2018).

Regarding the impact of leverage ratio on P/E ratio, the results showed that leverage has a positive impact on P/E ratio that is insignificant. Therefore, the research hypothesis was rejected, confirming that there was no relationship between the leverage ratio and P/E ratio. The results indicated that relying on debt has no impact on P/E ratio. This result is inconsistent with Beaver and Morse (1978), Ramcharran (2002), and Afza and Tahir (2012), who confirmed that higher leverage, as measured by debt to asset ratio, increases financial distress cost, thus resulting in a higher required rate of return and lower P/E ratio; with Martin and Stanley (2006), who claimed that P/E ratios are always lower for firms with higher leverage ratios; and with Uddin and Alam (2007) and Mahmood and Zakaria (2007), who proposed that companies with high leverage tend to pay a higher amount of interest on debts, which in turn lowers the P/E ratio. These results are also inconsistent with Lutfi and Arsitha (2016) and with Sari and Hermuningsih (2018), who found a positive impact of leverage on P/E ratio.

Regarding the impact of earnings growth on P/E ratio, the regression results indicate that there is a positive impact of earnings growth on P/E ratio that is insignificant. Accordingly, the research hypothesis was rejected, confirming that there is no relationship between earnings growth and P/E ratio. This result implies that earnings growth is not an imperative determinant of P/E ratio. The result agrees with Divanbeygi and Tehrani (2013) and is inconsistent with Gottwald (2012), who proposed that a low P/E ratio implies that investors are anticipating higher earnings growth within the next few years, whereas firms with a higher P/E are expecting lower growth. The result is also inconsistent with Loughlin, (1996), Azam (2010), Afza and Tahir (2012), and Johan and Fillip (2007), who found that there is a positive relationship between growth rate and P/E ratio; and with Nayaata (2009), who found a negative relationship between growth rate and P/E ratio.

Finally, regarding the impact of the independent variable interest rate on P/E ratio, the results revealed that the interest rate has a negative effect on P/E ratio that is insignificant. Consequently, the research hypothesis was rejected, confirming that there is no association between interest rate and P/E ratio. The results suggested that the interest rate is not a major determinant of P/E ratio. This result is inconsistent with many studies (Cho, 1994; Amoako-Adu & Smith, 2002; Anderson & Brooks, 2006; Jain & Rosett, 2006; Uddin & Alam, 2007; Mahmood & Zakaria, 2007; Azam, 2010; Gacheri, 2014), who found that interest rate negatively correlated with P/E ratio.

6. CONCLUSION

This study attempted to identify factors that have a direct impact and explain the P/E ratio volatility in Jordanian public shareholding companies to help investors judge their investment value using P/E ratios and help stock issuers in pricing IPOs using a more scientific model base.

The study results using panel data regression showed that dividend payout ratio and firms size significantly affect P/E ratio and that financial leverage, earnings growth, and interest rate have no impact on P/E ratio.

This study revealed that Dividend payout ratio was the most significant factor that explains the variations of P/E ratio, indicating that stock investors in Jordan are eager to pay high prices for corporation shares that used to distribute large dividends to their shareholders. At the same time, investors are more confident about investing in large-scale firms.

The study showed that earnings growth has no power to significantly interpret the P/E ratio fluctuations. It is reasonable to assume that the performance of Jordanian companies during the study period was unhealthy as a consequence of the Arab Spring. Jordan's international trade plummeted during these years. Regarding the interest rate, the descriptive statistics in Table 4 showed no fluctuations in the interest rate during the study period. Therefore, it is reasonable to presume that investors do not depend on the interest rate to influence their investment decisions. Finally, regarding leverage, again, the descriptive statistics in Table 4 showed that Jordanian firms do not heavily depend on debt to finance their assets. Therefore, the results did not show financial leverage as a significant explanatory factor for P/E ratio.

Based on the study results, the Jordanian publicly traded corporations are required to increase the distributed net income and to own large size if it is eager to attract investors' attention and increase their confidence to choose their firms in their portfolios. The current study limited itself to the investigation of factors that determine the P/E ratio of the industrial sector. Future research is recommended for identifying the determinants of P/E ratio for other sectors of the Amman Stock Exchange.

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