Valuation is the first step toward intelligent investing. The P/E ratio is one of the most commonly used valuation methods in the world of investment. An understanding of P/E ratio is very important for normal investors before taking any investment decisions. The P/E is the result of a network of influences such as: expected growth rate, current and future risk, current and future investment needs, dividends, stability of earnings, ROIC, debt in the capital structure, general market trend, interest rates.

In the first chapter, I aimed presenting the conceptual framework and the importance of P/E in stock valuation process. What is not commonly known though, is that there are different ways to calculate P/E ratios and that there are various drivers which determine its value. P/E ratios of the same index or company will vary depending on the methodology used as a foundation for the calculation. While writing this paper I tried to describe this concept, as well as explore the various approaches to the P/E ratio valuation model. Nevertheless, my goal was to identify the most accurate determinants of this ratio and to settle the most appropriate way to interpret the valuation results, according to context.

When investing in a stock, one’s interest primarily lies in whether the equity in a company is fairly priced. An equity multiple requires two inputs, one for the market value of the equity and one for the variable to which equity value is scaled – earnings, book value of equity or revenues, for instance.
Relative valuation is simple and easy to understand. When valuing a stock by multiples, one has to:

- create a list of stocks issued by comparable companies – often industry peers – and get their market values
- convert these market values into comparable trading multiples, such as P/E, price-to-book etc.
- compare the company’s multiples with those of its peers in order to conclude whether the stock is under or overpriced.

The multiples can be divided into two groups:

1. Multiples based on the company’s capitalization
   - The price/earnings ratio (P/E)
   - Price to Sales (P/S)
   - The price/book (P/B)

2. Growth-referenced multiples
   - The Price Earnings to Growth ratio (PEG)

Because part of a stock's intrinsic value is the percentage of a company's earnings it represents, one of the most popular valuation methods is looking at the price-to-earnings ratio (P/E). The P/E, which is the stock's share price divided by its EPS (earnings-per-share), tells one how much investors are currently willing to pay for each dollar of the company's current earnings. The price-to-earnings ratio also shows the amount of time (years) it takes to recover one’s investment in a stock (the price paid) from the company’s earnings (if all profit was assigned for dividends). The lower the ratio, the shorter it takes to recover the investment, thus the stock is cheaper.

P/E Advantages
- The most popular valuation metric due to its ease of calculation.
- Using earnings as denominator, a known determinant of investment value.

P/E Shortcomings
- Earnings can be negative or very low which makes the P/E meaningless.
- The denominator (earnings) is based on an accounting measure of earnings that is susceptible to forms of manipulation. Companies often use
a variety of accounting techniques to alter their reported net income. As a result, the reported earnings figures we read about are often not entirely representative of a company's true financial situation. Since net income is a critical component of a firm's P/E ratio, manipulated earnings can lead to misleading P/E data.

- No consensus regarding the use of operating or reported earnings.

The research in this area has mainly been devoted to the ratio analysis as the process of comparing and quantifying relationships between financial variables, such as those variables found in the statement of financial position and income statement of a company, measuring performance of security markets using financial ratios. The P/E ratio is the basic measure of a company’s performance from the market’s point of view and it is widely used.

The finance literature focuses in numerous empirical studies on the determinants or variations of the P/E ratio. Generally, the studies reveal two main variables: the growth in earnings and the risk. Part of the more recent studies disclose a varying number of local firms in the equity markets of the industrial countries.

Harri Ramcharran studies the factors determining the P/E in an article published by the University of Akron, USA in 2002 (An empirical analysis of the determinants of the P/E ratio in emerging markets). Tian Yuehong and Zheng Jianxin leaded a study based on the booming economy of China. They analyzed the main factors that affect the P/E ratio based on a sample of listed companies from the Chinese market. The Istanbul stock market has been studied by Funda H. Sezgin. The aim of this study was to identify relationship among market stock return, dividend yields and price to earnings ratio affect in the period 2000.01-2009.12. Therefore, to determine long-run and short-run relationship, Johansen cointegration tests, error-correction models and Granger causality tests were used. Ratios are examined for ISE 100 index. The ISE National-100 index is used as a main indicator of the National Market. Another economy, similar study: ‘Fundamental determinants of the Australian price–earnings multiple’. This is a first study attempting to investigate the factors fundamental to the setting of the price–earnings (P–E) multiple for the Australian stock market. In this study carried out in 2004, the authors Abul Shamsuddin and John Hillier from the University of Newcastle, the
ASX 200 index is used as a measure of the market wide P–E multiple. It is demonstrated that a large portion of the variation in the P–E multiple can be explained by the dividend payout ratio, interest rates and GDP growth rates.

In the second chapter I presented the methodology used in the empirical case studies. Testing the influence of determinants on P/E considers a sample of 27 listed companies in case of US, respectively 26 listed companies in case of China. The selection process of the companies takes into account the membership to the same activity sector, telecommunication in this case. Moreover, I considered the data availability of these determinants as not all indicators have available values on 2012 Damodaran database.

After the determination of the sample, the next step was to obtain the relevant information for the study. Therefore, a series of indicators were considered to make a thorough analysis of this sector.

One or more of these determinants may explain the variations in P/E and may influence its value at a certain moment. For these particular empirical studies (developed and emerging market), three key determinants have been selected:

- Expected growth in revenues for the next 5 years
- 3-y Regression beta
- Payout ratio

The most common tool used is the regression. A regression is a statistical measure that attempts to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables).

The two basic types of regression are linear regression and multiple regression. Linear regression uses one independent variable to explain and/or predict the outcome of Y, while multiple regression uses two or more independent variables to predict the outcome. The general form of each type of regression is:

**Linear Regression:** \( Y = a + bX + u \) (1), and

**Multiple Regression:** \( Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \ldots + b_tX_t + u \) (2)

*Where:*
\[ Y = \text{the variable that we are trying to predict (P/E)} \]
\[ X = \text{the variable that we are using to predict } Y \text{ (expected growth in revenues – 5 years, 3y regression beta and payout ratio)} \]
\[ a = \text{the intercept} \]
\[ b = \text{the slope} \]
\[ u = \text{the regression residual.} \]

In order to determine the value of regression equation coefficient, the method of least squared was used, which implies the following tests:

1. Normality of distribution law of residual terms
2. Homoskedasticity of residual terms
3. Autocorrelation of residual terms

In the last chapter, I presented the 2 regressions on telecommunication sector in case of American and Chinese markets. Analyzing the multiples that characterize the companies from the two markets, the following facts best describe the differences in terms of valuation. The results verify the research conclusions of Ernst&Young study made public in 2011.

1. Large companies that operate in China telecommunication industry have higher valuation multiples than their peers in the US mature market. The explanatory reason would be that investors place a premium on growth prospects, so long as they are well monitored and diversified. Therefore, the greater the exposure to emerging markets, the higher the EV/EBITDA multiple. This trend shows their ability to benefit from market growth rates and better margins, which are typical of less mature markets.

2. A second noticeable fact is that the smaller the company and the higher its exposure to emerging markets, the higher the Beta. The beta contains valuable information about the company’s risk profile. Typically, the telecommunications industry is now considered to be slightly less risky than the overall market, with beta coefficients within the 0.75-1.0 range.

Smaller telecommunications operators usually have a higher beta as their stocks are more volatile. Their operations are considered to be riskier than a larger comparable business, and therefore they would normally yield higher returns on investment. Therefore, exposure to emerging or mature markets also influences the operator’s risk.
3. The higher the exposure to emerging markets, the higher the price-to-book ratio (P/B). Price-to-book (P/B) ratios of large telecommunication companies operating in China are higher than those of their peers in developed market, USA. This shows that the market expectations of high growth have been built into their share price, thus boosting their P/B ratios.

Nevertheless, comparing the empirical studies of the two markets, out of the three independent variables (estimated growth of revenues, beta and payout ratio), only two have statistical significance over the variations of P/E. While American P/E positively varies in relation to estimated growth of revenues and payout ratio, the Chinese P/E varies positively in relation to estimated growth in revenues, but negatively in relation to beta. On the other hand, the payout ratio, with an associated probability of 2%, has a strongly significance in the American model, while in the Chinese emerging market it is not statistically valid.

After looking at the P/E ratio as a valuation model, we can conclude that while the expected growth in revenues is always obvious and easily determined by a look at the chart, while the other two factors included in the regressions have different statistical meanings.

Regardless of which P/E ratio we choose to use, P/E ratios and by extension stocks are overvalued, the risk/reward ratio seems to favor a cautious approach when investing in the market. Thus, it would be wise to wait for the P/E ratios to get to a level which history has proven to be a good investment opportunity for the long term.

However, there are some market sectors which provide stocks with growth perspectives and low volatility, especially defensive stock, which are less sensitive to business cycles.

**BIBLIOGRAPHY**


Other sources:

pages.stern.nyu.edu/~adamodar/
www.bloomberg.com
www.ey.com/
www.finviz.com
www.investopedia.com
www.reuters.com
www.standardandpoors.com
www.wikipedia.com