Investigating relationship between forward P/E ratio and expected earnings growth rate in car manufacturing industry and basic metals within the theoretical framework of AEG model

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Abstract: The aim of this study is to investigate the relationship between forward P/E ratio and the expected earnings growth rate within the theoretical framework of the AEG model. The expected earnings growth rate is divided into short-term expected earnings growth rate and long-term expected earnings growth rate. The cost of capital is also used as a control variable. This study was conducted over a five-year period from 2009 to 2013.The statistical population of this research consists of all car manufacturing and basic metal industry firms listed on Tehran Stock Exchange. The multiple hierarchical regression model and partial correlation are used in the methodology section of this study in order to investigate the level of relationships as well as partial coefficient of correlation between each independent variable in order to control the cost of capital as the control variable. The data and variables in this research are analyzed by SPSS and Eviews. The results indicated a negative correlation between forward P/E ratio and short-term expected earnings growth rate, a positive correlation between forward P/E ratio and long-term expected earnings growth rate, and a negative correlation between forward P/E ratio and cost of capital. In general, the results show that there is a weak linear relationship between forward P/E ratio and expected earnings growth rate.

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1. Introduction

Today, all developed and developing economies widely support investment and investors. That is why investment has become an important topic in economics. Investors, creditors and all other users of the financial data of companies would need information about the future of economic enterprises besides historical facts and they are always looking for information showing the trend of future earnings (Wan Ting W, 2013).

Researchers have largely studied stock markets throughout years in order to find the best options for investment. Uncertainty about the future of capital markets and the prospect of investment has forced investors to try to minimize risks of their decisions in any possible way. Analysts often use the P/E ratio in order to realize this objective. This ratio comprises two basic variables – share price and per-share earnings – which are instrumental in decision-making (Jahankhani, 2008).

The P/E ratio could be described as one of the most significant and the most applicable market ratios in examining common stocks of companies by investors and researchers. But the P/E ratio alone would not be enough to help choose the best stocks because not taking into consideration the value of money and ignoring the companies' prospective growth are among the most important restrictions in applying this method for estimating the companies' share prices (Mashayekh et al, 2013).

The P/E ratio, which is the valuation ratio of a company's current share price compared to its per-share earnings, is calculated by dividing the "market value per share" by "earnings per share (EPS)" and shows how much should be paid for a one-dollar earning (Hormozi, 2001).

There is no ambiguity about the numerator of this fraction, but there have been differences on the EPS to be used as the denominator. Some analysts use trailing EPS, some prefer current EPS and some choose forward EPS (Yunlong He, 2012).In the current research, forward EPS has been used.

Financial analysts mainly use the P/E ratio to justify proposals for their share buying. Economically speaking, given the extent of use of the P/E ratio, it would be important to know if one can expect changes in the P/E ratio and subsequently an impact on the decisions of potential and actual investors by modifying the earnings growth rate.

The earnings growth rate is in fact the percentage of changes in EPS year-on-year. To that effect, differences are mainly about how to use the projected

earnings growth rate than to use trailing earnings growth rate.

Following AEG theoretical framework (Ohlson and Juettner-Nauroth, 2005), this research considers three factors – expected short-term earnings growth rate, expected long-term earnings growth rate and the cost of capital – as the variables affecting the forward P/E ratio.

Therefore, this research is the first one in Iran to examine the relationship between forward P/E ratio and the expected earnings growth rate based on forecasts in car manufacturing and basic metal industrial companies listed on Tehran Stock Exchange. In order to have more transparent results, the expected earnings growth rate is divided into short-term and long-term earnings growth rate. The cost of capital is also considered as the control variable of this research.

2. Background

Murphy and Stevenson (1967) have examined the correlation between P/E and earnings growth rate. They concluded that there was no systematic relationship between these two variables and noted that P/E is a reliable ratio to know whether or not the company would see any forward earnings growth rate.

Basu (1977) carried out a research to examine the relationship between the P/E ratio and the bond performance. In this research, it has been assumed that the shares with a lower P/E ratio have better performance than those with a higher P/E ratio. This hypothesis was accepted after 14 years of research.

Beaver and Morse (1978) have demonstrated that there is a negative correlation between the P/E ratio and the current earnings growth rate. They have also highlighted unstable factors in this ratio. Moreover, they found a strong correlation between the P/E ratio and the earnings growth rate one or two years after the formation of portfolio. This correlation was weakened rapidly in the following years. They concluded that the earnings growth difference could not interpret the P/E ratio difference.

Zarowin (1990) examined the determining factors of the P/E ratio. He concluded that the main diversity factor in the P/E ratio is persistent periodic differences in the projected long-term earnings growth. Other factors like risk, projected short-term earnings growth and accounting methods are apparently less important in determining the P/E ratio.

Xing (1991) examined the relationship between investment in the shares of a company and EPS. The model was for this purpose was CAPM. According to the findings of the research, there was a positive and meaningful relationship between investment and earnings per share.

Firefield (1994) used a diverse volume of samples in its research, but he classified his observations under three categories based on their P/E ratio: high P/E, medium P/E and low P/E. The results showed similar negative correlation between changes in the current earnings and the current P/E ratio, but there was positive correlation between the P/E ratio and the forward earnings growth rate which had remained stable for more than five years.

Rahimi (1995) conducted a research to examine the relationship between EPS and the P/E ratio of companies listed on Tehran Stock Exchange. His research was focused on return and P/E. This search has studied the hypothesis that low P/E shares had a higher return rate than the high P/E shares during 1994-1997. The statistical population in this research comprised 67 companies classified based on their P/E. The rate of return for these companies was calculated through trial and error. Then four portfolios were formed and the rate of return for each portfolio was calculated. They were then compared. The rate of return for portfolio number one was the highest. The rate of return for portfolio number four was eliminated from this portfolio because its companies had no return. The results of the research proved the accuracy of the hypothesis.

Ohlson and Mussman (1995) conducted a research on how to use financial ratios for forecasting EPS. In this research, which was conducted during the 1976-1993 period, the neural network model and the least squares test were used for predicting the rate of return.

According to the conclusion of this research, neutral networks provide better results than other techniques with meaningful reduction in error.

Penman (1996) studied the P/E and EP ratios and their relationship with growth. According to his findings, the more the EP (less P/E), the less the forward earning would change.

Ramchan (2002) has made an experimental analysis of P/E determining factors in emerging markets. The results are indicative of the significance of growth and credit risk. Furthermore, the findings support growth as a determining factor in the P/E ratio diversity between countries in emerging markets.

Raei and Chavoshi (2003) studied projected rate of return on shares at Tehran Stock Exchange by using artificial neural networks and multi-factorial model. The following results were obtained: Earning-Per-Share (EPS) is predictable at stock market and is affected by economic macro-variables. Multi-index model can predict the EPS by using economic macro-variables, but neural network turns out to be more successful and they can meaningfully reduce prediction risk. Artificial neural networks are largely flexible. The relationship between EPS and economic macro-variables do not remain unchanged forever and this correction changes for a variety of reasons.

Gilles (2003) found in his research that a low P/E ratio has largely lost its credibility as a criterion and there is no such a thing as long-term strategy. He concluded that a P/E ratio with EPS could give a more helpful PEG, which is an attractive indication of the potential value of the company.

Chen et al (2003) concluded in their research that assessment ratios like P/E ratio are less capable in predicting forward earnings rate.

Mortazavi-Nia (2006) found in his research that some investors believe that stocks with lower P/E are on average better than those with higher P/E ratio. There is no logic ground for this conclusion, but it has proven to be true.

Izadi-Nia et al (2007) studied the relationship between the rate of return expected by investors by using capital assets' pricing model and the EPS ratio at Tehran Stock Exchange. According to the findings of this research, there has been a meaningful relationship between the P/E ratio and the expected rate of return expected by shareholders in some industrial sectors.

Thomas and Zhang (2006) used data related to earnings projections by analysts to calculate the forward P/E ratio as well as the expected earnings growth instead of trailing earnings to evaluate the relationship between the P/E ratio and the earnings growth. They found a stronger correlation between these two variables.

Wu (2009) studied correlation between the forward P/E ratio and different accounting indictors including short-term and long-term growth as well as earnings growth. This research found that the correlation between the P/E ratio and the sales growth has been higher than the correlation between the P/E ratio and the earnings growth rate. According to these findings, the P/E ratio for a five-year or longer period will be in correlation with earnings growth. That is in contradiction with the findings of previous studies. Wu also found that there has been a U-shaped relationship between the P/E ratio and earnings risk.

Pei Fun Liem and Sautma Ronni Basana (2012) analyzed the relationship between P/E ratio and the EPS at Indonesia Stock Exchange. results show that there is significance difference between low PE and high PE portfolio stock return in short term (holding period of 6 months) but there is no significance difference between both portfolio stock return if they are hold for one, two, three, and four years. This research also finds that there is no significant relationship between stock return and (trailing) P/E ratio which suggests that (trailing) P/E ratio is not useful in estimating both short term and long term stock returns.

Shahnaz Mashayekh et al (2013) conducted a research to compare the predictability of PEG and P/E ratios for the companies listed on Tehran Stock Exchange. The research shows that another criterion, known as PEG ratio, has emerged as an indicator of stocks. The PEG ratio (price/earnings to growth ratio) is a valuation metric for determining the relative trade-off between the price of a stock, the earnings generated per share (EPS), and the company's expected growth. The research has examined the stability of the P/E and PEC ratios and the accuracy of prediction by these two models in studying stocks. Information collected from 215 companies during the 2002-2020 period showed that the P/E ratio was more stable than PEG and that predicting the share prices is more precise by using PEG model.

Wan-Ting Wu (2103) examined the relationship between the E/P ratio and forward earnings growth and concluded that there is negative relation in the long term, but not in the short term. Contrary to theoretical predictions, the results show a U-shaped relation between the forward E/P ratio and earnings risk. This study shows that the forward E/P ratio is a stronger predictor of future growth than the conventionally used trailing E/P ratio.

Wan-Ting Wu (2014) examined the relation between the forward price-to-earnings (P/E) ratio and profitability. Consistent with the theoretical predictions of Ohlson and Zhan (2006), this paper finds a U-shaped relation between the forward P/E ratio and return on equity (ROE). Besides, firms with high P/E ratios tend to have lower ROE in the subsequent years, and their ROE is very volatile and wide-distributed.

3. Questions

In this research, the entire statistical population has been examined to determine the relationship between the forward P/E ratio and the expected earnings growth rate in the car manufacturing and basic metals industries within Ohlson's theoretical framework AEG. There is no need for hypotheses and the objective is to find answers to the following questions:

- What is the relationship between the expected earnings growth rate and forward P/E ratio (the cost of capital considered as the control variable) in the car manufacturing and basic metal companies listed on Tehran Stock Exchange?
- What is the relationship between the expected short-term earnings growth rate (g_2) and the forward P/E ratio in the car manufacturing and basic metal industry companies listed on Tehran Stock Exchange?
- What is the relationship between the expected long-term earnings growth rate (Y) and the forward P/E ratio in the car manufacturing and basic metal industry companies listed on Tehran Stock Exchange?

- What is the relationship between the cost of capital (r) and the forward P/E ratio in the car manufacturing and basic metal industry companies listed on Tehran Stock Exchange?

4. Methodology

This research is practical in terms of objective and is descriptive from the standpoint of identity and methodology. It studies the relationship between the P/E ratio and the forward earnings growth rate in car manufacturing and basic metal companies listed on Tehran Stock Exchange. Therefore, in this research, census has been applied.

The present research could be defined as follows based on the classification criteria in humanities:

1. In terms of objective: Practical
2. In terms of method: Descriptive, inductive (statistical analysis)
3. In terms of design: Ex posto facto (causal)

4. 1. Population and Samples

Due to the low number of car manufacturing and basic metal companies being studied in this research, all of them have been taken into consideration.

Car manufacturing and basic metal companies listed on Tehran Stock Exchange have been examined for the 2009-2013 period. Random sampling has not been used in this research and all companies in the statistical population have been examined by census. Table 1 provides the description of the statistical population of this research.

Table 1: Description of Statistical Population of Research

No	Industry	Total Number of Listed Companies	Number of Companies Eliminated Due to Research Restrictions	Share of Statistical Population
1	Basic Metals	31	17	14
2	Car Manufacturing	31	11	20
Total		62	28	34

4.2.Research Design

In order to examine the relationship between the forward P/E rate and the expected earnings growth rate in the car manufacturing and basic metal industries, the following regression model has been used:

$LogY=\alpha+\beta 1 logX1+ \beta 2 logX2+ \beta 3 logX3+\varepsilon$

In this model, (α) is the y-intercept in the regression analysis and (β) shows parameters of multi-variable regression model. Parameters in the multi-variable regression model are indicative of the extent of relationship between and the influence of each independent variable on dependent variables. Moreover, the sign of parameters in the regression model express the direction of relationship between dependent and independent variables.

The independent variables in this research include the expected short-term earnings growth rate and the expected long-term earnings growth rate. The control variable in this research is the estimated cost of capital for companies and the P/E ratio is the dependent variable in this research. Now, we see how these variables are calculated (Table 2):

Table 2: Calculation of Variables:

Variables	Definition	Calculation
g_2	Short-term earnings growth rate (in two years)	(EPS_{t+1}/EPS_t)*(1-inflation on rate)-1 EPS_{t+1} is the expected earnings per share in one year EPS_t is the EPS in the current year
r	The estimated cost of capital for the company	r is estimated based on Gordon model: $r=\frac{D}{P}+g$ D is the dividend per share P is the price of each share G is the growth of earnings per share
P/E	Price per Earnings	$PE=Price_0/X_1$ $Price_0$ is the price at the end of period zero X_1 is the prediction for share earnings after one year
Y or $\overline{G_N}$	Long-term earnings growth rate	$\overline{G_N}=\sqrt[3]{(1+g_n)(1+g_{n-1})(1+g_{n-2})}$ g_n is the annual earnings growth rate G_N is the earnings growth rate over three years $g_n=\frac{EPS_n-EPS_{n-1}}{EPS_{n-1}}$

Table 2 contains definition of variables and the way they are calculated.

5.Findings

Since in this research, the descriptive method has been applied, there has been no hypothesis in the research and only the questions pertaining to the research have been answered.

5.1.Description of Findings

In this research, the data related to three groups of variables (independent, dependent and control) have been used. In this section, the average of variables has been examined for the five-year period of the study.

Table 3: Changes in the Average of Variables During Five-Year Period

Variable / Year	P/E	g_2	Y	R
2009	9.53	1.76	0.70	0/88
2010	11.18	1.23	0/74	0/85
2011	7.33	2.50	0/55	0/68
2012	8.70	1.37	0/29	0/42
2013	18.31	2.36	0/24	0/30

The average of variables of the research is given in Table 3 for the five-year period of the research in order to understand the trend of changes. The data about the research is summarized in the following tables:

Table 4: Description of Research Data (34 companies for 2009-2013 period)

Indicator / Variable	Minimum	Maximum	Mean	Std. Deviation
P/E	-5.43	73.79	7.68	10.76
g_2	-26.67	61.17	1.84	6.99
Y	-3.80	4.54	0/50	1.09
R	-3.80	4.61	0.63	1.13

Table 4 provides data about the trend of changes in the average of variables as well as the minimum and maximum variables for the five-year period.

5.2.Regression Hypotheses Analysis

When regression is the tool for analyzing data, all hypotheses related to regression should be examined. These hypotheses and the way of their examination are given below. After examining regression hypotheses, data panel hypotheses have been examined.

5.2.1. Normal Distribution of Variables (PP-PLOT)

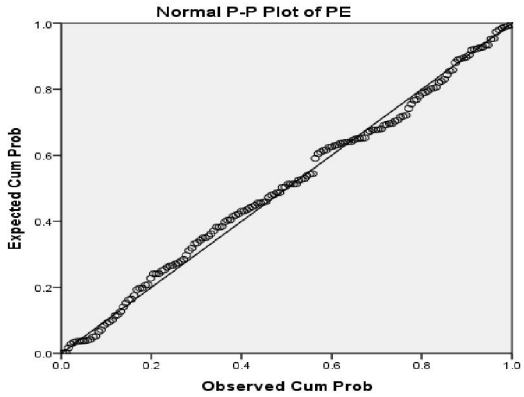

Diagram 1: PP-PLOT for P/E Ratio

In this research, since non-random methods are used for choosing the statistical population (the method is descriptive here), the PP-PLOT diagram is used to evaluate the normality of distribution of variables after calculating their logarithm. It is to note that logarithmic transformation is a method of normalization of variables, used in this research.

In diagram number one, distribution of the P/E ratio has been demonstrated as the dependent variable in examination. According to this diagram, distribution of this variable is assessed as almost normal and therefore one of the main hypotheses of regression is confirmed.

The hypothesis of multi-variable regression is based on the point that the function is an n-variable regression function, which means that the distribution of all variables in the research has been normal.

If a real function was available, the y estimate alone was enough. Therefore, due to the reasons mentioned above, it is assumed that the relations between variables could be defined as linear while in the real world, there is a possibility of lack of linear relations between them. It is important to take into account the point that if the distribution of all variables in the research is normal distribution of all research data would be also normal. The instrument used in this research for testing the normality of the research data is PP-PLOT diagram.

Moreover, in order to review the normality of distribution of P/E ratio, kurtosis and skewness have been used.

Table 5: kurtosis and skewness coefficients

N Valid	164
Lost Data	6
Skewness	0.149
The Standard Error Of Skewness	0.190
Kurtosis	0.300
The Standard Error Of Kurtosis	0.377

According to Table 5, since skewness and kurtosis lie in the range -1.96 to 1.96, the distribution of the dependent variable in the research, the P/E ratio, has been normal.

5.2.2. Linear Independence of Data (Independent Variables)

Since the census method has been used in this research, partial correlation and Pearson zero-order correlation (due to the existence of control variable and for the purpose of eliminating its effect on other variables) has been used for evaluating the linear independence of variables.

Table 6: Inter-Variable Correlation Test Based on Partial Correlation Coefficient

Correlations							
Control Variable	Variable	P/E	g_2	Y	r		
-none-[a]	P/E	1	-0.293	0.079	-0.004		
	g_2	-0.293	1	-0.732	-0.482		
	Y	0.079	-0.732	1	0.764		
	R	-0.004	-0.482	0.764	1		
R	P/E	1	-0.336	0.126			
	g_2	-0.336	1	-0.644			
	Y	-0.126	-0.644	1			
a. Cells contain zero-order (Pearson) correlations.						b.	c.

Given Table 3 and partial correlation coefficients calculated for the variables in the research, there has been no correlation between the independent variables. Therefore, the hypothesis of lack of linear independence between the independent variables of the research (X's) has been confirmed in the regression.

5.2.3. Normality of Remainders

Based on the diagram of normality, it would be easy to assess the normality of this section. The following diagram is indicative of this fact.

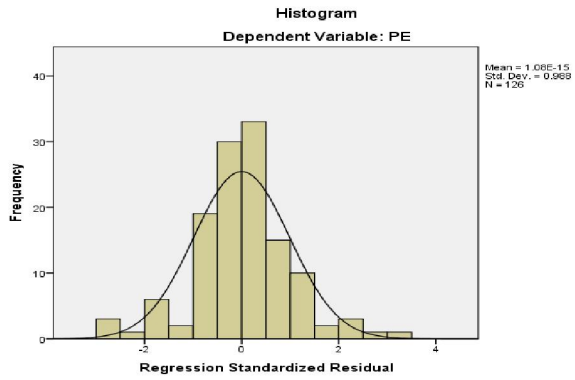

Diagram 2: Normality of Remainders

According to diagram number 2, since the histogram diagram of the normality of remainders almost follows the normal curve, the normality of the remainders (or error) stands.

5.2.4. Data Panel of Variables

Since five dependent samples have been used in this research (data related to 34 companies over five years), it could be concluded that the data has been dependent and data panel is needed. To that end, the output from Eviews is presented as follows after calculating their natural logarithms.

Table 7: Skewness, kurtosis and Jarque-Bera tests for P/E ratio

Description	P/E	g_2	Y	r
Mean	1.53	-0.03	-0.17	-0.07
Median	1.54	-0.16	-0.09	0.06
Maximum	4.30	4.11	1.51	1.53
Minimum	-0.81	-3.14	-1.58	-1.55
Std. deviation	1	1.14	0.49	0.47
Skewness	0.04	1.09	-0.30	-0.63
Kurtosis	2.96	5.71	4.83	5.46
Jarque-Bera	0.05	67.70	20.73	42.82
Probability	0.98	0	0	0
Probability	0.98	0	0	0

Given the values of skewness, kurtosis and Jacque-Bera tests and the P/E ratio in Table 7, it could be concluded that distribution of the dependent variable in this research is almost normal.

5.2.5. Examining Multicollinearity Between Independent Variables

In order to review the multicollinearity between independent variables, tolerance and inflation factors have been used in the table of output variables.

Table 8: Excluded Variable

Excluded Variables [a]						
Model		Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	g2	-.384[b]	-3.961	0.000	-0.336	0.768
	Y	.196[b]	1.414	0.160	0.126	0.416
a. Dependent Variable: P/E						
b. Predictors in the Model: (Constant), r						

Based on Table 8 (output variables), since the tolerance for independent variables is 0.768 and 0.416 while the inflation is 1.302 and 2.404 (below 2.5), there has been no multicollinearity between the variables.

5.2.6 Non-Parametric Analysis – Spearman's Correlation

Due to the weakness of the coefficient of determination, a non-parametric analysis known as Spearman's correlation between independent and dependent variables has been used in this research in order to analyze the type and strength of relationship between variables. In total, a final conclusion is achieved based on results from regression analysis and non-parametric analysis.

Table 9: Spearman's Correlation Coefficient

Spearman's Correlation Coefficient				
Description	PE	g2	Y	r
PE Correlation Coefficient	1	0/254	0/081	-0/092
Probability	0	0/002	0/394	0/290
Sample number	164	142	135	135
g2 Correlation Coefficient	-0/254	1	-0/614	-0/443
Probability	0/002	0	0/000	0/000
Sample number	142	144	134	129
Y Correlation Coefficient	0/081	-0/614	1	0/762
Probability	0/394	0/000	0	0/000
Sample number	135	134	136	128
r Correlation Coefficient	-0/092	-0/443	0/762	1
Probability	-0/290	0/000	0/000	0
Sample number	135	129	128	136

According to Table 9, the correlation between PE and g2 equals -0.254, which indicates negative and medium correlation. The correlation P/E and Y is 0.081, showing positive and weak correlation, while the correlation between r and P/E equals -0.092 which shows negative and weak correlation.

5.3. Inter-Variable Relations

Given the fact that this research has been conducted based on a descriptive method, issues related to the level of significance of the estimate model has no place there and the results are exclusively based on the findings of analysis of data related to all companies in the statistical population. In other words, this research contains no data related to the generalization of the results of the research to the entire population and the responses have been explained based on the results and model of regression. It could be said that there is a weak linear relationship between variables in the statistical population because the coefficient of determination is calculated at 0.127 and there has been a weak relationship between variables.

Table 10: Regression Parameters Estimate

Description	Symbol	Beta Coefficient	SD	T	Standardized Coefficient
Intercept	a	1.567	-	16.510	-
short-term expected earnings growth rate	g2	-0/398	6.99	-3.940	-0.497
long-term expected earnings growth rate	Y	-0/119	1.13	-0/453	-0.060
Cost of capital	r	-0/445	1.09	-1.396	-0.239

In this research, multiple linear regression model has been used for assessing relationship between variables. To that effect, the parameters of the regression model have been summarized in the table below in order to determine the relationship between variables.

After incorporating the parameters of Table 10 in the regression equation, the relation between variables is defined as follows:

Log(PE)= 1.567- 0/398 (g_2)- 0/445 (Y)- 0/119 (r)+E

Then, based on data of Table 10 as well as other information presented earlier, the relationship between variables is examined and described.

5.3.1. Relationship Between Expected Earnings Growth Rate and Forward P/E Ratio

In order to examine this relationship, a variety of statistical projects have been carried out. Examinations conducted based on partial correlation have shown a reverse relationship between the variable of expected short-term earnings growth rate (g2) and the P/E ratio. The coefficient in these examinations, which take into account the cost of capital, is -0.336 which shows the degree of influence of this variable on the P/E ratio. It means that for each unit of change in the independent variable, -0.336 change will occur in the dependent variable. The important factor in the examination of this relationship has been the value of coefficient of determination. Given the correlation coefficient at 0.336 between the expected short-term earnings growth rate (g2) and the P/E ratio and given the coefficient of determination (12.7%) and the negative coefficient of this variable in the regression model (reverse relationship with coefficient -0.398), there is a negative and linear relationship between the expected short-term earnings growth rate (g2) and the P/E ratio between car manufacturing and basic metal companies listed on Tehran Stock Exchange.

Moreover, based on results from non-parametric analysis (Spearman's correlation coefficient), the correlation coefficient between these two variables equals -0.254, which indicates negative and weak correlation between them.

5.3.2. Relationship between Expected Long-Term Earnings Growth Rate and Forward P/E Ratio

Based on partial correlation test (in the section of zero-order correlations), there is a direct relationship between the excepted long-term earnings growth rate (Y) and the forward P/E ratio with a coefficient at 0.126. It shows the weakness of influence of this variable on the forward P/E ratio in the companies listed on TSE. Another important factor in the examination of this relationship is the coefficient of determination for the regression model.

Given the coefficient of correlation at 0.126 between the expected long-term earnings growth rate (Y) and the forward P/E ratio and given the coefficient of determination at 12.7% in the regression model and also taking into consideration the negative coefficient of this variable in the regression model (reverse relationship with coefficient at -0.445), a weak and negative linear relationship exists between the expected long-term earnings growth rate (Y) and the forward P/E ratio in the car manufacturing and basic metal companies listed on TSE.

Moreover, based on results from non-parametric analysis (Spearman's correlation coefficient), the correlation coefficient between these two parameters stands at 0.081 which shows positive and weak correlation between them.

5.3.3. Relationship between Cost of Capital and Forward P/E Ratio

In order to assess this relationship, a variety of statistical activities have been carried out. Based on partial correlation test, there has been a direct relationship between the cost of capital (r) and the forward P/E ratio among car manufacturing and basic metal companies listed on TSE. The relationship with coefficient -0.004 indicates the weakness of influence of this variable on the forward P/E ratio in the TSE-listed companies. Another important factor in the examination of this relationship has been the coefficient of determination for the regression model. Given the correlation coefficient at -0.004 between the cost of capital (r) and the forward P/E ratio and given the coefficient of estimate model at 12.7% and also the negative coefficient of this variable in the regression model (negative relationship with coefficient at -0.119), a weak and negative linear relationship has existed between the cost of capital (r) and the forward P/E ratio in the car manufacturing and basic metal companies listed on TSE.

Moreover, based on the results of non-parametric analysis (Spearman's correlation coefficient), the correlation coefficient between these two variables equals -0.092, which indicates negative and weak correlation between them.

5.3.4. Relationship between Expected Earnings Growth Rate and Forward P/E Ratio

In order to examine this relationship, a variety of statistical work has been done. Based on results from partial correlation test, there has been a reverse relationship with coefficient -0.336 between the expected short-term earnings growth rate and the forward P/E ratio in the car manufacturing and basic metal companies listed on TSE, and the correlation between the expected long-term earnings growth rate

and forward P/E ratio has been direct with coefficient 0.126. Moreover, the relationship between the cost of capital and the forward P/E ratio has been reverse with coefficient at -0.004. Another important factor involved in the examination of this relationship has been the coefficient of determination in the regression model.

Given the results of non-parametric analysis, Spearman's correlation coefficient between the P/E ratio and g2, y and r respectively equals -0.254, 0.081 and -0.092. Moreover, the coefficient of determination for the estimate model stands at 12.7% and the linear relationship between the expected short-term earnings growth rate (g2), the expected long-term earnings growth rate (Y) and between the cost of capital (r) as the control variable and the forward P/E ratio in car manufacturing and basic companies listed on TSE are assessed as weak.

6. Conclusion

This research examines the relationship between the forward P/E ratio and the expected earnings growth rate. Based on Ohlson theoretical framework (AEG), the P/E ratio is calculated from three factors – cost of capital, expected short-term earnings growth rate and expected long-term earnings growth rate. In this research, the influence of the cost of capital as the control variable on other variables has been examined and then the relationship between the expected short-term earnings growth rate and the expected long-term earnings growth rate with the forward P/E ratio has been examined.

In this research, in order to use linear regression, the natural logarithm of a model designed based on Ohlson's theoretical framework has been calculated. Then in order to examine it, multi-variable regression method has been applied in order to be able to examine the relationship between the forward P/E ratio and the three influential parameters (cost of capital, expected short-term earnings growth rate and expected long-term earnings growth rate).

The results of this research have shown that in the two industries examined during the period 2009-2013, there was a reverse relationship between the forward P/E ratio and the expected short-term earnings growth rate, a direct relationship between the forward P/E ratio and the expected long-term earnings growth rate and a reverse relationship between the forward P/E ratio and the cost of capital. In total, there has been a weak linear relationship between the forward P/E ratio and the expected earnings growth rate.

Generally speaking, this research presents a method to examine the relationship between the forward P/E ratio and the expected short-term and long-term earnings growth rates. The results of this research were in contrast with Ohlson's theoretical hypotheses AEG because according to the findings of this research, in addition to the cost of capital, excepted short-term earnings growth rate and expected long-term earnings growth rate, other factors have influenced the forward P/E ratio.

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