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FINANCIAL INVESTMENT COMPANIES (SIFS) RELATIVE VALUATION AND FUNDAMENTALS

***Abstract.** We researched the impact of economic data analysis and fundamental financial valuation multiples on the Financial Investments Companies FICs (SIFs) valuations and market prices to assess how relevant these multiples are for relative calculations and ranking of these investment companies. In the first attempt to answer the primary question of our research, we applied the comparison evaluation via multiple methods in order to assess the relative value of the all 5 FICs (SIFs) listed on the Romanian Bucharest Stock Exchange, based on fundamental parameters of the analysis. One answer to the question of our research is that ROE and ROA multiples are the independent variables that best explains the relative valuation differences between the 5 FICs (SIFs). Then, we further approach the second part of the research question trying to identify any possible statistical relationships between multiples relative evaluation and the fundamental factors that feasibly influence these multiples. We analyzed nine regression equations between the three multiples (EV/EBITDA; P/E and Price/Book) and three of their possible independent fundamental factors (MktCap; Tax Rate; ROA; ROE and Reinvestment Rate). We performed our analysis for all 5 FICs (SIFs). Correlation between multiple fundamental factors suggests that the most significant are their relations with rates of return (ROA and ROE), and with the rate of reinvestment of net profit (ReinvRate). The negative correlation between the EV/EBITDA multiple and P/E multiple, on the one hand, and the ROE and*

ReinvRate, on the other hand, is explained by the fact that the profits number of the two multiples are included as denominator of the ratios of these multiples.

Keywords: Stock return, Corporate Finance, Corporate Investment.

JEL Classification : E44, E62, G3, G32, G14, H6

1. Introduction

Evaluating the intrinsic value estimate of companies aims to assess whether the book value and/or the market value (stock) are over or undervalued. On the basis of this relative assessment, an analyst can argue a financing decision or investment. The evaluation on the basis of discounted cash flow (DCF) is expected to generate and estimation of the company capacity to produce cash flow (earnings) for its shareholders. Relative valuation (market multiples based) is centered on the average price paid on the capital market for comparable companies.

Using market based multiples for valuation relies on the assumption that, on average, the market estimation is right in the long run. As a result, the two methods of assessing the value of a company or its stock, DCF and relative multiple based, should lead towards close values. More significant and persistent differences between cash flow generation ability evaluation and relative comparison occur when general economic conditions or sectorial situation of the capital market determine systematic, consistent and persistent under or over valuation of some of specific sectors. Additionally, some other elements and systemic factors can be manifested in this difference, for example the economic cycle or sector operating specifics of the company, monetary or fiscal policy stance, exchange rate expectations, the level of interest rates, economic growth, (de/dis) inflation, etc. Multiples ratios are also related to fundamental indicators of the company, as return on assets (ROA) and on equity (ROE), components of the total cash-flow, overall risk, estimated growth rate, reinvestment rate of net profit, dividend distribution rate, effective tax rate.

A meta-analysis by Damodaran of 550 research studies published from early 2001 on the assessment of capital and valuation of companies shows that DCF valuation¹ can be more than 10 times more conservative (i.e. estimates a lesser value) than multiple based technique. Cash flow based valuation more conservative approach and its final result recommends the method mostly for assessing the potential outcome of mergers and acquisitions investments. Thus, DCF valuations looks more appropriate for minimizing the risk of eventual probability of undertaking a too expensive investment. Paying too high of a price for the acquisition would affect the final profitability of the investment project. However, in evaluating some of the cash-flows, for the residual value, in particular, the value depends essentially on the price multiples. The main argument that makes for market multiples assessment an indispensable method is related to the comparability between companies, between sectors or between their respective capital markets. Furthermore, the introduction of specific prediction, as it required

Financial Investment Companies (SIFS) Relative Valuation and Fundamentals

by DCF analysis, do not entail elements of subjective information asymmetry or different set of forecasts of analysts:

- Relative valuation (by market multiples) are based on the average price paid on the capital market for comparable companies, on the assumption that, on average, the market is right.
- In the discounted cash flow valuation (DCF) we estimate companies' ability to generate future cash-flows (earnings).
- As a result of a same economic logic, the two approaches, DCF and relative, should lead to closer values.
- Divergence between the DCF and the relative multiples valuation arise when general or sectoral capital market systematically over or undervalues some industrial sectors.
- There are instances when relative valuation method exceeds more than 10 times the DCF valuation approach.

We have researched the impact of economic data analysis and fundamental financial valuation multiples on the Financial Investments Companies FICs (SIFs) valuations and market prices to assess how relevant these multiples are for relative calculations and ranking of these investment companies. Relative valuation by multiples is not only far more optimistic than DCF, but can be used by investors for the ranking of companies relative values to the multiples by their current or expected market price.

ROE and ROA respectively are good and trust-worthy indicators of the relative value of listed companies, at least in the financial sector that we addressed to our study. Perhaps an explanation for this strong correlation could be given both to the history of the establishment, evolution, investment management and to the relative similarity of the initial fundamental structure of the portfolios of all five FICs (SIFs) investment companies. This dilemma will be discussed in a subsequent research.

In the first attempt to answer the primary question of our research, we applied the comparison evaluation via multiple methods in order to assess the relative value of the all 5 FICs (SIFs) listed on the Romanian Bucharest Stock Exchange, based on fundamental parameters of the analysis. One answer to the question of our research is that ROE and ROA multiples are the independent variables that best explains the relative valuation differences between the 5 FICs (SIFs).

Then, we further approached the second part of the research question trying to identify any possible statistical relationships between multiples relative evaluation and the fundamental factors that, in our opinion, feasibly influence these multiples. We analyzed nine regression equations between the three multiples (EV/EBITDA; P/E and Price/Book) and three of their possible independent fundamental factors (MktCap; Tax Rate; ROA; ROE and Reinvestment Rate). We performed our analysis for all 5 FICs (SIFs).

2. The company's relative valuation (multiples based valuation)

Both from a theoretical and application standpoint, company value assessment on the basis of the free cash-flow is a cumbersome procedure. It requires many working assumptions concerning the cost of capital, risk and growth scenarios and importantly, the terminal value in perpetuity. Most of the present value of the cash flow depends on the assumptions related to this factor of value in generated in perpetuity.

Since estimating with sufficient precision the cash-flow values available disposed by the company, their timing and the choice of the appropriate discount rate are difficult and subject to a plethora of biased assumptions of risk scenarios, evaluation by specific discounted cash-flow (DCF) it is often abandoned in favor of a more convenient, simplistic method of valuation by comparable.

Investors, evaluators, portfolio managers often use multiples valuation assessment method, sometimes as an alternative to the calculation through the discounting cash-flow. Multiples are also used to calibrate the results conveyed by the DCF evaluation and to estimate one the most critical point of valuation assumptions – the size of the residual value. In addition, the complementary use of both methods can predict a range of value of the firm's capital, as a good information source for evaluation.

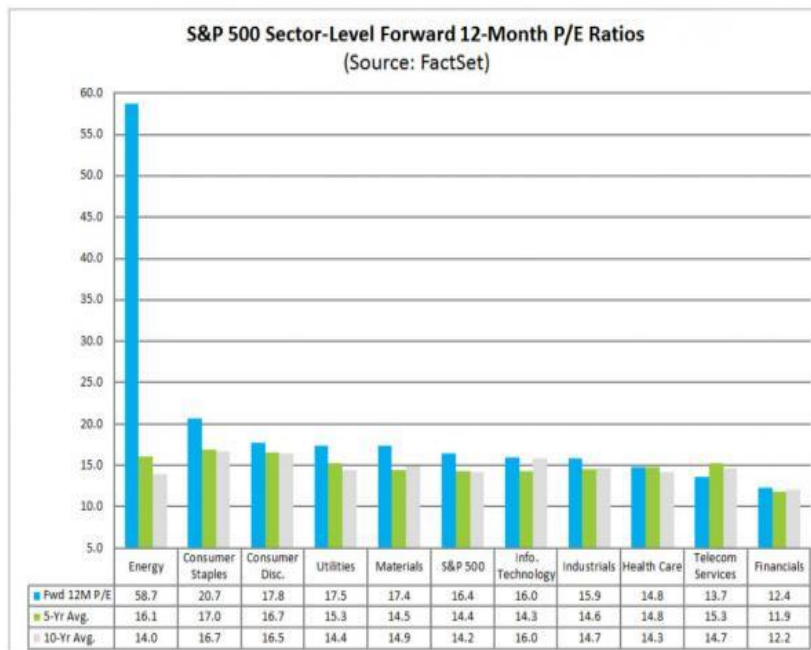


Figure1: Multiples data can reveal not only different valuation of specific sectors of the market but also different valuation within the same sector, based on their forward 12M, 5-years or 10 years P/E multiple. Source: FactSet, March 2016

Figure 1 depicts current estimation P/E multiple ratio for the 11 most attractive and active market sectors. Multiples data reveal different valuation of specific sectors of the market and different valuation within the same sector, based on their forward 12M, 5-years or 10-years P/E market multiple. Market valuation using comparable is mostly based on forward 12-months multiple. For a longer investment holding period, investors and valuers are also interested in the 5 years and the 10 years' sector level forward multiple.

Multiples value compared with market estimations reveal relevant information of the current value of the company or the potential for appreciation in the future. Capital market (stock market) sets a price on the performance of companies listed on the stock exchange through market quotation of the share and depict the implicit value of the company in relation to and as a consequence of the results, information and data shown in the financial statements, brokers report, valuation assessments, market and competition panorama, about local and international context of the investment asset subjected to evaluation (financing and investment policies, net assets, sales, EBITDA, net profit and cash-flow, etc.). Specifically, multiples are so-called value pricing multiples (of the company shares listed, *stocks' price multiples*) and multiples of value (market *enterprise value multiples*).^[2]

Most used **multiples of price** report price per share per net profit per share (P/E multiple), price per share per sales (P/S) multiple and price per book net assets per share (Price/Book) multiple. **Multiples of market value** of the company (EV/EBITDA multiple) report the market value of debt and of equity of company (*enterprise value=EV*), per earnings before interest, tax and depreciation (EBITDA, *earnings before interest, taxes, depreciation and amortization*), the operating profit (EBIT), operating profit tax shield ($EBIT \cdot (1 - \tau)$, where τ =actual share of profit tax) and cash flow to the company (EV/FCFF, *free cash flow to firm*). As a result of their synthetic and easy to understand approach, comparable multiples of price and value are most often used in the valuation of shareholder's equity and for estimation of company value, as a whole.

Comparable multiples represent a good computation alternative to the other methods of valuation (e.g. asset based patrimonial method of valuation, expected financial return valuation method, valuation by comparison, etc.).^[3]

Methodologically, two categories of comparable multiples are used for valuation purposes:

- **Historic Multiples** (trailing multiples/ex.: TTM = trailing twelve months) report historical quotes, respectively, the average market value of the company over the last 12 months/4 quarters of profit, per net assets, per sales, etc. For our proposed theme of research, we input the market value of the 5 FICs (SIFs) during the past 12 months' average/4 quarters.

These market multiples are also extensively used by analysts for comparative analyses of different companies and stocks. Multiples comparison can improve the investment decision process with added confidence in the evaluation logic mostly provided that economic, and financial conditions and business cycle of the company evaluated have not been altered significantly.

- Expected Multiples, estimates for the multiples report a forecast average rate for the next 12 months/4 quarters of profit, net asset, sales, etc. An investor can build her valuation assumption on these multiples if company evolution is assumed to be reasonable stable as to give certain confidence in robustness of the estimates of the indicators shown above. [4]

Classical empirical research on the progression of these multiples and the profitability of shares listed on stock exchange describes a good correlation between multiples of price and value, on the one hand and the profitability of the market, on the other hand. Also, these multiples are good indicators for investors that are looking for persistent over/under/correct evaluation of shares on the stock exchange in relation to the financial results you company (profit, net asset, sales, cash-flow, etc.).

By comparison evaluation a company multiple with other similar or with the overall market multiple, the investment portfolio manager gauges an indication for a more efficient asset allocation and a security selection of the stocks in the portfolio.

3. Critical studies relating to performance, precision and accuracy of the valuation by multiples

Multiples are used in evaluating investment assets that are readily comparable, based on the premise of the law of one price and the impossibility of risk free arbitrage: two similar stocks from companies with the same multiples need to trade at the same price. Otherwise, investor will arbitrage between the two liquid and deep markets until the equality of price of the two investments is established. Consequently, the value of those two issues should tend to be the same, and any difference arbitrated instantly by market, otherwise, a listed company stays under or over-exposure in relation to another company that has a fair but different value that is estimated by the market multiple. Risk-free arbitrage between the two prices of comparable assets should be impossible in a market economy.

At the same time, the most commonly valuation multiples used in finance business are derived from the intrinsic value of share, i.e., the value determined by discounting all future cash flow obtainable from owning that stock, at a proper discount rate of all future earnings (terminal value included), estimated to be generated by the listed company. So, if a multiple quoted/listed currently is higher/lower than the intrinsic value multiple, then the investor can assume that the

share is over/under evaluated, for any specific reason. Relative evaluation of companies listed on the stock exchange is performed on the basis of the comparison of available information of price of the shares or the market value thereof, and the financial information reported by these companies on their competitive position, their performance, liquidity, solvability.

For exemplification, the criteria used by Alford^[5] in the study of the 4,698 companies, for the period 1978 -1986 highlight seven sets of potential reference variables (comparable): company industry, total assets size and ROE, or any combination of the three. The conclusion of this research is that the choice of the reference companies based on industry factor or on the combination of industry and ROE or total assets leads to the most appropriate evaluations. Alford has found also a positive relationship between the size of the company and the accuracy of the value assessment of the company.

In another relevant study,^[6] Erik Lie and Heidi j. Lie (2002) examined specifically the overall performance, valuation precision and the accuracy of the appraisal based on market-based multiples. In their research, authors indicate that multiple Price/Book provides more accurate estimates and is less biased than the multiple P/S or P/E. Also, EV/EBITDA multiple leads to better estimates than EV/EBIT, probably because the amortization and depreciation policy do matter in the company operating profitability. Finally, overall performance, valuation precision and the accuracy of the valuation based on market-based multiples are correlated with ratio of intangible assets of the company.

Furthermore, Berger and Ofek, 1995, 1996, 1999; Denis, Denis, and Sarin, 1997 developed very interesting studies that assessed favorably the synergy effect of activities diversification inside companies. Using relative valuation (comparable multiples) for each specific segment of activity within the company, authors then compare the sum of the values of each activity segments of the company to the overall market value of the sum of the activities to determine the added value achieved through diversification by segments.

Another relevant research on the relative performance to valuation through multiples performed on a sample of 26,613 firm-years, winsorized at 1% and 99%, by Jing Liu, Doron Nissim and Jacob Thomas, 2002^[7] concluded, inter alia, that historical multiples of sales (Price per Sales) lead the incorrect estimates, probably because is too simplistic. Multiples compared on the basis of profits (P/E) are leading to better estimates than those on the book value (Price/Book). Also, multiples based on different cash-flow components lead to weak valuation and company ratings, like those based on value multiple related to sales and respectively to the EBITDA. Performance assessment of valuation by multiples increases when respective multiples of the reference price are calculated using the harmonic mean, average mean or median but that this performance decreases when evaluator uses as a reference all companies analyzed cross-sectional each year.

Damodaran^[8] study recommended relative evaluation of companies on the basis of multiples that have the greatest determination (highest R^2 coefficient) of the sector in relation to its fundamental factors. Then, it examines multiple regressions analysis between each of the value multiples. Dependent variables are the multiples and independent variables can be any financial indicators closely related, proxies for the profitability, risk and growth expectation for the respective companies.

4. The database and research methodology of the paper

Each multiple of price or value encompasses all fundamental factors which determines the estimated value based on discounted free cash-flow generated (return on assets-ROA, return on capital-ROE, individual cash flow components, risk, growth rate, net profit reinvestment rate, dividend policy and distribution rate, the effective rate of tax on profit). An accurate valuation assessment is performed only on the relative knowledge of the correct relationship between the fundamental factors and multiples used for evaluation. Our method is based on adaptation of Damodaran relative valuation and time series regressions and tries to capture multiple's fundamentals and the relationship between the multiple and each variable:

- Financial Investments Companies five FICs (SIFs) financial statements and market quotes
- Data from Q1 2004 – Q4 2014
- Winsorising 25% and 10%

Financial Investment Companies (SIFS) Relative Valuation and Fundamentals

For the analysis of these fundamental factors for relative evaluation of the financial services sector, we used quarterly data from five FICs (SIFs) on the period 2004-2014, three multiples (EV/EBITBA, Price/Sales, Price/Book) as the dependent variable, and five possible fundamental factors of these multiples (MktCap, Tax Rate, ROE, ROA and ReinvRate), as independent variables.

For multiples series (EV/EBITBA, Price/Sales, Price/Book) and for the MktCap data series we use the percentage variation from one quarter to the next, and for the other variables (Tax Rate, ROE, ROA and ReinvRate) we used differences (as percentage points) from one quarter to another. Since these variables were, for the most part, reported quarterly, in our analysis we used quarterly data from financial statements and accounting reports. MktCap indicator was calculated based on the stock prices of the reference quarters.

As a result of the use of quarterly data for all indicators involving the reported enterprise's value and profit before interest, tax and amortization (EV/EBITDA and P/S multiple respectively) or reporting between net income and net reinvested income, on the one hand, and the total assets and equity, on the other hand (i.e., ROA, ROE and ReinvRate), the study used the total quarterly profits that summed up the previous four quarters (including the reporting quarter: *Trailing Twelve Months -TTM*). Example:

$$EV/EBITDA, TTM_{(\text{March } 2014)} = \frac{EV}{EBITDA, TTM}$$

Where:

$$EV_{(\text{March } 2014)} = \text{Market Cap}_{(\text{Mar } 2014)} + \text{Total Debt}_{(\text{Mar } 2014)} - \text{Cash \& Equivalent}_{(\text{Mar } 2014)}$$

$$EBITDA, TTM_{(\text{March } 2014)} = EBITDA_{(\text{June } 2013)} + EBITDA_{(\text{Sept } 2013)} + EBITDA_{(\text{Dec } 2013)} + EBITDA_{(\text{Mar } 2014)}$$

Also, for total assets and own equity (that are reported to net income and net reinvested income), and for ROA, ROE, and ReinvRate respectively, we used the average quarter of reference from the previous fourth quarter. For example:

$$ROA, TTM_{(\text{March } 2014)} = \frac{\text{Net Profit, TTM}}{\text{Average Total Assets, TTM}}$$

where,

$$\text{Net profit, TTM}_{(\text{March } 2014)} = \text{Net Profit}_{(\text{Jun } 2013)} + \text{Net Profit}_{(\text{September } 2013)} + \text{Net Profit}_{(\text{Dec } 2013)} + \text{Net Profit}_{(\text{Mar } 2013)}$$

$$\text{Avg. Total Assets, TTM}_{(\text{Mar } 2014)} = \frac{\text{Total Assets}_{(\text{Mar } 2014)} + \text{Total Assets}_{(\text{Mar } 2013)}}{2}$$

$$EV/EBITDA, TTM_{(\text{Mar } 2014)} = \frac{EV}{EBITDA, TTM}$$

Where:

EBITDA, TTM (Mar 2014) = EBITDA (Jun 2013) + EBITDA (Sept 2013) + EBITDA (Dec 2013) + EBITDA (Mar 2014) and TTM = Trailing Twelve Months

Both stock market data (market capitalization, P/E, Price/Book, etc.) as well as financial indicators (ROA, ROE and reinvestment rate) have been extracted from Thompson Reuters Eikon databases with some additions from the Bucharest Stock Exchange market's returns reports.

Our study researched multiple regression models aimed at explaining the relative multiples assessment used in relative evaluation (EV/EBITDA, P/E and Price/Book multiple) by the independent variables—the most significant economic fundamental factors:

1. The market capitalization of each FIC (SIF) (MktCap = number of shares · FIC's stock price at end of respective quarter)
2. The effective tax rate (Tax Rate = profit/taxable profits)
3. Return on total assets (ROA = net income TTM /average total assets for respective quarter)
4. Return on total equity (ROE = net income/average total equity for respective quarter)
5. Net profit reinvestment rate (ReinvRate = reinvested net profit TTM/ average equity capital and reserves from the previous quarter).

For the analysis of multiple regression models, in the panel, we used exclusively Excel and Eviews applications. Factorial models of the three multiples (EV/EBITDA, P/E and Price/Book), once validated by the statistical analysis, are used for calibration of the results obtained from the relative valuation assessment of each FIC (SIF).

In the opinion of professor Damodaran^[9], evaluation by relative multiples that is closest to the DCF absolute valuation is through the multiple EV/FCFF (Enterprise value on free cash flow available to the firm). FCFF calculation turns out to be complex and laborious and subjected to many assumptions. For more practical and easy applications, the market participants divide value multiples to reported operating earnings, in particular, EBITDA, and respectively the EV/EBITDA multiple:

$$\text{EV/EBITDA} = \frac{\text{EV}}{\text{EBITDA}} = \frac{\text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash}}{\text{Earnings before Interest, Taxes and Depreciation}}$$

Transforming DCF valuation in the evaluation by EV/EBITDA multiple offers a perspective of the fundamental factors implicitly included in the

Financial Investment Companies (SIFS) Relative Valuation and Fundamentals

EV/EBITDA multiple. For simplicity and exemplification, we recall on the evaluation of the growth perpetuity:

$$V_0 = \frac{\text{FCFF}}{\text{WACC} - g} = \frac{\text{EBITDA} (1 - \tau) + \text{Amortization} \cdot \tau - \Delta \text{FA} - \Delta \text{WCR}}{\text{WACC} - g}$$

where,

- WACC = weighted average cost of capital
- $g = \text{growth rate} = \text{ROE} \cdot b$, respectively, the rate of profitability of invested capital (ROIC)
- net profits reinvestment ratio (b)
- $\Delta \text{FA} = \text{FA}_1 - \text{FA}_0 + \text{Amortization}_1$; Fixed Assets Investment
- $\Delta \text{WCR} = \text{WCR}_1 - \text{WCR}_0$; the working capital requirement of the company

Then, to solve for EV/EBITDA multiple, divide evaluation sum (assuming a reasonable growth in perpetuity scenario) to earnings before interest, tax and amortization:

$$V_0 = \frac{\text{FCFF}}{\text{WACC} - g} = \frac{(1 - \tau)}{\text{WACC} - g} + \frac{(\text{Amo} \cdot \tau)/\text{EBITDA}}{\text{WACC} - g} - \frac{(\Delta \text{FA})/\text{EBITDA}}{\text{WACC} - g} - \frac{(\Delta \text{NFR})/\text{EBITDA}}{\text{WACC} - g}$$

However, as the reinvestment rate of net profit is equal to the rate of new investments in fixed assets (FA) and net working capital requirement (NWCR), we can infer the following fundamental factors for multiple EV/EBITDA multiple:

- Market capitalization (MktCap);
- The effective tax on profit (Tax Rate);
- The return on total assets (ROA)/rate of return to equity capital (ROE)
- Net profits reinvestment rate (ReinvRate);
- Weighted average cost of capital (WACC)

Similarly, we can identify the fundamental factors, for the other two multiples: P/E and Price/Book.

Whereas the initial time series variables have significant variations, we proceeded to winsorization (trimming the outliers) in two ways: between 10% and 90%, and among the first quartile (quartile 3-quartile 1) $\cdot 1.5$. Our research aims to identify possible relationships between multiples relative evaluation and fundamental factors that are included in these multiples. Next, we proceeded to analyze regressions between the three multiples (EV/EBITDA; P/E and Price/Book) and their most probable explanatory fundamental factors (MktCap; Tax Rate; ROA; ROE and ReinvRate), for all 5 FICs (SIFs).

Interestingly, correlation matrices of the three multiples regressions (EV/EBITDA; P/E and Price/Book) and their fundamental factors (MktCap; Tax

Rate; ROA; ROE and ReinvRate), suggests, for all 5 FICs (SIFs), that the most significant correlation of multiples are directly related with the profitability ratios (ROA and ROE), and with the reinvestment rate of net profit (ReinvRate).

Since the two rates of return (ROA and ROE), are strongly correlated (with $\rho = 0.987$; 0.983^* , respectively 0.983^*), further analysis retains as significant factor only one of them, namely, that one that will be chosen by the statistical significance of the regression models. For the data series of the five FICs (SIFs), market capitalization indicator, although part of the three multiples, does not show a significant correlation, except with P/E multiple winsorized at 25%, respectively $\rho = 0.16^*$. Although previous analytical development presented above (transformation of the DCF valuation into the evaluation by EV/EBITDA multiple) our analysis has identified the effective rate of corporate tax as a fundamental explanatory factor for the EV/EBITDA multiple. Additionally, our study has not identified any significant correlation between Tax Rate and any of the multiples analyzed.

The following graphic represent the winsorization of the variable EV/EBITDA multiple. It illustrates in the eloquent way appropriate procedure for correction of extreme values (all that exceed the red color). The closest values are obtained by winsorization of 10% (figure 2 below).

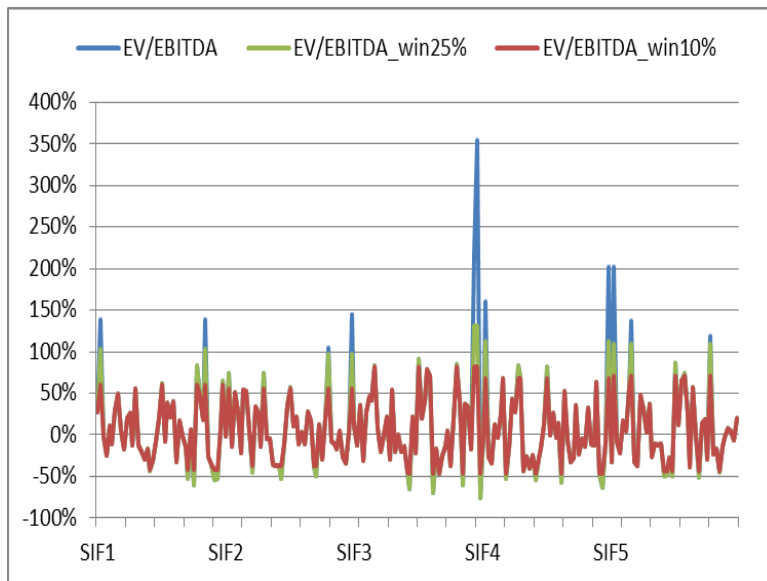


Figure 2: Winsorization of the variable EV/EBITDA multiple.
Source: own calculations based on data extracted from Thomson Reuters Eikon & www.bvb.ro, multiples data

Financial Investment Companies (SIFS) Relative Valuation and Fundamentals

Correlation tables:

Correlation	EV_EBITDA	EV_EBITDA_WIN25	EV_EBITDA_WIN10
MKTCAP	0.105*	0.140**	0.147**
TAXRATE			
ROA	-0.453***	-0.468***	-0.437***
ROE	-0.457***	-0.487***	-0.459***
REINVRATE	-0.430***	-0.447***	-0.441***

Correlation	P/E	P/E_WIN25	P/E_WIN10
MKTCAP	0.121*	0.160**	0.150**
TAXRATE			
ROA	-0.514***	-0.493***	-0.482***
ROE	-0.506***	-0.498***	-0.491***
REINVRATE	-0.483***	-0.475***	-0.483***

Correlation	P/Bk	P/Bk_WIN25	P/Bk_WIN10
MKTCAP			
TAXRATE			
ROA	0.142**	0.185***	0.142**
ROE	0.139**	0.173***	0.137**
REINVRATE			

***Significant at 1% ** Significant at 5% *Significant at 10%

Finally, the statistical significance of the coefficients of the fundamental factors in models of regression will determine the selection of the most representative of them to characterize all multiples of the five FICs(SIFs).

Models selected by our analysis are those with fixed cross-section effects (in which the intercept varies over the five FICs(SIFs) but remains constant over time). Further, at the level of each FICs(SIFs), the coefficients of the independent variables remain constant.

The results of the regression analysis are summarized in the following table:

Variable/Model	EV/EBITDA	EV/EBITDA win25%	EV/EBITDA win10%	P/E	P/E win 25%	P/E win 10%	P/Bk	P/Bk win 25%	P/Bk win 10%
C	0.109**	0.078*	0.063*	0.091**	0.083*	0.058*			
MKTCAP									
TAXRATE									
ROA	(3.804) ***			(3.732) ***	(3.194) ***	(2.747) **			
ROE		(3.696) ***	(3.239) ***						
REINVRATE	(1.791) ***	(1.472) *	(2.016) **	(1.566) **	(1.946) *	(2.310) **			
Ad R-squared	0.198	0.224	0.204	0.256	0.242	0.239			
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000			
Durbin-Watson stat	2.038	2.111	2.019	2.218	2.135	2.056			

***Significant at 1%
 ** Significant at 5%
 * Significant at 10%

- The highest coefficients of determination (R2 adjusted = 0.224; 0.256 respectively) have been identified for the next two regression models: EV/EBITDA_win25% and P/E.^[10]

Equation (1):

$$\text{EV/EBITDA_win25\%} = 0,078 - 3,696 \cdot \text{ROE} - 1,472 \cdot \text{ReinvRate}$$

Dependent Variable: EV_EBITDA_WIN25				
Method: Panel Least Squares				
Periods included: 44				
Cross-sections included: 5				
Total panel (balanced) observations: 220				
White cross-section standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.078	0.046	1.708	0.089
ROE	-3.696	1.246	-2.967	0.003
REINVRATE	-1.472	0.799	-1.842	0.067
Cross-section fixed (dummy variables)				
Adjusted R-squared	0.224	S.D. dependent var		0.435
F-statistic	11.552	Akaike info criterion		0.948
Prob(F-statistic)	0.000	Durbin-Watson stat		2.111

Equation (2):

$$\text{P/E} = 0,091 - 3,732 \cdot \text{ROA} - 1,566 \cdot \text{ReinvRate}$$

Dependent Variable: P_E				
Method: Panel Least Squares				
Periods included: 44				
Cross-sections included: 5				
Total panel (balanced) observations: 220				
White cross-section standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.091	0.045	2.013	0.045
ROA	-3.732	1.029	-3.626	0.000
REINVRATE	-1.566	0.699	-2.241	0.026
Cross-section fixed (dummy variables)				
Adjusted R-squared	0.256	S.D. dependent var		0.453
F-statistic	13.571	Akaike info criterion		0.988
Prob(F-statistic)	0.000	Durbin-Watson stat		2.218

In our two models, the most relevant fundamental factors are the rate of return of equity capital (ROE, in model 1) and the rate of return on total assets (ROA, for the model 2). Also, the reinvestment rate of net profit (ReinvRate) is statistically relevant in both models. The correlation of ROA or ROE with

ReinvRate (i.e., $\rho = 0.82^*$ in both models) indicates that the only relevant factor for new multiples analyzed explanation remains either ROE or ROA.

The negative correlation between the EV/EBITDA multiple and P/E multiple and the ROE, ROA and ReinvRate, is mostly explained by the fact that the profits number of the two multiples are expressed at the denominator of the ratios of these multiples.

5. Conclusions

Investors, valuers and portfolio managers frequently use multiples-based valuation due to simplified and intuitive methodology vs. the evaluation approach through free cash flow discounting. Widely quoted in financial reports and news, the market multiples are conveniently used for evaluation of shares in comparable markets, sectors or companies as a result of the law of one price and the impossibility of risk-free arbitrage: two similar assets/stocks from different companies, that have the same multiples must sell at the same price, *ceteris paribus*.

Basically, each comparable multiple of market price or estimated value is based on economic fundamentals of the company. The same fundamentals are key premises for free cash flow valuation (return on assets-ROA-and return on equity capital ROE-, total cash flow components-, risk, estimated sustainable growth rate, reinvestment rate of net profit, dividend distribution rate, the effective rate of tax on profit). For a robust assessment, the evaluator must gather the multitude of economic data and financial information about the company and its stock.

For a company relative evaluation and comparison against its peers, the investor needs to understand correctly the relationships between the fundamental factors and market multiples.

For all of the five FICs(SIFs), our research approach was identification of most possible robust statistical relationships between market multiples and relative valuation of their economic fundamentals. We analyzed three regressions for the multiples (EV/EBITDA multiples; P/E and Price/Book) and their possible statistical correlation with each of the five FICs(SIFs), economic fundamental factors (MktCap; Tax Rate; ROA; ROE and ReinvRate). Correlation between multiple fundamental factors suggests that the most significant are their relations with rates of return (ROA and ROE), and with the rate of reinvestment of net profit (ReinvRate). The two rates of return are strongly correlated so that we keep as a significant factor only one of them.

Market capitalization (MktCap) shows a significant correlation only with multiple P/E winzorized (25%), i.e. $\rho = 0.16$.

Of the nine models of regression we investigated for the three market comparable multiples with their economic fundamental factors, we identified that highest coefficients of determination (R^2_{adj}) for two market comparable multiples: EV/EBITDA_win25%, and respectively P/E:

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- $EV/EBITDA_{win25\%} = 0.078 - 3.696 \cdot ROE - 1.472 \cdot ReinvRate$ (1)
 - $P/E = 0.091 - 3.732 \cdot ROA - 1.566 \cdot ReinvRate$ (2)

In our research models, the fundamental factors most relevant were the return on equity capital (ROE, in model 1) and return on total assets (ROA, in model 2).

We also found that the reinvestment rate of net profit (ReinvRate) is statistically relevant in both our models. Close correlation between ROA or ROE with the ReinvRate (i.e., $\rho = 0.82$) indicates that the only statistically relevant factor for the explanation of market comparable multiples analyzed remains either ROE or ROA. The negative correlation between the EV/EBITDA multiple and P/E multiple, on the one hand, and the ROE and ReinvRate, on the other hand, is explained by the fact that the profits number of the two multiples are included as denominator of the ratios of these multiples.

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