

THE STUDY OF FINANCIAL INDICATORS THAT REFLECT THE PERFORMANCE AND VALUE OF COMPANIES LISTED ON THE ROMANIAN CAPITAL MARKET

-Estimating market multiples-

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1. Abstract

The financial performance is a topic of major importance because it is the main criterion for appreciating a company's activity. The company's performance means maximizing shareholder value by increasing profitability and rentability. Performance and enterprise value are closely linked. Financial performance leads to value and value is an expression of performance. The measurement of performance and enterprise value can be achieved by using financial indicators. Our work focuses on the study of these indicators, with focus on the listed companies on Romanian capital market. We chose the most commonly used indicators of performance and market value: PER, PBR, PSR, EV / EBITDA, EV / EBIT and EV / SALES. In valuation practice these indicators also play the role of synthetic multiples and can be calculated even for the entire national economy through multiple regression.

Questions that we try to answer are:

- 1) can these synthetic multiples be estimated for the Romanian capital market through multiple regression?
- 2) what are the determinants of each and how to interpret their influence in economic terms?
- 3) which of these multiples provide the most accurate estimation?

2. Introduction

The financial performance of firms is the most important criterion for evaluating their activity. A company that does not perform well in financial terms, generating losses can not continue its activity on long term. On the other hand, not every level of profit is enough. The company must increase shareholders' wealth and this can only be done by reaching a certain level of profitability, expected by them. Here comes the role of financial management and the decisions they take, investment, financing and dividend distribution shall achieve this goal. From this point of view, the assessment of company performance through specific performance indicators, has particular importance. Enterprise performance evaluation is performed compared to similar businesses in the same sector, industry or even national economy.

For companies listed on the stock market, shareholder value maximization is achieved by maximizing the market value of equity. Previous studies on this topic use indicators such as: the percentage increase in the stock price, TSR (Total Shareholder Return) MVA (Market Value Added) or EVA (Economic Value Added) to evaluate the performance of the company. We believe that the use of

indicators such as PER, PBR, PSR, EV / EBITDA, EV / EBIT, EV / SALES to measure performance would bring a new perspective in this area. These indicators, also known as market multiples, are currently used in the practice of company valuation. They are part of the market approach (relative valuation). In the market approach the company is compared to similar companies in terms of scope of activity, size, number of employees etc. There is also another method of implementing this approach by using market multiples estimated through multiple regression. This method removes the subjectivity of choosing the set of comparables. Synthetic multiples estimated based on the fundamental data of companies determine which of the fundamentals of such companies significantly influence the multiples and quantify that influence.

Synthetic multiples represent the meeting point between the valuation of companies and the study of their performance. They have multiple utility:

- criterion for assessing company and financial management performance;
- selection criteria for investments by identifying undervalued and overvalued companies;
- means of assessing enterprises, useful for evaluators.

We will try to estimate these synthetic multiples for the Romanian capital market. Such a study is useful to find out which of the fundamentals of the companies most influence the market value and to make comparisons with other economies. Additionally we want to determine which of these multiple offers better estimates of market value, using the criterion of average errors of estimation.

Questions that we try to answer are:

- 1) can these synthetic multiples be estimated for the Romanian capital market through multiple regression?
- 2) what are the determinants of each and how to interpret their influence in economic terms?
- 3) which of these multiples provide the most accurate estimation?

3. Literature review

3.1 Classification of financial performance indicators

The performance of listed companies on the capital market should be measured using those indicators that reflect the investors view of the market as a whole, and not just based on the accounting data. Certain financial performance indicators such as margin rates and rates of return, are based solely on the accounting information when trying to capture the performance of an enterprise. The indicators containing the market values of companies synthesize a greater volume of information of risk, expected growth, and the overall situation of the company. For companies listed on the stock market are preferred the indicators of market value. The latter are also influenced by the information in the financial statements.

Among the indicators of market performance market multiples play a special role. They express how much investors are willing to pay for a stake in an enterprise. From this point of view are very useful and applied in valuating companies.

Enterprise performance indicators can be classified as follows:

- margin rates: PN / CA , $EBIT / Sales$, $EBITDA / Sales$
- profitability ratios: ROA (Return on Asset), ROE (Return on Equity) ROIC (Return on Invested Capital).
- indicators of market performance: PER (Price Earnings Ratio), PBR (Price to Book Ratio), PEG (Price Earnings Growth), EPS (Earnings per Share), EV / EBITDA (Enterprise Value to EBITDA), EV / EBIT (Enterprise Value to EBIT), EV / Sales (Enterprise Value to Sales), EV / CF (Enterprise Value

to Cash Flow), PSR (Price to Sales Ratio), Divy (Dividend Yield), MVA (Market Value Added), TSR (Total Shareholder Return), the percentage increase of the share price, Tobin's Q.

➤ shareholder value indicators: EVA (Economic Value Added), NPV, IRR.

3.2 Valuing companies using the market approach

One of the main difficulties encountered in valuing assets in general, businesses in particular, is the lack or limited data available. This is even more pronounced in emerging economies. On the one hand, in this kind of economy, economic activity has a lower level compared to developed economies. The number of transactions is lower and the value of this transaction is also lower. Consequently interest to build a comprehensive database that features such transactions is reduced. Romania is among emerging economies and assessment activity of enterprises is facing the difficulties mentioned above. Calculation of synthetic multiples for the entire capital market so that the group of comparable companies can be widened is one of the solutions to this problem. So, the topic addressed has significant practical utility.

Approach The market approach is based on the substitution principle. According to this, the investor will prefer the lowest price to equal risk in the event of alternatives to choose (Stan & Anghel, 2009). This attitude is similar to that of portfolio investors seeking to build efficient portfolios that provide the highest return for a certain level of undertaken risk. The alternatives, in our case businesses, must not be identical to the subject business, but should be similar and relevant. Similar refers to the nature of the business, the economic sector it belongs to. Relevant character refers to the investors' expectations about the level of risk, profitability and liquidity of the company. (Stan & Anghel, 2009). In his approach, in search for an investment the buyer will analyze the market looking for some comparable companies. He will not pay for a particular enterprise more than for a comparable business that has the same risk and return. The buyer also analyzes market transactions with similar and relevant enterprises to determine a range of values. In analyzing the sales price the buyer must investigate whether behind a transaction hides a special motivation to parties that may influence the market value, transforming it into a type of special value.

The market approach is heavily dependent on the existence of market information. Its applicability is limited by market conditions that rapidly change or where business transactions are rare. (Stan & Anghel, 2009).

3.3 Informational efficiency of Romanian capital market

Informational efficiency of the market in general and the capital market in particular has special significance in the valuation process. This concept was developed by Eugene Fama (1971). An efficient market is a market where prices of traded assets reflect all available information related to these. In this situation, of the efficiency, the price will be the reflection of asset value. In an efficient market prices can suffer deviations from value, but they are random and investors can not develop an investment strategy to profit from these deviations (Damodaran, 2004). If the market is not efficient, when asset prices deviate from the value overvaluation and undervaluation situations of assets will occur. In an efficient market it is not possible to obtain yields greater than those of the market, while in inefficient markets it is possible. Exceeding market yields can be achieved by exploiting inefficiencies precisely when the price no longer coincides with the value and assets are overvalued or undervalued. To obtain higher yields market inefficiencies need to correct in time, and the prices need to come back to the fundamental value. The time it takes to make this correction is very important and it may take several months or years (Damodaran, 2004).

The valuation of assets, businesses in our case will run differently in the condition of efficiency or inefficiency of the market. If the market is efficient assessment approach will be oriented to justify the market price. If the market is inefficient, the valuation will focus on a reasonable estimate of the asset's fundamental value (Damodaran, 2004).

Studies conducted in the Romanian capital market determine whether the conditions of the weak form of informational efficiency are met. Informational efficiency in weak form is present if asset prices fully reflects the historical information: historical values, changes in prices, the volume of transactions. If this is done there will not be any correlations between past and future changes in stock prices, so changes will be independent. (Stănculescu & Mitrică, 2012). Accordingly, investors may not obtain surplus profits based on historical prices.

Dragotă and Mitrică (2004) conclude that the conditions of informational efficiency in weak form are not met. It follows that any other forms of informational efficiency, semistrong and strong are also not present. However the study shows that excess profits can not be obtained from the market due to transaction costs and temporary liquidity shortages.

Stanculescu and Mitrică (2012) conducted a similar study on the 10 most liquid shares traded on the Bucharest Stock Exchange. They use tests for unit root to verify if the share prices follows a random walk process type. The findings show that there is not a random walk process and, accordingly, weak form of informational efficiency is not present.

3.4 Multiples description

PER expresses the time period in which a stock investment can be recovered and the amount of money that the investor is willing to pay for net profit per share. In terms of business valuation practice, multiple PER is used in assessing companies at the mature stage of their life cycle, when development investment are no longer needed.

The intrinsic value of PER derived from Gordon & Shapiro model is :

$$P_0/EPS_0=PER=[d_0*(1+g_n)]/(k-g_n)$$

PBR shows how many times investors are willing to pay for the book value of equity. If $PBR > 1$ it means that investors appreciate the value of equity above the value reflected in the accounts. This is due to intangible factors that are not included in the accounts of the company, but are recognized by the market (Stancu, 2007). An example of this is goodwill an intangible asset that arises from the reputation of the enterprise, commercial venue, quality management etc. The fundamental value of PBR, resulting from Gordon-Shapiro model is shown in the figure below:

$$P_0/BV_0=PBR=[ROE*d_0*(1+g_n)]/(k-g_n)$$

PSR (price to sales ratio) is part of the category called revenue multiples . It is used to compare companies that have a homogeneous and similar turnover, a similar share of operating costs and debt. PSR advantage is that it does not take negative values, as opposed to profit multiples (PER, EV / EBIT) or multiples of the book value of equity (PBR). Thus it is available for companies with difficulties or at the beginning of their activity. Another advantage of PSR is that it is not affected by depreciation, accounting policies etc. The third advantage is that the turnover and PSR are less volatile than net profit and PER. PSR is less influenced by cyclical developments in the company than income multiples (Damodaran, 2004).

The fundamental value of PBR, resulting from Gordon-Shapiro model is shown in the figure below:

$$P_0/\text{Sales}_0 = \text{PSR} = [\text{Net margin} \times \text{Payout ratio} \times (1 + g_n)] / (k_e - g_n)$$

EV / EBITDA is frequently used to assess the overall businesses, unlike PER and PBR that are used to assess equity. Analysts prefer this multiple because there are fewer cases where negative values occur, unlike PER. It happens more often that an enterprise should have loss, so a negative PER, than to have a negative EBITDA margin. Another advantage of this is that companies with different depreciation policy, leverage and effective tax rate can be compared. These advantages ensure the objectivity of this indicator. Fundamental factors that influence the value of EV / EBITDA are shown in the formula below:

$$\text{EV}_0/\text{EBITDA}_0 = [(\text{ROIC} - g_n) / \text{ROIC}_0 * (\text{WACC} - g_n)] * (1 - \tau)(1 - d)$$

EV/EBIT is used to compare companies with different leverage and effective tax rate. Is part of the income multiples and is a version of multiple EV / EBITDA. Fundamental factors that influence the value of EV / EBITDA are shown in the formula below:

$$\text{EV}_0/\text{EBIT}_0 = [(\text{ROIC} - g_n) / \text{ROIC}_0 * (\text{WACC} - g_n)] * (1 - \tau)$$

EV / SALES is part of the revenue multiples, along with PSR. It used to compare companies that have a homogenous turnover and share similar operating costs. The share of operating costs is important because it reduces the revenue and may lead to different operating results. The intrinsic value of this multiple derived from the DCF method (Discounted Cash Flow) applied to cash flows to the investors (CFNI or FCFF), is the following:

$$\text{EV}_0/\text{Sales} = [\text{After tax operating margin} (1 - \text{Reinvestment rate})] / (\text{wacc} - g_n)$$

4. Empirical review

Empirical studies conducted on synthetic market multiples of enterprises use both econometric method with control variables and averages. Relevant to our study are those using econometric method, but those which use averages have also a certain utility to compare results. We will further mention studies belonging to both categories.

O'Byrne (1996) conducts a study that determines the influence of certain financial performance indicators on the market value of the company. As dependent variable he uses enterprise value divided by invested capital (EV / invested capital) and explanatory variables are EVA / Capital invested (Economic Value Added / Invested Capital), NOPAT / invested capital (net operating profit after tax / capital invested) and FCF / Capital invested (Free cash flow to firm / invested capital). The database used is the list of public companies included in the composition of Stern Stewart Performance Index 1000. The study covers the period 1985-1993. Using multiple linear regression as a research method, O'Byrne discovers that NOPAT and EVA have similar explanatory power. NOPAT and EVA variation explains about 33% of the variation of MVA (Market Value Added). The findings show that EVA is best linked to the company's market value and offers the best prediction. (O'Byrne, 1996).

Another author who has studied market multiples of enterprises and the factors that influence them is Aswath Damodaran. Fundamental factors influencing the market multiples are: expected growth, payout ratio, risk, net margin, effective tax rate, reinvestment rate, return on invested

capital. Market value of assets always include future expectations. It is therefore necessary to introduce a variable to reflect expected growth. One can use forecasts of financial analysts or, if not available, variables such as historical growth in net profit or EPS growth.

Damodaran's study also underlines the instability of coefficients in time. R^2 is declining, which means that the explanatory power of the variables used diminishes over time. These changes are explained in part by the volatile nature of profits. Because of instability over time, these equations should periodically be re-estimated to capture changes in the stock market and the real economy. The author has in his personal website a special section for the periodic estimation of synthetic market multiples of companies. This estimation is performed in the developed economies and emerging economies also. From the comparative study of these estimates one may notice differences in terms of control variables, their coefficients and their statistical significance (Damodaran, 2006).

Ivashkovskaya and Kuznetsov (2007) conducted a comparative study of market multiples of companies in the US and Russia. They used cross-section data series, covering the 2001-2006 period, of US companies listed on the NYSE (New York Stock Exchange) and Russian companies listed on RTS (Russian Trading System). They used two methods for determining the synthetic multiples (PER, PBV, EV / Sales). The first method is based on a single regression equation to estimate the synthetic multiples, a vector of financial variables and a dummy variable to distinguish the Russian from the American companies. The second method uses one regression equation for each of the two markets, without the need of dummy variable.

In the estimation of these multiples the authors use a set of financial variables that are considered relevant: interest coverage ratio, payout ratio, leverage, turnover, EBIT margin. The study conducted notes that the equation estimating PER is unstable over time. Thus, from one year to another signs of the coefficients and their statistical significance may change. This behavior is explained by the volatility and management of profits. The profit management means the possibility to influence the accounting results for the financial year.

Unlike PER, PBV and EV / Sales are more stable over time. The estimated coefficients have signs consistent with economic reality and are statistically significant. The authors also highlights the possibility that data collected from emerging markets are subject to error and influenced by a subjective perspective (Ivashkovskaya, et al., 2007).

5. Case study

We try to estimate companies' synthetic multiples for the Romanian capital market. Such a study is useful to find out which of the fundamentals of the companies most influences their market value and to make comparisons with other economies. Additionally we want to determine which of these multiple offers better estimates of market value, using as criteria the average estimation errors.

5.1 Data base

To obtain the data necessary for the case study we used the Amadeus database, which contains economic and financial information about a large number of public and private companies in Europe.

We chose to calculate the synthetic values of multiples across the capital market in Romania because if we were limited to a particular sector or industry the number of companies would have been very small and an impediment to achieving a statistically relevant study. We chose companies from the regulated market. The resulting sample consists of 66 companies. We collected data related to 2013 as for 2014 there were numerous shortcomings that would have resulted in significant reduction of our sample. Where data was missing we completed it with information from the Bucharest Stock Exchange website.

5.2 Methodology

To determine the influence of different fundamental variables of companies on the market multiples we used the multiple linear regression method. This research method was used in previous studies, such as those of O'Byrne (1996), Damodaran (2004 and 2006), Herrman & Richter (2003) and Ivashkovskaya & Kuznetsov (2007). Some indicators that were not in the Amadeus database were obtained by own calculations. This is the case for ROA, E (g) PN, E (g) CA, $d, \tau, EV / EBITDA, EV / EBIT, EV / SALES$.

The expected growth rate of net profit E (g) PN was obtained as the average net profit growth rate over the last 5 years. It has positive and negative values. The expected growth rate of turnover, E (g) CA, was calculated similarly. Although turnover and net profit are two correlated variables, we chose to calculate E (g) as it has a lower volatility and less negative values. Enterprise value multiples were obtained as the ratio of enterprise value, calculated by the database Amadeus, and the corresponding margin (EBITDA, EBIT).

In our study we used a total of 22 variables. Of these, six are dependent variables (market multiples) and 16 are independent, represented by financial indicators that reflect performance and enterprise activity. Data taken from Amadeus was supplemented with data from the Bucharest Stock Exchange site. In some cases we had to use our own calculations to obtain the values of certain variables, such as: E (g) PN, E (g) CA, payout, reinvestment rate, tax rate.

In the Amadeus database the variable EV, enterprise value, was calculated for the year 2013 only for 50 companies in our sample, which restricts our number of available observations. For the explanatory variables used in the study containing EV multiples we have also used 50 observations (Annex 3. Variables definition).

5.3 Results

For every multiple we studied its distribution in the capital market and variables that had a statistically significant effect. In some cases we found only one significant variable (PER and EV / EBITDA) and we ended with a simple linear regression. After obtaining regression estimation errors we calculated the average as a percentage to verify if these multiples can be used or not in practice evaluation.

5.3.1 PER determinants

We estimated regression equation on data sets containing both positive and negative values of PER and EPS. Companies' profits generally have high volatility. This is true in Romania also, to which are added the low liquidity of the stock market. A third factor is the volatility of revenues in the studied economic context, the period of 2008-2013, for which we calculated the average growth rate. During this period many companies have alternated years of profit or loss and there were large variations in the absolute value of profits from one year to another. All this results in a large dispersion of data series, making it difficult to obtain convincing statistical results and high R^2 values.

$$PER = 4.34 E(g)^{**} + 11.91 \quad R^2=0.08$$

** Significant coefficient for the 90% confidence level.

We tested the influence of variables that reflect profitability, risk, profitability and cash flow of the company PER (Annex 6. Case study results). Of these, only two were found to be statistically significant.

The expected growth rate, E (g) has a positive influence on PER. Investors anticipate the future growth of a company by purchasing its shares and thus trying to profit from the present low price. Growing demand for the company's shares increase PER. E (g) is statistically significant with a significance level of 90%. We will remain only with one variable in our regression. The value of R² is low, only 8%. We anticipate that the use of such a model with a low R² will result in high estimation errors. PER has a high level of estimation errors, 423,95%. This is because we have not found many variables that have a significant influence on it. E (g) alone can not explain the PER values, which results in very high estimation errors. This multiple can not be used to value companies in these circumstances.

5.3.2 PBR determinants

In our case study estimating a regression equation to have some statistical significance is difficult. The data of companies present atypical values for some financial indicators such as negative equity or negative return on equity. We chose to keep in our group of companies those with negative PBR because we obtain better statistical results. Their elimination from group led to not finding any variables with significant impact.

$$\text{PBR} = 1.29 \text{ E(g) CA}^* + 0.01 \text{ ROA}^* + 0.56 \quad \text{R}^2=0.32$$

Analyzing the results we observed that the variables ROA and E (g) have a positive impact on PBR. E (g) CA is significant for a confidence level of 99% and ROA for a confidence level of 90%. Investors appreciate companies with a high return on assets and high expected growth of turnover by buying their shares at increasing prices. This will lead to the increase of PBR.

PBR has a small average estimation error of only 20%. Accuracy is high and we can say that this multiple is suitable for evaluation purposes

5.3.3 PSR determinants

To estimate the regression equation corresponding to PSR from the data sample we eliminated the companies that reported losses in 2013. Initially we tried to estimate the regression keeping these companies in the sample but the result obtained was a negative net margin impact, which contradicts the economic reality. A higher net margin has a positive impact on the share price because it's a proof of performance.

$$\text{PSR} = 4.25 \text{ Net Margin}^* + 0.06 \text{ Current ratio}^* + 0.37 \quad \text{R}^2=0.54$$

Among the explanatory variables we tested there were only two statistically significant for the confidence level of 99%. These are current liquidity and net margin. Current liquidity is an expression of the company's risk. The higher the liquidity the lower is the risk of the company not being able to repay short-term debt. A company with low risk has a high stock prices, so a higher PSR, as confirmed by the positive coefficient of this variable.

* Significant coefficient for the 95% confidence level.

Net margin, as stated above, has a positive impact on the PSR because it is a proof of performance. In our equation we used the percentage net margin. If the net margin is higher than the share price is higher.

PSR has a high average estimation error of approximately 170%, which means that the estimated value may be more than double the actual value. We believe that this multiple is not suitable for estimating value, under these conditions.

5.3.4 EV/EBITDA determinants

Fundamental factors influencing the market value of this indicator are: the expected growth, reinvestment rate, risk, return on capital employed (Damodaran, 2006). From the initial sample of companies we have eliminated those for whom EV wasn't calculated. A total of 50 companies remain.

$$EV/EBITDA = 29.31 ROCE^* + 4.59 \quad R^2=0.4$$

According to the results above ROCE (Return on capital employed) is the only variable statistically significant. P-value corresponding to this variable is near the confidence level of 99%. ROCE expresses the company's profitability obtained by all investors, both shareholders and creditors. In this way the market value of equity and debt will grow with their rentability. EV / EBITDA has a low average estimation error of around 22%. This is similar to the average EV/ EBIT. We believe that this multiple has a high estimation accuracy.

5.3.5 EV/EBIT determinants

Fundamental factors that influence this multiple are: return on capital employed, risk, expected growth and the effective tax rate.

$$EV/EBIT = 4.44 \text{ Reinvestment rate}^* - 0.09 \text{ Beta}^{**} + 0.013$$

We observe that only two variables are statistically significant: reinvestment rate and β factor. Reinvestment rate has a positive impact on EV / EBIT as net income reinvested increases the equity of the enterprise and then increases the total value of the company. β , a measure of risk has a negative impact on EV / EBIT. Investors purchase risky shares at lower prices to secure a higher return in compensation. This leads to a lower value of market capitalization and enterprise value.

This multiple has a small average estimation error, around 22% which means it can be used to accurately estimate the enterprise value

5.3.6 EV/SALES determinants

EV/SALES takes only positive values because both enterprise value and turnover have only positive values.

* Significant coefficient for the 95% confidence level.

** Significant coefficient for the 90% confidence level.

We tested the influence of several variables on the multiple EV / SALES and found only two that are significant.

$$EV/SALES = 2.95 \text{ EBITDA Margin}^* + 0.65 \text{ Payout}^{**} + 0.54 \quad R^2=0.23$$

Among profitability indicators EBITDA margin provided the best results. This has a positive impact and is significant for a confidence level of 99%. Payout ratio also has a positive impact. This leads to increased share price and market capitalization growth and thus contribute to increasing enterprise value. EV / SALES has an average estimation error exceeding 100%. We believe that this multiple has a low estimation accuracy.

6. Conclusions

At the end of the study we can conclude that calculating the synthetic multiples for the Romanian capital market is difficult. This is due to the low number of listed companies, leading to a reduced number of observations for econometric calculation. Price changes of shares are also affected by the low level of liquidity of the market and its lack of informational efficiency. The influence of fundamental indicators on the market value of companies is more difficult to identify.

Information provided by financial information services may be incomplete and outdated. In this case the analyst or the appraiser must use their own calculations to complete the data base. Our study was conducted for 2013, the latest year for which we have found information processed about Romanian companies. The previous economic period was a difficult one for Romanian businesses. The recovering from economic and financial crisis that started in 2008 was only partial. A large number of businesses have losses, some even have negative equity, others have negative expected growth rates. Significant relationships between variables are difficult to identify. For some multiples, such as PER, we found a single statistically significant explanatory variable, which reduces the explanatory capacity of regression and leads to high estimation errors.

For PER multiple, PSR, EV / SALES average estimation errors are more than 100% and they can not be used in the valuation process in this form. PBR multiples, EV / EBITDA, EV / SALES estimation errors were low, around the level of 20%. This is an acceptable level and the equations obtained can be used in practice. Determinants of the multiples, which emerged from the econometric study are:

- for PER: net profit growth forecast;
- for PBR: expected growth in turnover and ROA;
- for PSR: net margin and current liquidity;
- EV / EBITDA: economic profitability (ROCE);
- EV / EBIT: reinvestment rate β factor;
- EV / SALES: EBITDA margin and dividend distribution rate.

As future research directions we mention the possibility of expanding the database with the companies listed on the alternative trading system of the Bucharest Stock Exchange.

* Significant coefficient for the 95% confidence level.

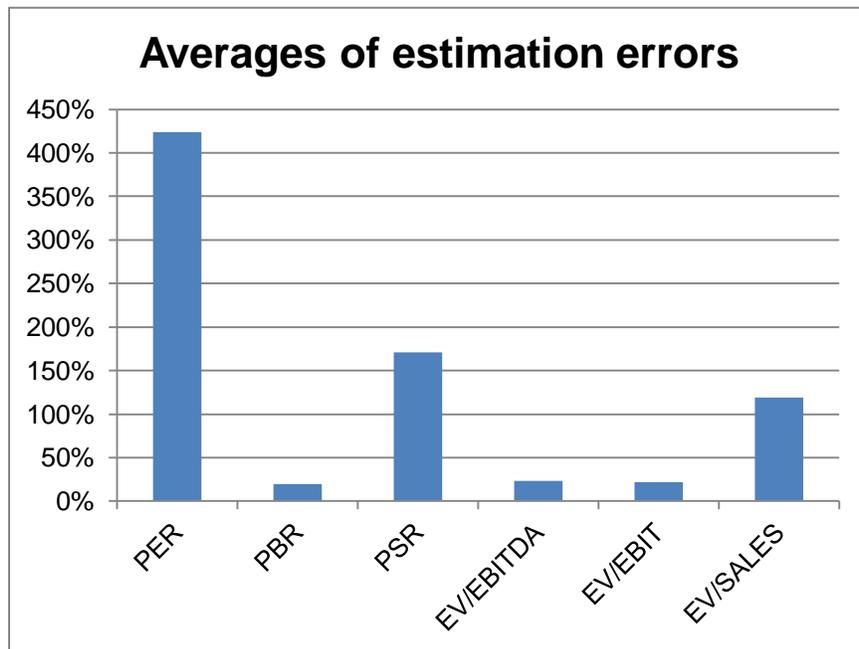
** Significant coefficient for the 90% confidence level.

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8. Annexes



| Multiple | Average of estimation error |
|-----------|-----------------------------|
| PER | 423.95% |
| PBR | 20.03% |
| PSR | 170.65% |
| EV/EBITDA | 23.36% |
| EV/EBIT | 21.83% |
| EV/SALES | 119.05% |

Annex 1. The averages of estimation errors

| Nr. Crt. | Author | Year | Data base | Methodology | Dependent variable | Independent variable | Results |
|----------|---|------|---|--|--|---|--|
| 1 | O'Byrne, S. | 1996 | Companies of Stern&Stewart Performance Index 1000 | Multiple linear regression | EV/Capital invested | EVA, NOPAT, FCF | EVA is the best predictor for EV |
| 2 | Liu, Nissim si Thomas | 2002 | COMPUSTAT | Simple linear regression | PER, PEG, PBR, EV/EBIT, EV/EBITDA, EV/SALES, EV/ASSETS | Expected growth in earnings, Earnings, EBITDA, EBIT, SALES, CFO, Book value of equity | Expected profit offers the best estimates for future performance |
| 3 | Lie, Erik; Lie, Heidi | 2002 | COMPUSTAT | Average, Median | PER, EV/EBIT, EV/EBITDA, EV/SALES, EV/ASSETS | | EV/ASSETS offers the lowest estimation errors |
| 4 | Herrman, Volker; Richter, Frank | 2003 | American and European companies | Simple linear regression, exponential linear regression, average, median | PER, PBV, EV/EBIT, EV/EBITDA, EV/SALES | g, ROE, ROIC, d | The choice of companies based on financial indicators gives the best results |
| 5 | Damodaran, A. | 2006 | COMPUSTAT | Multiple linear regression | PER, PBV, PSR, EV/Sales, EV/EBITDA, EV/Capital ratio | Expected growth, payout, beta, ROE, Net margin, tax rate, reinvestment rate, ROCE | Estimated equations vary in time |
| 6 | Ivashkovskaya, Irina; Parkhomenko, Alexander; Kuznetsov, Ivan | 2007 | NYSE (SUA), RTS (Rusia) | Multiple linear regression | PER, PBV, EV/Sales | Interest coverage, leverage, sales, EBIT/Sales, ROE | Estimated equations vary in time and from one economy to another |

Annex 2. Empirical studies

| Nr. | Variable | Type | Definition | Source |
|-----|---|-------------|---|--|
| 1 | EV/EBITDA (Enterprise Value to EBITDA) | dependent | Enterprise value/ EBITDA margin | Amadeus |
| 2 | EV/EBIT (Enterprise Value to EBIT) | dependent | Enterprise value / EBIT margin | Amadeus |
| 3 | EV/SALES | dependent | Enterprise value /Sales | Amadeus |
| 4 | PER (Price Earnings Ratio) | dependent | Price/earnings per share | Amadeus, BVB |
| 5 | PBR (Price Book Ratio) | dependent | Price/book value of equity per share | Amadeus, BVB |
| 6 | PSR(Price to Sales Ratio) | dependent | Price/Sales per share | Author's calculations based on Amadeus and BVB |
| 7 | E(g) PN | independent | Expected growth of net profit | Author's calculations based on Amadeus and BVB |
| 8 | E (g) CA | Independent | Expected growth of sales | Author's calculations based on Amadeus and BVB |
| 9 | Payout (Payout Ratio) | Independent | Payout | Author's calculations based on Amadeus and BVB |
| 10 | Current Ratio | Independent | Current ratio | Amadeus, BVB |
| 11 | Reinvestment rate | Independent | Reinvestment rate of net profit | Author's calculations based on Amadeus and BVB |
| 12 | Ln Total Assets | Independent | Natural logarithm of total assets | Amadeus |
| 13 | Ln Sales | Independent | Natural logarithm of sales | Amadeus |
| 14 | Gearing (levier) | Independent | leverage | Amadeus |
| 15 | ROE | independent | Return on equity | Amadeus |
| 16 | Beta (5 ani) | Independent | β factor | Amadeus |
| 17 | ROA | Independent | Return on assets | Amadeus |
| 18 | ROCE | Independent | Return on capital employed | Amadeus |
| 19 | Tax rate | Independent | Effective tax rate | Author's calculations based on Amadeus and |

| | | | | |
|----|-------------|-------------|------------------------------|---------|
| | | | | BVB |
| 20 | EBITDA% | Independent | EBITDA margin, percentual | Amadeus |
| 21 | EBIT% | Independent | EBIT margin, percentual | Amadeus |
| 22 | Net Margin% | independent | Net margin, percentual | Amadeus |

Annex 3. Variables definition

| Nr. | Variable | Number of observations | Minimum value | Maximum value | Average | Median | Standard deviations | Coefficient of variation |
|------------|--------------------------|-------------------------------|----------------------|----------------------|----------------|---------------|----------------------------|---------------------------------|
| 1 | PER | 66 | 0.00 | 60.00 | 21.28 | 13.47 | 18.78 | 88.24% |
| 2 | PBR | 66 | 0.00 | 2.65 | 0.61 | 0.54 | 0.50 | 81.60% |
| 3 | PSR | 66 | 0.00 | 14.30 | 1.14 | 0.52 | 2.02 | 176.30% |
| 4 | EV/EBITDA | 50 | 1.21 | 25.00 | 8.27 | 6.45 | 6.40 | 77.40% |
| 5 | EV/EBIT | 50 | 0.02 | 2.18 | 0.27 | 0.13 | 0.40 | 145.60% |
| 6 | EV/SALES | 50 | 0.07 | 5.23 | 1.08 | 0.81 | 0.99 | 91.95% |
| 7 | E(g) | 66 | -3.35 | 3.91 | 0.31 | 0.11 | 1.34 | 430.57% |
| 8 | E(g) CA | 66 | -0.27 | 0.58 | 0.02 | 0.02 | 0.15 | 761.53% |
| 9 | Current ratio | 66 | 0.04 | 32.01 | 2.97 | 1.64 | 4.31 | 145.36% |
| 10 | Payout | 66 | 0.00 | 1.00 | 0.22 | 0.00 | 0.35 | 155.84% |
| 11 | Ln Total assets | 66 | 16.30 | 24.38 | 19.15 | 18.89 | 1.63 | 8.52% |
| 12 | Gearing | 59 | 0.00 | 10.00 | 0.57 | 0.26 | 1.40 | 243.52% |
| 13 | LN Sales | 66 | 14.32 | 23.62 | 18.42 | 18.48 | 1.83 | 9.95% |
| 14 | ROE | 66 | -0.98 | 1.00 | 0.04 | 0.03 | 0.26 | 575.42% |
| 15 | ROCE | 50 | -1.92 | 0.18 | -0.01 | 0.00 | 0.25 | 3031.21% |
| 16 | ROA | 66 | -0.69 | 0.15 | -0.01 | 0.01 | 0.13 | 887.20% |
| 17 | Beta | 66 | -1.00 | 1.80 | 0.57 | 0.63 | 0.51 | 89.68% |
| 18 | Cota Impozit | 66 | 0.00 | 1.00 | 0.15 | 0.14 | 0.18 | 126.64% |
| 19 | Reinvestment rate | 66 | 0.00 | 1.00 | 0.46 | 0.32 | 0.44 | 96.75% |
| 20 | EBIT % | 50 | -0.65 | 0.35 | 0.02 | 0.03 | 0.17 | 1025.08% |
| 21 | EBITDA % | 50 | -0.98 | 0.53 | 0.11 | 0.09 | 0.22 | 202.95% |
| 22 | Net margin % | 66 | -1.90 | 0.56 | -0.07 | 0.02 | 0.39 | 588.87% |

Annex 4. Descriptive statistics

| VARIABLE | PER | PBR | PSR | EV/EBITDA | EV/EBIT | EV/SALES | E(g)PN | E(g)CA | Current ratio | Payout | Ln Total assets | Gearing | LN Sales | ROE | ROCE | ROA | Beta | Tax rate | Reinvestment rate | EBIT % | EBITDA % | Net margin % | |
|-------------------|-------|-------|-------|-----------|---------|----------|--------|--------|---------------|--------|-----------------|---------|----------|-------|-------|-------|-------|----------|-------------------|--------|----------|--------------|--|
| PER | 1.00 | | | | | | | | | | | | | | | | | | | | | | |
| PBR | -0.04 | 1.00 | | | | | | | | | | | | | | | | | | | | | |
| PSR | 0.17 | 0.48 | 1.00 | | | | | | | | | | | | | | | | | | | | |
| EV/EBITDA | 0.45 | 0.08 | 0.17 | 1.00 | | | | | | | | | | | | | | | | | | | |
| EV/EBIT | 0.02 | -0.17 | -0.14 | -0.27 | 1.00 | | | | | | | | | | | | | | | | | | |
| EV/SALES | 0.07 | 0.17 | 0.32 | -0.05 | 0.22 | 1.00 | | | | | | | | | | | | | | | | | |
| E(g) PN | -0.04 | 0.04 | -0.18 | -0.18 | -0.04 | 0.00 | 1.00 | | | | | | | | | | | | | | | | |
| E(g) CA | -0.06 | 0.49 | -0.01 | -0.04 | 0.12 | -0.15 | 0.15 | 1.00 | | | | | | | | | | | | | | | |
| Current ratio | 0.01 | 0.02 | 0.16 | -0.29 | 0.34 | 0.13 | 0.03 | -0.07 | 1.00 | | | | | | | | | | | | | | |
| Payout | -0.15 | 0.18 | -0.06 | -0.35 | -0.12 | 0.15 | 0.26 | 0.07 | -0.03 | 1.00 | | | | | | | | | | | | | |
| Ln Total assets | -0.31 | 0.03 | -0.01 | -0.12 | -0.43 | -0.05 | 0.17 | 0.06 | -0.18 | 0.13 | 1.00 | | | | | | | | | | | | |
| Gearing | 0.09 | 0.17 | -0.11 | 0.34 | -0.06 | -0.06 | -0.28 | 0.10 | -0.17 | -0.18 | -0.06 | 1.00 | | | | | | | | | | | |
| LN Sales | -0.39 | 0.07 | -0.25 | -0.19 | -0.41 | -0.12 | 0.22 | 0.24 | -0.24 | 0.21 | 0.89 | -0.04 | 1.00 | | | | | | | | | | |
| ROE | -0.59 | -0.21 | -0.08 | -0.45 | -0.18 | -0.11 | -0.14 | 0.03 | -0.01 | 0.09 | 0.16 | -0.59 | 0.18 | 1.00 | | | | | | | | | |
| ROCE | 0.06 | -0.07 | 0.08 | 0.12 | -0.10 | 0.06 | -0.04 | -0.07 | 0.06 | -0.15 | 0.11 | 0.05 | 0.03 | 0.02 | 1.00 | | | | | | | | |
| ROA | -0.55 | 0.38 | 0.04 | -0.50 | 0.04 | 0.14 | 0.41 | 0.38 | 0.16 | 0.32 | 0.01 | -0.24 | 0.10 | -0.18 | -0.04 | 1.00 | | | | | | | |
| Beta | -0.07 | -0.23 | 0.01 | -0.19 | -0.06 | -0.16 | -0.01 | -0.31 | -0.04 | -0.18 | 0.12 | -0.38 | 0.02 | 0.28 | -0.01 | -0.29 | 1.00 | | | | | | |
| Cota Impozit | 0.20 | -0.09 | -0.14 | -0.22 | 0.06 | 0.25 | 0.26 | 0.12 | -0.03 | 0.12 | 0.12 | -0.11 | 0.06 | 0.00 | 0.01 | 0.24 | 0.01 | 1.00 | | | | | |
| Reinvestment rate | 0.15 | 0.12 | 0.04 | -0.11 | -0.14 | 0.10 | 0.34 | 0.33 | 0.17 | -0.32 | 0.03 | -0.13 | -0.02 | 0.05 | 0.07 | 0.43 | 0.10 | 0.33 | 1.00 | | | | |
| EBIT % | -0.28 | 0.43 | 0.33 | -0.50 | -0.09 | 0.24 | 0.31 | 0.29 | 0.22 | 0.36 | 0.32 | -0.12 | 0.30 | -0.08 | 0.02 | 0.85 | -0.20 | 0.24 | 0.40 | 1.00 | | | |
| EBITDA % | 0.13 | -0.23 | -0.08 | 0.06 | -0.17 | 0.32 | 0.04 | -0.23 | -0.03 | -0.22 | 0.29 | 0.02 | 0.21 | -0.03 | 0.36 | -0.12 | 0.09 | 0.12 | 0.09 | 0.01 | 1.00 | | |
| Net margin % | -0.41 | 0.20 | -0.27 | -0.58 | 0.06 | 0.16 | 0.44 | 0.28 | 0.15 | 0.26 | 0.00 | -0.15 | 0.09 | -0.16 | -0.02 | 0.87 | -0.24 | 0.25 | 0.43 | 0.91 | -0.07 | 1 | |

Annex 5. Correlation matrix

| PER | | |
|-----------------|------------|----------------|
| Variabila | Coeficient | <i>P-value</i> |
| Intercept | 56.21 | 0.05 |
| E(g)** | 4.34 | 0.10 |
| LN Sales* | -6.25 | 0.05 |
| Ln Total assets | 3.34 | 0.32 |
| Payout | 7.48 | 0.30 |
| ROE | 6.53 | 0.49 |
| Net margin | 3.18 | 0.64 |
| ROA | -0.05 | 0.85 |
| E(g) CA | 28.13 | 0.13 |
| Cota Impozit* | 28.12 | 0.04 |
| Current ratio | 0.28 | 0.77 |

| PBR | | |
|-----------------|------------|----------------|
| Variabila | Coeficient | <i>P-value</i> |
| Intercept | -0.35 | 0.59 |
| ROA** | 0.01 | 0.10 |
| E(g) CA* | 1.29 | 0.00 |
| Ln Total assets | 0.07 | 0.35 |
| LN Sales | -0.03 | 0.65 |
| Beta | 0.10 | 0.36 |
| E(g) | -0.06 | 0.24 |
| Current ratio | 0.02 | 0.21 |
| ROE* | -0.83 | 0.00 |
| Payout** | 0.31 | 0.07 |

| PSR | | |
|------------------|------------|----------------|
| Variabile | Coeficient | <i>P-value</i> |
| Intercept | 0.27 | 0.90 |
| Current ratio* | 0.06 | 0.04 |
| Net margin* | 4.25 | 0.00 |
| E(g) CA* | 2.95 | 0.04 |
| Cota Impozit** | -1.84 | 0.07 |
| Ln Total assets* | 1.31 | 0.00 |
| LN Sales* | -1.31 | 0.00 |
| E(g) | 0.07 | 0.65 |
| ROA | 0.11 | 0.15 |
| ROE | -0.14 | 0.85 |
| Beta | -0.25 | 0.51 |

| EV/EBITDA | | |
|-------------------|------------|----------------|
| Variabila | Coeficient | <i>P-value</i> |
| Intercept* | 5.63 | 0.01 |
| ROCE* | 29.31 | 0.01 |
| E(g) CA | 5.66 | 0.47 |
| E(g) | -0.65 | 0.49 |
| Cota Impozit | -1.34 | 0.81 |
| Beta | 0.02 | 0.99 |
| Current ratio | -0.49 | 0.24 |
| Reinvestment rate | 2.69 | 0.29 |

| EV/EBIT | | |
|--------------------|------------|----------------|
| Variabila | Coeficient | <i>P-value</i> |
| Intercept | 5.63 | 0.01 |
| ROCE** | 7.05 | 0.09 |
| E(g) CA | 5.66 | 0.47 |
| E(g) | -0.65 | 0.49 |
| Cota Impozit | -1.34 | 0.81 |
| Beta | 0.02 | 0.99 |
| Current ratio | -0.49 | 0.24 |
| Reinvestment rate* | 4.44 | 0.04 |

| EV/SALES | | |
|-------------------|------------|----------------|
| Variabila | Coeficient | <i>P-value</i> |
| Intercept | 4.80 | 0.02 |
| EBITDA Margin %* | 2.95 | 0.00 |
| Payout** | 0.65 | 0.10 |
| Beta | -0.29 | 0.35 |
| ROCE | -0.32 | 0.60 |
| Net margin | 0.19 | 0.82 |
| E(g) | -0.12 | 0.38 |
| ROE | 0.03 | 0.97 |
| E(g) CA | -0.89 | 0.43 |
| ROA | 0.01 | 0.80 |
| Reinvestment rate | 0.12 | 0.75 |
| Ln Total assets* | -0.21 | 0.04 |
| Current ratio | -0.05 | 0.40 |
| Cota Impozit | -0.78 | 0.34 |

Annex 6. Case study results