Target P/E ratio determinants in the Turkish Stock Market: Earning volatility effect

Halil ARSLAN
İstanbul Şehir University, Turkey
halilarslan@sehir.edu.tr
Yuksel ILTAS
Ahi Evran University, Turkey
yiltas@ahievran.edu.tr
Temur KAYHAN
İstanbul Şehir University, Turkey
temurkayhan@sehir.edu.tr

Abstract. *This paper investigates that what are the determinants of target PE in the case of Turkish Stock Market. The general outputs: i) Projected dividend yield is the dominant factor on PE. ii) Boosted investments and growing top-line raise PE ratio. iii) PE ratios come down as companies' financial leverage and working capital needs grow. iv) Although stabilizing foreign exchange risks and gross profit margins with the aid of hedge tools and product diversity of the companies decreases the acceleration of profitability, it eventually augments PE ratio. Data from Borsa İstanbul covering 2000-2014 term have been modeled by GMM.*

Keywords: PE, earning volatility, dividend yield, working capital, leverage.

JEL Classification: C33, C58, D53, L11.

1. Introduction

After the development of the discounted dividend growth model of Gordon and Shapiro (1956), many studies on PE have been carried out. For stock market investors, PE is the most commonly used ratio in the global sense. It has become widespread amongst investors through being calculated practically, being comprehended easily and giving pay-back period. While investors use other methodologies in valuation, the final value is generally tested with PE in order to get roughly pay-back period.

The valuation of stocks has become an attractive issue for a long while. Although the US has a broaden literature in this sense, the market value concept for the Turkish companies has been gaining importance since the 1980s. Twenty years ago, while profit maximization for the Turkish companies was vital, today maximization of market value has been adopted by the company shareholders in an increasing trend. The increase or decrease in the value of companies in the United States is a key performance indicator for the partners, managers, suppliers, creditors and employees. The companies give the employees their share as a success bonus, they can pay their debt in mergers by capital raise, and share of the company may be given as borrower loan collateral. This new concept shows itself in Turkey nowadays.

Those motivations augment the importance of company valuation methodologies. PE is the earliest valuation methodology. In this sense, it is significant to pinpoint the factors affecting PE in the market. Thus, it is crucial to determine the target market multiples for the managers who want to augment their companies' market value as a strategic goal. Factors influencing PE ratio are important for employees who want to get more bonus by increasing corporate value. In terms of investors, it is inevitable that which level of PE of a company preparing IPO or trading at stock exchange is fair. Lastly, for policy makers wishing to improve economic welfare of a country, the fair PE ratio is solemn for determining whether or not investors' resources can be used efficiently.

(Gordon and Shapiro, 1956; Crag, Johnson and Joy, 1987; Beaver and Morse, 1978; Jaffe, Keim, and Westerfield, 1989; Zorowin, 1990; Leibowitz and Kogelman, 1990; Constand, Freitas, and Sullivan, 1991; Nikbakht and Polat, 1998; Barnes, 2001; Afza and Tahir, 2012; Reilly, Griggs, and Wong, 1983) made outstanding works in related to PE and other market multiples. When looking at the literature, scholars are generally concerned about the relationship between PE and dividend growth, realized or expected growth of earning and systematic risks. Some studies claimed that the relationship between accounting policies and PE is at a level that can change investors' point of view.

Model outputs show that the expected dividend yield for investors is very critical for the Turkish market. Also, aggressive profit expansion for Turkish companies is seen as a source of value growth. However, the model outputs show that sustainable and stable profitability levels climb the corporate value even if bringing low growth. When a

maximization of market value becomes more important in the Turkish market, the companies will need to make more foreign exchange and commodity hedging in order to reduce cost of capital and improve corporate value.

This study contributes to the literature in different ways. The risk perception in the literature is generally defined as systematic risk. In this work, companies' leverage ratios and earning volatilities have been taken as other risk tools. When companies work with high working capital need, even if they can generate net profits in the income statements, the profits are lost and cash cannot be generated in the cash flow statements. It is unlikely that the two companies with the same profitability will have similar PE due to the fact that the company that needs more working capital produces less cash in the bottom line. Therefore, our model adds working capital needs of the companies to the equation which is not taken into account in the literature. It is also inevitable that the PE ratios are influenced by lagged values. This is because the lagged value of them has a psychological effect for the investors. Thus, we contribute to the literature by incorporating in the lagged value of the dependent variable.

The rest of the work is as follows: In the second part, the relevant literature will be given. In the third part, model, variables and data will be introduced. The fourth part is devoted to the presentation of GMM regression findings. In the conclusion section, the findings will be given as a summary and discussed.

2. Brief literature

There are many studies in the literature in order to pinpoint the factors affecting PE ratios. Especially after developing the discounted dividend growth model Gordon and Shapiro (1956), PE has been continuously examined as a vital tool in corporate valuation.

Beaver and Morse (1978),'s results were one of the first studies in this area. Scholars measured the relationship between earning growth, beta, accounting policies and PE. According to this, scholars claimed that the earning growth has diminishing effect over years. The companies with low earning growth can have high PE. This means that investors perceive current profitability as a temporary situation. There can be both positive and negative relationship between firms' betas and PE. They argued that 50% of PE is made up by accounting policies in addition to the earning growth and risk.

Crag, Johnson, and Joy (1987), examined the relationship between PEs of 117 firms traded between 1970-1975 and stock valuation method (FIFO-LIFO), accelerated depreciation, asset growth, systematic risk and asset size. Analysts argued that if PEs are heavily dependent on accounting policies, portfolio managers may remove such companies from their portfolios.

Jaffe, Keim and Westerfield (1989), found a negative relationship between PE and the size of a company in their study. They corrected the "look-ahead bias" problem by using the market value in the period which companies declared their profits while calculating PE.

Zorowin (1990), claimed that only 15% of variation of PE can be explained by the accounting policies. Analyst said that short and long-term realized earning growth has a positive impact on PE, while the dominant variable explaining variation of PE amongst cross sections is the long-term expected growth of earning.

Leibowitz and Kogelman (1990), argued that there is no significant relationship between ordinary growth expectancies and PE, unless there is a sizeable growth that can separate the company from the market.

Constand, Freitas, and Sullivan (1991), studied the rapidly rising PEs of Japanese firms from 1979 to 1989. The basic hypothesis of the study was that of PE would depend on the risk level, the expected growth rate and the sustainable dividend payout ratio. While the risk factor was pinpointed as the main factor affecting PE, a weak relationship was found between dividend growth and PE. Analysts argued that the very low growth rate of Japanese companies would be effective in this case.

Nikbakht and Polat (1998), argued that PE will decline with the uptrend in standard deviation of profitability in their work. Analysts also found a positive relationship between expected growth rate of profitability and PE.

Barnes (2001), examined the relationship between earnings and cash flow volatility, size, leverage, profitability, investment, sales growth and Tobin q (market to book ratio). Earning and cash flow volatility and leverage led to the decline in q. A positive correlation between the other variables and q factor was found in this work.

Afza and Tahir (2012) tried to determine the factors affecting PE through pooled OLS method with the data of 25 firms that were traded at Karachi stock exchange between 2005-2009. According to analysts, the two dominant variables on PE are dividend payout ratio and Tobin q.

Reilly, Griggs, and Wong (1983), investigated the variables influencing PE with the S&P500 quarterly data stretched from 1963 to 1980. A positive relationship between PE and dividend payout ratio, realized profitability growth and dividend growth was found. In addition, the variables of business failure rate, risk free, inflation rate and earning volatility had a negative effect on PE.

3. Model, variables and data

3.1. Model

While using the panel data set, with the assumption that the dependent variable is affected by the lagged value of it, the model is transformed into a dynamic panel. In

case of using dynamic panel data, Generalized Method of Moments developed by (Arellano, 1991) is applied to eliminate the endogenous problem. According to (Baltagi, 2005), the application of OLS in the dynamic panel data results in bias and inconsistent coefficients. The heterogeneous structure of the panel data poses a problem of endogeneity. The GMM eliminates endogeneity and changing variance problem by using instrument variables and first differences method. The use of first differences in the model produces a solution to the cross section dependency and non-stationary problem. The GMM is the top-level data modeling system that takes into consideration dynamic structure of many economic relationships.

Main model;

$$y_{it} = a_i + \varphi y_{i,t-1} + \beta \, Earning \, Volatility_{it} + \psi X_t + u_{it} \tag{1}$$

$$y_{it} = a_i + \beta_1 y_{i,t-1} + \beta_2 Dividend \, Yield(1)_{it} + \beta_3 Leverage_{it} +$$

$$+ \beta_4 Working \, Capital_{it} + \beta_5 Earning \, Volatility_{it} + \beta_6 Size_{it} + \beta_7 Profitability_{it} +$$

$$+ \beta_8 Investment_{it} + \beta_9 Sales \, Growth_{it} + u_{it}$$

y_{it} symbolizes PEs of the firms.

While a_i defines fixed effects, X_t is the vector of control variables.

3.2. Variables

While calculating PE, the average market value of the companies for each year is divided by the average net profit of the companies for the current and following year. Thus, instead of using a single market value, the average market value has been used to take into account the general pattern of the market. In addition, the effect of realized and expected profitability has been incorporated in. Explanations on the variables used in the study are summarized in Table 1.

Table 1. *Variables*

Code	Variable	Explanation	Term
P/E	Price to Earnings Ratio	Average Market Cap$_{it}$/Average (Net Income$_{it}$, Net Income$_{i(t+1)}$)	2000-2014
Divy	Dividend Yield	Gross Dividend$_{it}$/Market Cap Before Excluded Dividend$_{it}$	2000-2014
Lev	Leverage	Average Financial Debt$_{it}$/Average Asset$_{it}$	2000-2014
WC	Working Capital	Net Working Capital$_{it}$/Asset$_{it}$	2000-2014
EarnVol.	Earning Volatility	Forward Standard Deviation of 8 quarter EBITDA$_{it}$/ Forward Average of 8 quarter EBITDA$_{it}$	2000-2014
Size	Ln(Asset)	Ln(Asset)$_{it}$ or Ln(Enterprise Value)$_{it}$	2000-2014
Prof.	Profitability	Net Income$_{it}$/Shareholder Equity$_{it}$	2000-2014
Inv	Investment	Investment$_{it}$/Asset$_{it}$	2000-2014
Sales	Sales Growth	(Net Sales$_{it}$ – Net Sales$_{i(t-1)}$)/ Net Sales$_{i(t-1)}$	2000-2014

3.3. Data

In the article, 2,148 firm-year data of 186 companies traded at Borsa Istanbul between 2000-2014 have been used. Financial indicators of the companies are obtained from annual and interim independent audit reports, investor relations, annual reports, Bloomberg and Finnet Data Provider. In order to be able to obtain PEs formed with healthy pricing, it has been tried to take sampling of the firms with enough transaction volume. The companies with less than 5% free float are not included in the sampling. The holding, financial institutions, investment trusts and banks have been excluded from the sample because it is aimed to examine the pattern of industrial companies. The mean, standard deviation and correlation matrix for the dependent and independent variables used in the model are shown in Table 2.

Table 2. *Mean, standard deviation and corelations*

Variable	Median	Average	Std.	Corelations								
Full Sample				1	2	3	4	5	6	7	8	9
1 P/E	1,6	-1,3	98,2	1,000								
2 Dividend Yield	0,00	0,02	0,04	0,018	1,000							
3 Leverage	0,21	0,27	0,36	-0,009	-0,165	1,000						
4 Working Capital	0,20	0,22	0,17	-0,050	0,009	-0,011	1,000					
5 Earning Volatility	0,27	0,55	6,81	0,001	-0,021	-0,004	0,007	1,000				
6 Ln(Asset)	19,0	19,0	1,7	-0,008	0,136	-0,064	-0,252	-0,008	1,000			
7 Profitability	10,6	12,8	21,8	0,017	0,177	-0,085	0,034	-0,008	-0,016	1,000		
8 Investment	0,08	0,19	0,52	0,012	0,001	-0,011	-0,108	0,013	-0,018	0,630	1,000	
8 Sales Growth	0,17	0,39	3,31	0,029	-0,010	-0,008	-0,030	-0,006	-0,019	0,000	0,181	1,000
N = 2.148												

4. Findings

The two regressions made before interpreting the regression output should pass the necessary tests. There are 3 important tests in GMM models in the literature. These are the Wald test, which measures the significance of the model globally, the Aerallano Bond Test, which tests the autocorrelation, and the Sargan Test, which measures the validity of the instrument variables used in the model. Firstly, it is seen that the model coefficients according to the Wald test are not zero at the same time. The Aerallano bond test has found no autocorrelation at the second order. Due to the fact that the Sargan test probability is above 0.05, the instrument variables used in the model are not related to the error of the model; are related to independent variables. This indicates that the instrument variables can solve the endogeneity problem in the model.

It is seen that the PEs are negatively affected from the previous level. According to the model outputs, all other factors are fixed, in the average, the companies' PEs, which are in the rising trend in the previous year have to be expected to decline in the current period. As the dividend yields of the companies raise, the PE ratios seem to boost. This situation is also in accordance with the Gordon Growth model. It is important for the

investors whether or not the company has a dividend policy. The firms can augment their PE ratios that can be valid in both IPO-M&A and reduce the cost of capital by distributing regular dividend. Increased financial indebtedness level of companies is accompanied by high leverage. It is seen that the foreign loans account for major part of the loans of the Turkish companies. Profitability of the companies operating at high leverage may be significantly reduced when there is abrupt movements in the currencies. So, this means that the dividend distribution potential of the company decreases. Accordingly, high leverage is perceived as high risk by the market, so, as the leverage of the companies enhances, all other factors are constant, PE ratios decrease, in the average.

Although the second model does not provide meaningful data, the PE ratios have declined in the first model when companies' working capital requirements augment. The uptrend in working capital need may induce companies to borrow in order to close cash deficit. Boosted working capital need is being perceived high risk level by the market and eventually it decreases PE ratios of the firms.

Earning volatility of the companies has been measured by getting the standard deviation of EBITDA over the next 8 quarters from the current data. The standard deviation has been scaled by dividing the average of EBITDAs obtained in the same period and a more rational benchmarking methodology has been established. In addition, instead of past volatility, it has been tried to measure the effect of future or expected volatility. In both models, the uptrend in earning volatility induces low PE ratios. For many partners, the increase in company profit is important. However, if there is high volatility in the boosted profits, this may have negative effects on the company value. The slight but more stable earnings growth may has more positive impact on the corporate value. Accordingly, stabilizing the profitability of companies with the aid of foreign exchange or commodity hedge tools can increase the PEs of companies. The level of stabilization profit that Turkish companies can obtain through foreign exchange hedges both in foreign currency positions and in raw material imports increases the value of the company by reducing cost of capital.

The size of the firms has been measured in two different ways. While ln(asset) is being used in the first case, ln(enterprise value) is being utilized in the second case. In both models, it has been seen that the size effect improves PE ratios. The perception of low risk level of blue-chip companies at investors is seen as the biggest plausible reason for this result.

PE is also influenced by the expectation of investors. Accordingly, the companies' high investment expands their PE levels. Likewise, the rise in top-line raises the PEs of the companies with the anticipation of growth in profitability and dividends. Interestingly, in the first model the increase in return on equity has reduced the PE level.

Table 3. *The effect of earning volatility and control variables on price to earning ratio (P/E), 2000-2014*

	Dependent Variables	
	Price to earning ratio (PE)	Price to earning ratio (PE)
PE (-1)	-0.004***	-0.003***
Dividend Yield (1)	9.375***	6.354***
Leverage	-1.055***	-0.821***
Working Capital	-0.995***	-0.271
Earning Volatility	-0.013***	-0.015***
Size	0.481***	1.580***
Profitability	-0.007***	-
Investment	0.309***	0.102***
Sales Growth	0.820***	0.831***
Cross Sections	186	186
Periods	15	15
Number of Observations	2.148	2.148
AR(2) Probability	0.58	0.59
Sargan Test Probability	0.23	0.27
Wald Test Probability	0.00	0.00

Note: All regressions are figured out by GMM based on first order differences. Variables: PE = Price to Earning Ratio, Size(1) = Ln(Asset), Size(2) = Ln(Enterprise Value), Profitability = Net Income/Shareholder Equity. Stars represent confidence intervals respectively 1%, 5%, and 10%.

5. Concluding remark

PE has been one of the most used ratios by investors since 1930. It is utilized in the valuation of stocks, IPO, and the mergers and acquisitions. It has become widespread amongst investors through being calculated practically, being comprehended easily and giving pay-back period. When looking at the historical trends of the stocks, the factors that influence the target multiple and the models that can find out the target multiple are crucial for the investors. This is also vital for the main shareholders who want to climb the value of the company.

PE is generally affected by the financial data of the firms. Firstly, the lagged value of PE has effect on the current level. This confirms the tendency of rising markets to fall.

According to the Gordon growth model, the value of the stock is directly related to the dividend yield. This implies a strong relationship between PE and dividend yield. Model suggests that dividend yield has a dominant influence on PEs of Turkish companies. The average dividend yield at the Borsa Istanbul hovers at 2%. As the companies increase their dividend yield, valuation multiples also augment and cost of capital declines. This means that distributing regular dividends to the investors is very important for the value of the companies. In the United States, the companies distribute dividend for every quarter, and in an environment where interest rates are at 2%, the average dividend yield fluctuates at around 2%. Distributing of the profits also strengthens the company's reputation for its investors.

Moreover, the PEs of the firms increase, as investments and net sales of the companies augment. So, this means that the market players price expectation growth rate in order to form PE. This result affirms Gordon's basis thesis.

The Gordon growth model claims that apart from the earning growth and dividend payout ratio, rising risk has a negative impact on the PE. According to the model outputs, PEs decrease as the leverage of companies increases. The uptrend in leverage bodes the bankruptcy risk of the firms. This has a negative effect on market multiples. The increase in the working capital need is also a sign of risk levels of the companies and it decreases PE ratios, all other factors are fixed, in the average. In other words, even if the company has a strong net profit, it may lose its net profit due to investment in working capital and cannot generate cash in the bottom line. Investors seem to take this into account working capital effect in the target PE formation.

In addition, the uptrend in earning volatility causes low PE ratios. For the Turkish firms, the rise in company profits is too vital. However, if there is high volatility in the boosted profits, this may have negative effects on the company value. The slight but more stable earning growth may has more positive impact on the corporate value. Stabilizing the profitability of companies with foreign exchange or commodity hedges can increase the PEs of companies. The level of stabilization profit that Turkish companies can obtain through foreign exchange hedges both in foreign currency positions and in raw material imports increases the value of the company by reducing cost of capital.

The model only takes into account the PE ratio as market multiple. How other market multiples such as EV/EBITDA are influenced by similar variables may be important for further studies. Also, there may be one-off transactions like the profit/loss of real estate sales. Throughout the sample, the elimination of one-offs can allow healthier outcomes. Moreover, the differentiation of companies' depreciation policies also prevents the standardized net profit level for all samples. Establishing a similar amortization policy for all companies can help to identify healthier PEs.

References

Afza, T. and Tahir, S., 2012. Determinants of Price-Earning ratio: The case of chemical sector of Pakistan. *International Journal of Academic Research in Business and Social Sciences*, Vol. 2, No. 8.

Arellano, M. and Bond, S., 1991. Some Tests of Specification for Panel Data:Monte Carlo Evidence and an Appolication to Employment Equations. *Review of Economic Studies*, pp. 277-297.

Baltagi, B., 2005. *Econometric Analysis of Panel Data.* Chichester, England: John Wiley and Sons Press.

Barnes, R., 2001. Earning Volatility and Market Valuations: An Empirical Investigation. *Working Paper*, London Business School.

Beaver, W. and Morse, D., 1978. What Determines Price-Earning Ratios? *Financial Analyst Journal*, Vol. 34, No. 4, pp. 65-78.

Constand, R., Freitas, L. and Sullivan, M., 1991. Factors Affecting Price Earning Ratios and Market Values of Japanese Firms. *Financial Management*, 20(4), Winter, pp. 68-79.

Crag, D., Johnson, G. and Joy, M., 1987. Accounting Methods and PE Ratios. *Financial Analyst Journal*, March-April, 43(2), pp. 41-45.

Gordon, M. and Shapiro, E., 1956. Capital Equipment Analysis: The Required Rate of Profit. *Management Science*, 3(1), pp. 102-112.

Jaffe, J., Keim, D. and Westerfield, R., 1989. Earnings Yield, Market Values and Stock Returns. *Journal of Finance*, March, XI, IV (1), pp. 135-148.

Leibowitz, M. and Kogelman, S., 1990. Inside The P/E Ratio: The Franchise Factor. *Financial Analyst Journal*, November-December, 46(6), pp. 17-35.

Nikbakht, E. and Polat, C., 1998. A Global Perspective of P/E Ratio Determinants: The Case of ADRS. *Global Finance Journal*, 9(2), pp. 253-267.

Reilly, F., Griggs, F. and Wong, W., 1983. Determinants of The Aggregate Stock Market Earnings Multiple. *Journal of Portfolio Management*, Vol. 1, No. 1, pp. 36-45.

Zorowin, P., 1990. What Determines Earning-Price Ratios: Revisited. *Journal of Accounting*, Summer, 5(3), pp. 439-457.