FABA
Finance, Accounting and Business Analysis
ISSN: 2603-5324

Finance, Accounting and Business Analysis
Volume 7 Issue 2, 2025
http://faba.bg/
ISSN 2603-5324
DOI: https://doi.org/10.37075/FABA.2025.2.08

An Analytical Approach to Comparing Actual Vs. Fundamental "Enterprise Value-to-EBITDA" Ratios on the US and European Stock Markets

Dimiter Nenkov

Department of Finance, University of National and World Economy, Sofia, Bulgaria

Info Articles

History Article:
Submitted: 6 October 2025
Revised: 14 November 2025
Accepted: 20 November 2025

Keywords:
US and European stock markets, actual EV/EBITDA multiples, fundamental EV/EBITDA ratios

JEL: G11, G12, G15

Abstract

Purpose: The subject of this research paper is the level of the EV/EBITDA market ratios on the US and the European stock markets. The interest was aroused by the continuously rising levels of the indexes on the leading stock markets, on one hand, and the very wide use of the EV/EBITDA multiples by financial analysts, on the other hand. The purpose is: 1/ to compare the two markets in terms of their actual EV/EBITDA ratios, and 2/ to analyze to what extent the levels of these multiples are supported by the respective key fundamental indicators.
Design/Methodology/Approach: The dynamics of the actual EV/EBITDA ratio in recent years is reviewed for each of the US and European developed stock markets. In addition to the comparison of these ratios between the two markets, fundamental EV/EBITDA ratios are also derived, based on key financial-performance indicators, in order to be used as a more reasonable benchmark.
Findings: The comparison indicates that the actual average EV/EBITDA of the US market for the analyzed period is by 38% higher than that of the European market. For both markets, the derived fundamental EV/EBITDA ratios do not support the significantly higher actual EV/EBITDA multiples, which are about twice as high. This difference is more pronounced for the US market.
Practical Implications: The important implications for investors are that the actual average EV/EBITDA levels on the US and European stock markets indicate for an unreasonably high prices of stocks as a whole for 2024.
Originality/Value: The analyses of this type, involving not only actual but also fundamental market ratios, seem to be quite limited among academic publications. To the extent that they are available for the market as a whole, they mainly focus on the PE and PBV ratios. The in-depth academic study of the EV/EBITDA multiples, with regard to using them for the analysis of the entire stock market, is still not a well-covered area.
Paper Type: Research Paper

Address Correspondence:
E-mail : d.nenkovv@gmail.com

INTRODUCTION

Investing on the stock market is a serious challenge and requires significant knowledge, skills and analyses. The term "investing" here is used in the sense given to it by Benjamin Graham and David Dodd. According to them, "one of the first things that need clarification in connection with capital markets, is the meaning of investor or investing". They choose to use the term "investor" as the opposite to "speculator" (Graham, Dodd, 2009). In the first edition of their book "Security Analysis" of 1934, they try to give a precise definition of the difference between the two categories (Nenkov 2021a). It is as follows: "An investment operation is one which, upon thorough analysis promises safety of principal and an adequate return. Operations not meeting these requirements are speculative" (Graham 2006).

This is what predetermines the challenge related to true investing – the need to identify the intrinsic value of stocks as potential investments. An investor determines the value of a share of stock based on the value of its businesses. At the same time, the speculator bets that the share price will rise because someone else is willing to pay even more for it. As Graham notes, "investors judge the market price by established standards of value, while speculators base their standards of value upon the market price" (Graham, B., 2006).

At the same time, it is important to note that determining the actual value of companies is an exercise of increased difficulty. The reason is very simple – the value of each stock and company is kind of hidden and invisible (Nenkov 2021a). The stock market is called upon to determine this invisible intrinsic value. However, the market fails to perform this function correctly too often. What we normally see on the stock market is the price of the stock. A distinction must be made between the price of the stock and its true value. According to Benjamin Graham and Warren Buffett, "Price is what you pay, value is what you get." (Graham 2006; Morris 2009). The fact that determining value is a difficult task, is evident in the very definitions of value used by appraisers and stock analysts, as well as in valuation standards (Graham 2006; International Valuation Standards Committee 2001; Hitchner 2017; International Appraisal Standards Board 2020; Zukin 1990).

Appraisers are often not fully aware of what exactly they are looking for in the specific appraisal task - the actual value, or rather the price that would satisfy the wishes of the appraisers and the contracting counterparties (Nenkov 2021b). This is probably one of the reasons for Prof. Damodaran to raise the question: "What are we looking for in the evaluation - the price or the value?" (Are we pricing or valuing?)" (Damodaran 2019). Moreover, in reality it turns out that a company can have different values at the same moment, which can be illustrated by the "hexagon" figure of Copeland, Murrin and Koller (Copeland et. al. 2000; Nenkov and Hristozov 2023).

The problem highlighted above carries over from the individual stock and company level to the stock market as a whole. The question that is constantly asked is whether the market is undervalued, overvalued, or fairly valued. According to Nobel laureate Robert Shiller, the Global Financial Crisis of 2007-2009 once again reminded us of the need for a qualitative analysis of stocks and their price levels, both for the individual investor and for the better functioning of markets (Shiller 2012, 2015). With regard to this need, it is useful to analyze stock market levels in at least the following three breakdowns: 1/ in dynamics, 2/ in comparison to other markets, and 3/ in relation to fundamentals. The aim of this study is to cover all three aspects in the comparative analysis of actual versus fundamental "Enterprise Value-to-EBITDA" ratios on the US and European stock markets.

PURPOSE, HYPOTHESES AND METHODS

The *objective* of this research is to explore the levels of the US and European stock markets, as represented by their actual average EV/EBITDA multiples, against the background of fundamental EV/EBITDA ratios, derived for the two markets. The *object* of the study is the level and dynamics of stocks on the US and European stock markets. The *subject* of the research is the fundamental value of the US stock market and the European stock market, and how it copes with the actual price level of the two markets, both measured through the EV/EBITDA ratios.

In connection with the realization of the above objective of the research, the working hypotheses are formulated, as follows:

Hypothesis 1: The fundamental, intrinsic value of each of the two stock markets in question can be derived at any point in time, expressed as fundamental EV/EBITDA ratios, to be used as a reliable benchmark for the true levels of these markets.

Hypothesis 2: The actual EV/EBITDA ratios on the US and European markets are most likely significantly higher than the fundamental levels of EV/EBITDA.

Hypothesis 3: The deviation of actual EV/EBITDA multiples on the US market above their fundamental EV/EBITDA ratios is most likely higher than that on the European stock market.

For the purpose of the study, fundamental indicators on the two markets are explored, such as: return

on capital (ROC), growth (g) of after-tax operating profit (NOPAT), cost of capital (WACC) and other relevant indicators. The nature of this research suggests the use of EV/EBITDA ratios, since they provide the needed comparability between the two stock markets, as well as with other stock markets of the global economy. The factors that lead to probable short-term moves of the stock markets are not included in this research.

A combination of research methods and approaches is used. The hypotheses will be tested based on the results of the study. Among the methods used in the study are comparative and historical analyses, as well as modelling. Summarized quantitative data from more than 5000 public companies for each of the US and European stock markets is used for the study. The scientific study is a mix of descriptive and experimental research.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

As noted above in the introduction, the opportunity for comparison between the two stock markets, as well as with other stock markets, is an important aspect of this study. One problem with the prices of stocks, expressed in absolute terms – in the respective currency (US dollars, Euro, British pounds, etc.), is that they are not comparable among companies, sectors and markets. They are convenient for analysis and comparison in historical aspect, in terms of their dynamics over the years, including percentage increase or decrease. However, they cannot be compared directly with the stock prices of other companies, sectors and markets, because of difference in the scale.

This is an important reason to involve indicators, which allow for comparability among different companies, sectors and markets. This is the main explanation for the popularity and the extensive use of the market ratios (also called market-performance ratios or market multipliers). According to Burton Malkiel, market multipliers provide a good yardstick for comparing different stocks that have different prices and different earnings per share in absolute terms (Malkiel 2015). There is a wide range of such ratios, starting with the price-to-earnings ratio (PE), price-to-book ratio (PBV), price-to-sales (PS), price-to-cash flow ratio, price-to dividend ratio, etc.

These market ratios are a part of the well-known financial ratios (coefficients) for company analysis, based on data from the companies' financial statements, such as profitability ratios, liquidity ratios and others (Brigham and Gapenski 1994; Hristozov 2020). One of the specifics of market ratios is that they need data not only from the financial statements, but also data from the stock market. The market price per share (P_0) is in the numerator of each of them.

At the end of the 20th century and during the 21st century a new generation of market ratios gained popularity among financial analysts and appraisers, which include: Value-to-Sales ratio, Value-to-EBIT ratios, Value-to-EBITDA ratios, etc. The numerator of each of these modern ratios is the market value of the whole company, instead of the market value of equity only. This value of the company as a whole is usually represented by the enterprise value (EV) or the firm value (FV). This will be discussed in more detail later. EBIT stands for earnings before interest and tax, and EBITDA stands for earnings before interest, tax, amortization and depreciation.

Market ratios are used by financial analysts, appraisers, company management, investors and other interested parties in different aspects. They are widely used for relative valuation of stocks (multiples or peer companies approach). Market ratios are very useful for the analysis of the market performance of stocks of public companies, as compared with other companies, with the sector as a whole or with the market. Another important advantage of market ratios is that they give the opportunity to analyze the stock market as a whole, including comparison between markets (Nenkov 2021b).

The comparability among companies, sectors and markets, provided by market multiples comes from the fact that market ratios are a kind of "standardized" share prices, or prices on a common basis (Damodaran 2012). This overcomes the shortage of stock prices in absolute terms (in the respective currency). One problem with market ratios research, however, is that relatively little is written about it. According to Emanuel Bagna and Enrico Ramusino, "market multipliers are used more than they are studied. Stock analysts, investment bankers and other practitioners make extensive use of market multipliers to determine the value of companies. However, the literature on multipliers is not as rich as the widespread use of these assessment tools in practice suggests." (Bagna and Ramusino 2017). All this makes the literature review on market ratios quite difficult.

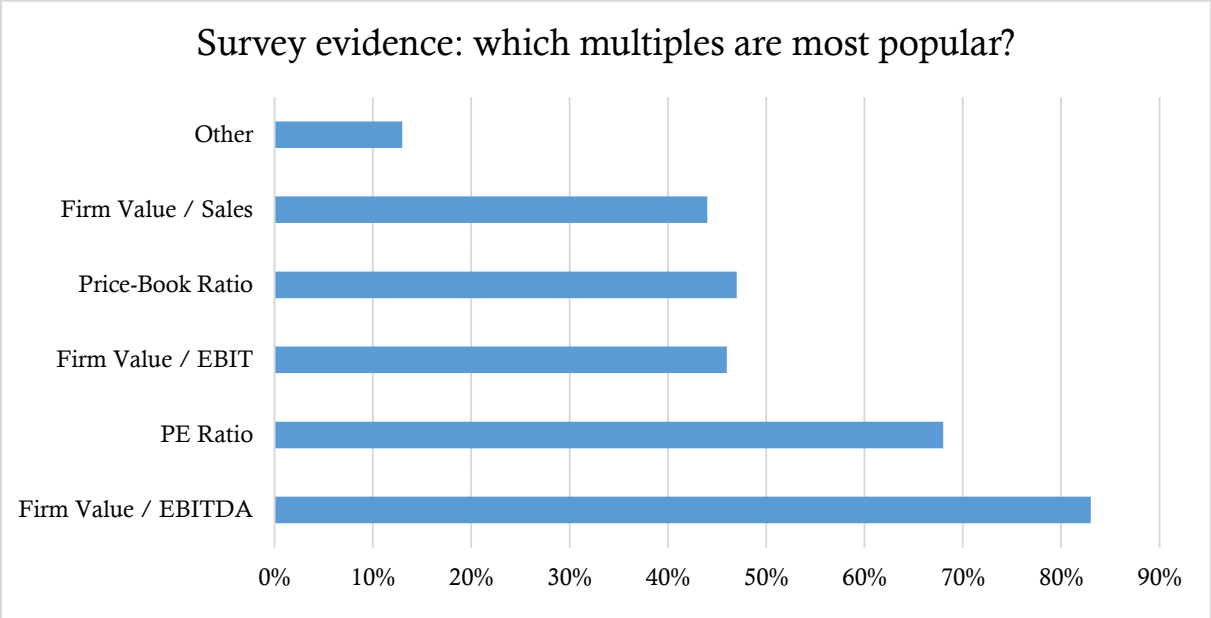
According to top experts in the field, the relative valuation methods are implicitly directed to reach the market price, rather than the intrinsic value of stocks. In other words, comparative evaluation methods seem to be far from fundamental analysis. One of the reasons for this is the prevailing way in which market multiples approach is applied in reality – with limited or no analysis of the factors (forces) standing behind the multiples used. The question here is to what extent these market multiples, as standardized prices, represent the intrinsic (fundamental) value of the respective stocks. There is an opportunity, however, to use them in a way that brings them as close as possible to fundamental analysis. Burton Malkiel, for example,

clearly links fundamental stock valuation analysis to the use of the PE market ratio (Malikel, 2015). Since market ratios are standardized forms of stock prices, they should also have fundamental value. In other words, they could also be expressed as a function of the ***three fundamental variables***: *the earnings potential, the expected earnings growth and the level of risk* (Damodaran 2012). The only essential difference with DCF valuation is that under DCF models the visions and expectations about these three fundamentals are discussed explicitly, while in relative (multiples) valuation they are included implicitly (Nenkov and Hristozov 2023). This link between market ratios and fundamentals is in the focus of the current research.

The PE ratio, which is the oldest market performance ratio, seems to be the most often used among market ratios for the analysis of the market as a whole. One reason is the sufficient available data regarding share prices and earnings per share (EPS). On the other hand, it is the fact that PE is the expression of the direct relationships of interest to investors - the relationship between the price they pay per share of stock and the income that this share brings. James O'Shaughnessy says that "The PE ratio per share is the most widely used measure of how cheap or how expensive a stock is compared to other stocks (O'Shaughnessy 2005).

However, since the end of the 20th century until now, the EV/EBITDA have been very intensively used by analysts in the valuation of companies (Damodaran 2012). It is logical to conclude that it could be also used in the analysis of the contemporary stock market as a whole. Frank Bancel and Usha Mittoo also reach to the conclusion that Firm Value/EBITDA multiple is the most widely used market multiple in the valuation of companies. They make a survey among 356 European experts in company valuation, with CFA certificate or its professional equivalent. In the first place, the study indicates that the most popular are the market multiples methods, used by about 80% of the surveyed analysts, followed by 79% for the DCF enterprise valuation model (Bancel and Mittoo 2014). Similar findings at a global level are reported by Pinto, Robinson, and Stowe from the CFA Institute (Pinto, Robinson and Stowe 2019) and by Pablo Fernandez (Fernandez, 2017).

In the second place, Bancel and Mittoo illustrate the popularity of the different market multiples (ratios). This is illustrated in Figure 1.



Source: Bancel and Mittoo (2014)
Figure 1. Most commonly used market multiples in relative valuation methods

Figure 1 illustrates that the most widely used is the Firm Value-to-EBITDA ratio. It is relied on by 83% of appraisers who use several multipliers and by 70% of appraisers who use only one multiplier. Second most trusted is the Price-to-Earnings (PE) multiple, used by 68% of respondents. Other relatively widely used ratios include Price-to-Book, Firm Value-to-EBIT, Firm Value-to-Sales (Bancel and Mittoo 2014).

The reason for the extensive use of EBITDA-based multiples in recent decades is that EBITDA is a financial indicator at the enterprise level (or invested-capital level), which is not influenced by the financial leverage of the company. Other important advantages of the EBITDA-based multiples are as follows (Damodaran 2012):

- There are much fewer companies with negative EBITDA than there are companies with negative net profit and EPS. Thus, far fewer companies are excluded from the analysis due to the lack of a published ratio (i.e. due to a negative ratio), as compared with the case of the PE ratios.
- The EBITDA indicator is not affected by differences in the applied depreciation methods, unlike operating profit (EBIT) and net profit (NI). Thus, it provides better comparability between different companies.

Because of the above reasons, Price-to-EBITDA (P/EBITDA) ratios gained popularity, replacing in many cases the PE ratios in the valuation of stocks towards the end of the 20th century. There is a problem, however, with the P/EBITDA and P/EBIT ratios, because of inconsistency between numerator and denominator. The denominator is an indicator at the enterprise level (firm measure), independent of the financial leverage, while the numerator is an indicator at the equity level (equity value), dependent, among other factors, on the financial leverage of the company. According to Damodaran, these ratios are inconsistently defined and can be very misleading when comparing companies with significant difference in their capital structures (Damodaran 2012).

This is why financial analysts switched to Value/EBITDA and Value/EBIT multiples, where the term "Value" includes generally equity plus debt (with or without cash). In this way both numerator and denominator are firm values (invested-capital values), which ensures the needed comparability between these two components of the multiple. The Value/EBITDA provides better comparability between companies with different capital structures.

One issue in this regard is the lack of a uniform interpretation of company value. The two terms most often used are "firm value" (FV) and "enterprise value" (EV). Aswath Damodaran defines *firm value (FV)* as the total value of the company, including both operating and non-operating assets (operating value + value of non-operating assets). In other words, firm value is supposed to be:

$$\text{FV} = \text{Market Value of Equity} + \text{Market Value of Deb} \quad (1)$$

The bulk of non-operating assets normally consists of *financial assets*, i.e. *cash*. At the same time Damodaran defines the *enterprise value (EV)* as the value of operating assets only (Damodaran 2012). In other words:

$$\text{EV} = \text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash} \quad (2)$$

Provided that EBITDA represents the earnings from the use of operating assets only, EV seems to ensure better comparability between numerator and denominator for the Value/EBITDA ratio. This is the explanation why the most often used version of this multiple is:

$$\frac{\text{EV}}{\text{EBITDA}} = \frac{(\text{Market Value of Equity} + \text{Value of Debt} - \text{Cash})}{\text{EBITDA}} \quad (3)$$

Copeland, Murrin and Koller have a different interpretation of the term *enterprise value (EV)*. According to them this the total value of the company, including both operating and non-operating assets (Copeland, Murrin and Koller 2000). In other words, for them *enterprise value* is what Damodaran calls *firm value (FV)*. Bancel and Mittoo in their study referred above, work with the term *firm value* (FV/EBIT and FV/EBITDA). It does not become clear what their interpretation is behind FV. For the purpose of this research, the understanding is that *enterprise value (EV)* is the *operating value (the value of operating assets)* of the company.

EMPIRICAL STUDY OF ACTUAL EV/EBITDA MULTIPLES

Comparative analysis of actual EV/EBITDA ratios on the European and US stock markets

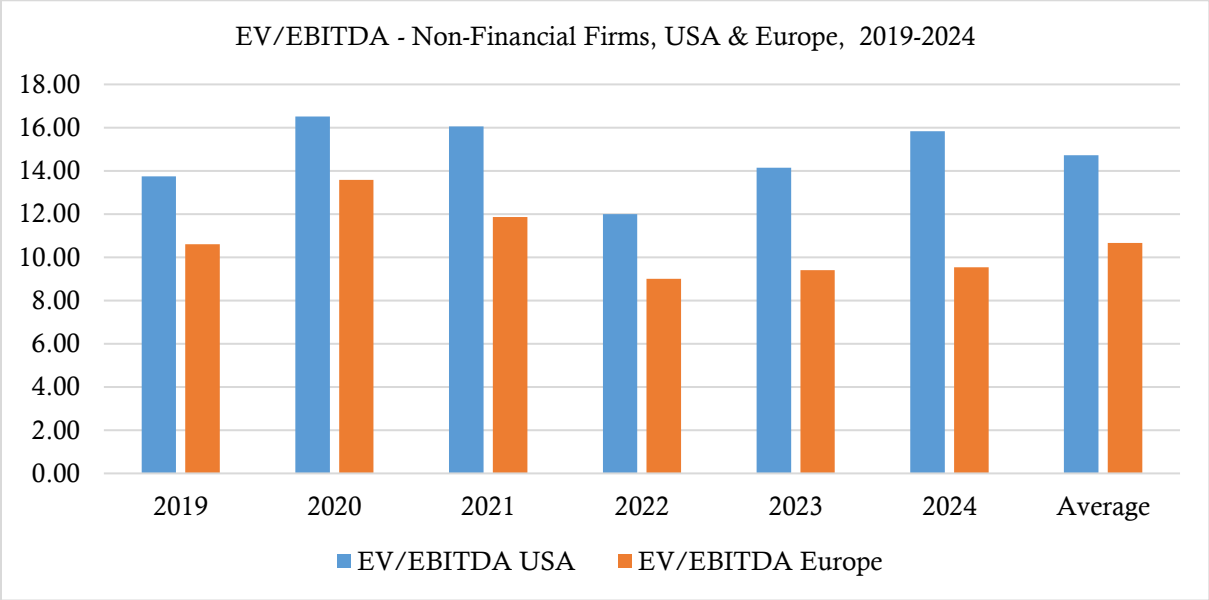
Table 1 and Figure 2 show the average EV/EBITDA ratios for non-financial companies on the developed stock markets of the USA and Europe. The data is for the recent period 2019-2024 and covers more than 5 000 non-financial public companies on each of the two markets.

Table1. EV/EBITDA and EV/EBIT ratios on the US and European stock markets in the period 2019-2024

Indicator	EV/EBITDA		EV/EBIT		EBIT/EBITDA		DA/EBITDA	
Year	**USA**	**Europe**	**USA**	**Europe**	**USA**	**Europe**	**USA**	**Europe**
2019	13,75	10,60	22,97	18,22	0,60	0,58	0,40	0,42
2020	16,52	13,58	30,62	25,69	0,54	0,53	0,46	0,47
2021	16,06	11,86	26,27	16,27	0,61	0,73	0,39	0,27
2022	12,00	9,00	18,67	13,84	0,64	0,65	0,36	0,35
2023	14,15	9,41	22,06	12,99	0,64	0,72	0,36	0,28
2024	15,83	9,54	24,41	13,93	0,65	0,68	0,35	0,32
Average	**14,72**	**10,67**	**24,17**	**16,82**	**0,61**	**0,63**	**0,39**	**0,37**

Source: http://pages.stern.nyu.edu/~adamodar/ , Calculations of the author

The average EV/EBITDA multiples of non-financial companies for the US market range from 12,00 in 2022 to 16,52 in 2020. The average EV/EBITDA multiples for Europe take values between 9,00 in 2022 and 13,58 in 2020. Not surprisingly, for both markets the minimum is respectively in the year with the highest interest rates (2022), while the maximum is in the year with the lowest interest rates (2020). This negative relationship will be further discussed in the next section. The total average EV/EBITDA for the entire period is 14,72 for the USA and 10,67 for Europe. The EV/EBITDA of the USA is significantly higher than that of Europe for each of the years. The total average EV/EBITDA for the whole period in the USA is higher by 38% than that of Europe.



Source: http://pages.stern.nyu.edu/~adamodar/ , Illustrations of the author

Figure 2. EV/EBITDA ratios on the US and European stock markets – non-financial companies - 2019-2024

Table 1 also contains the EV/EBIT ratios for the two markets, also quite intensively used by analysts. The average EV/EBIT multiples for the US market range from 18,67 in 2022 to 30,62 in 2020. The average EV/EBIT multiples for Europe range from 12,99 in 2023 to 25,69 in 2020. The total average EV/EBIT for the entire period is 24,17 for the USA and 16,82 for Europe. The EV/EBIT of the USA is again significantly higher than that of Europe for each of the years. The total average EV/EBIT for the whole period in the USA is higher by 44% than that of Europe.

Other average ratios were also derived for the two stock markets from the EV/EBITDA and the EV/EBIT ratios, such as the EBIT/EBITDA and DA/EBITDA. The first indicates the average proportion of EBIT in EBITDA, while the second indicates the average proportion of depreciation and amortization in EBITDA. The average EBIT/EBITDA is 0,61 for the USA and 0,63 for Europe. The average DA/EBITDA, respectively, is 0,39 for the USA and 0,37 for Europe. Each of them is needed and will be used in the derivation of the fundamental EV/EBITDA ratios in the next section.

EV/EBITDA MULTIPLES AND FUNDAMENTALS

Fundamental models for determining theoretical EV/EBITDA ratios

The levels of EV/EBITDA ratios are function, among other things, of certain fundamental variables. Fundamental (theoretical) ratios can be determined on the basis of these variables. The most suitable starting point for developing and illustrating the logic of the fundamental model for determining such fundamental EV/EBITDA ratios is the DCF enterprise valuation model. This is due to the fact that the numerator of the EV/EBITDA multiple is the enterprise value (operating value) of the company. If we assume that the company is going to follow a stable growth rate from now until infinity, we can use the short, one-stage version of the model, according to which the operating (enterprise) value of the company is:

$$EV = \frac{FCFF_1}{WACC - g} \tag{4}$$

Where:

***FCFF*$_1$ =** expected free cash flow to the firm,

WACC = weighted average cost of capital of the company,

g = expected long-term average growth rate of net operating profit (NOPAT, after-tax operating profit).

By expressing the free cash flow to the firm via its determinants, we arrive at (Damodaran 2012):

$$\begin{aligned} FCFF &= EBIT \times (1-T) - (CAPEX - DA + \Delta WC) = \\ &= (EBITDA - DA) \times (1-T) - (CAPEX - DA + \Delta WC) = \\ &= EBITDA \times (1-T) - DA \times (1-T) - Reinvestment \end{aligned} \tag{5}$$

Where:

***EBIT* =** profit before interest and tax (operating profit before tax),

EBITDA = profit before interest, tax, depreciation and amortization

T = corporate tax rate,

***DA* =** depreciation and amortization,

***CAPEX* =** capital expenditures (investments for acquiring of non-current assets),

Δ***WC*** = increase (decrease) of net operating working capital,

Reinvestment (Net Investment) = the proportion of gross investments, which is financed from the after-tax operating profit (EBIT×(1-T), or NOPAT).

This leads to the following expression of the one-stage model for determining the operating value of the company:

$$EV = \frac{EBITDA_1 \times (1-T) - DA_1 \times (1-T) - Reinvestment_1}{WACC - g} \tag{6}$$

After dividing both sides of the equation by EBITDA and removing the index "1" we arrive at the model for the fundamental EV/EBITDA ratio (Damodaran 2012):

$$V/EBITDA = \frac{(1-T) - \frac{DA}{EBITDA} \times (1-T) - \frac{Reinvestment}{EBITDA}}{WACC - g} \tag{7}$$

Being a proportion of gross investments, reinvestment (or net investment) amount can be determined by deducting DA from gross investments, i.e.:

$$\text{Reinvestment (Net Investment)} = \text{Gross Investment} - \text{DA} \tag{8}$$

At the same time reinvestment amount is the proportion of the after-operating profit (NOPAT), which

is retained and invested in the company's business. It can be determined alternatively as follows:

$$\text{Reinvestment (Net Investment)} = \text{NOPAT} \times \text{b(RIR)} \quad (9)$$

Where:
NOPAT = after-tax operating profit (net operating profit after tax),
b (RIR) = reinvestment rate.

The above fundamental model outlines the variables determining the EV/EBITDA ratio (Damodaran 2012):

1. *Corporate tax rate:* The lower tax rate contributes for a higher numerator, and a higher EV/EBITDA.
2. *Depreciation and amortization (DA):* The lower the proportion of DA to EBITDA, the higher is the numerator, respectively the higher is the EV/EBITDA ratio.
3. *Net investment (Reinvestment):* The higher the proportion of reinvestment to EBITDA, the lower should be the EV/EBITDA ratio (other things being equal, including disregarding the impact of higher reinvestment on the expected growth rate (*g*)).
4. *Cost of capital invested (WACC):* The EV/EBITDA is negatively correlated with the cost of capital (WACC), and the lower the WACC, the higher is the EV/EBITDA ratio.
5. *Expected growth rate of NOPAT:* The EV/EBITDA is positively correlated with the expected growth rate (*g*) of the after-tax operating profit (NOPAT), and the higher the growth rate, the higher is the EV/EBITDA ratio.

The idea behind the above EV/EBITDA fundamental model is to express the EV/EBITDA ratio as the function of the three fundamentals, determining the value of any company or stock:

- The earnings potential of the company;
- The expected growth of earnings;
- The level of risk.

The three indicators used for these fundamentals, at the enterprise level (or invested-capital level), respectively are:

- ROC or ROIC - the return on capital (return on invested capital);
- g – expected growth rate of NOPAT;
- WACC – cost of invested capital (weighted average cost of capital).

The application of the EV/EBITDA fundamental model is a bit of a challenge. The reason is that at first glance, the EV/EBITDA fundamental model doesn't represent the ratio as a function of fundamentals only. There are also other input variables, such as: corporate tax rate, proportion of DA to EBITDA, and reinvestment as a proportion to EBITDA. This looks as significant difference with the models for deriving the fundamental Price-to-Earnings (PE) and Price-to-Book (PBV) ratios, for example. A closer look at the model, however, reveals its true fundamental character. With regard to the denominator of the formula, things are quite clear – it includes only WACC and g, the indicators of the second and the third fundamental variables. Still, in the numerator things are not essentially different: 1/ the effective tax rate and the proportion of DA to EBITDA may be referred to as conditionally fixed inputs, and 2/ the third variable there – Reinvestment/EBITDA, may be considered the only indeed dynamic variable. It is also directly dependent on the first fundamental variable - ROIC. This can be illustrated through the model for determining the so called *internal growth rate* of NOPAT (g):

$$g = ROIC \times b\ (RIR \quad (10)$$

Where:
g = expected growth rate of NOPAT,
ROIC (ROC) = return on invested capital,
b (RIR) = reinvestment rate, expressed as a proportion of NOPLAT.
This relationship makes it possible to express the reinvestment rate (RIR) as the function of *ROIC* and *g*:

$$b\ (RIR) = g/ROIC \quad (11)$$

At the same time the reinvestment rate (RIR) can also be expressed as a proportion to EBITDA, as follows:

$$\frac{Reinvestment}{EBITDA} = RIR \times (1-T) \times \frac{EBIT}{EBITDA} = \frac{\boldsymbol{g}}{\boldsymbol{ROIC}} \times (\mathbf{1}-\boldsymbol{T}) \times \frac{\boldsymbol{EBIT}}{\boldsymbol{EBITDA}} \quad (12)$$

This equation makes it clear that in essence the model for determining the fundamental EV/EBITDA ratio is based upon the three fundamentals: *earnings potential, growth in earnings and risk*. Or course, at the company level, it is possible to apply the fundamental model by using the absolute numbers for DA, EBITDA and reinvestment amount. But the true idea of the model is to apply it on the basis of the relative fundamental indicators, such as: *ROIC (ROC), g* and *WACC*. This is especially important for the current research, since it involves determining the fundamental EV/EBITDA ratios for the stock market as a whole.

Input variables for the model and deriving the fundamental EV/EBITDA ratios for the US and European stocks

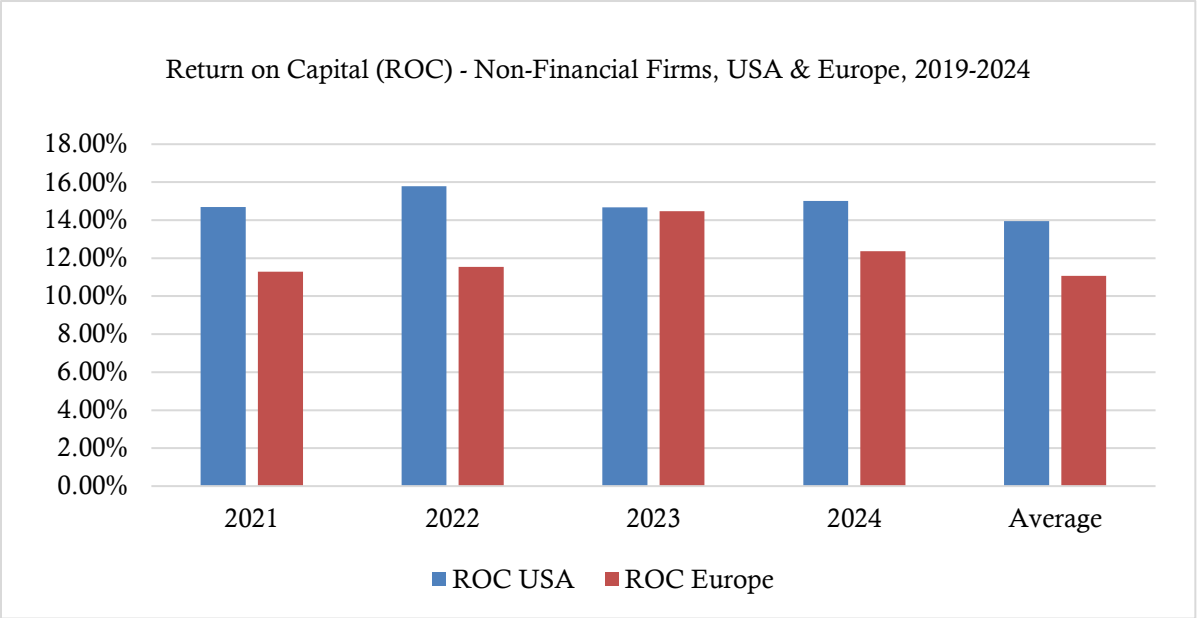
The application of the model for determining the correct fundamental EV/EBITDA ratios requires sound assumptions and forecasts regarding the key input variables. These input variables are derived on the basis of historic or current average values for the two markets, with the expectation that they will be valid in the future as well.

Table 2. ROC, Reinvestment Rate, Expected Growth and Effective Tax Rate - USA & Europe (Non-Financial Companies) – 2019-2024

Indicator	ROC		Reinvestment Rate (RIR, b)		Expected Growth in EBIT		Effective Tax Rate (aggregate)	
Year	USA	Europe	USA	Europe	USA	Europe	USA	Europe
2019	12,96%	9,67%	66,82%	39,87%	8,66%	3,86%	19,01%	26,71%
2020	10,58%	7,10%	29,40%	13,13%	3,11%	0,93%	21,74%	45,43%
2021	14,70%	11,29%	51,00%	29,25%	7,50%	3,30%	19,26%	24,90%
2022	15,79%	11,55%	66,70%	56,33%	10,53%	6,50%	20,99%	29,15%
2023	14,67%	14,47%	44,37%	32,07%	6,51%	4,64%	21,66%	28,06%
2024	15,01%	12,36%	50,79%	114,69%	7,62%	14,17%	21,61%	27,17%
Average	**13,95%**	**11,07%**	**51,51%**	**47,56%**	**7,19%**	**5,27%**	**20,71%**	**30,24%**

Source: http://pages.stern.nyu.edu/~adamodar/, Calculations of the author

Table 2, Table 3 and Figure 2 contain the needed key historic and current values. Table 2 shows the average return on invested capital (ROC), which is 13,95% for USA and 11,07% for Europe for the period 2019-2024. The reinvestment rate (b, RIR) is 51,51% for USA and 47,56% for Europe. The resulting expected growth of EBIT, estimated as internal growth rate (g=ROC×RIR), is 7,19% for USA and 5,27% for Europe.



Source: http://pages.stern.nyu.edu/~adamodar/ , Illustrations of the author
Figure 3. Return on Capital - USA and Europe (Non-Financial Companies) – 2019-2024

Table 3 shows the cost of equity, cost of debt and cost of invested capital (WACC). The average cost of equity for the period is 8,32% for USA and 8,90% for Europe. The average after-tax cost of debt is 3,31% and 3,87% respectively. The cost of capital (WACC), as a function of the cost of equity and the cost of debt, ranges between 4,87% and 10,01% for USA, and between 5,22% and 9,84% for Europe. The lowest values are in 2020 and the highest values are in 2022. The average WACC for the period is 7,33% for USA and 7,29% for Europe. The WACC for Europe becomes even lower – 6,30%, after adjusted for the Euro inflation rate.

Table 3. Cost of Capital - USA & Europe (Non-Financial Companies) – 2019-2024

Indicator	Cost of Equity		Debt / (Debt+Equity)		After-Tax Cost of Debt		Cost of Capital (WACC)		Europe
Year	USA	Europe	USA	Europe	USA	Europe	USA	Europe	in Euro
2019	8,21%	8,43%	0,24	0,32	2,75%	3,37%	6,90%	6,83%	5,47%
2020	5,55%	6,33%	0,20	0,30	2,19%	2,63%	4,87%	5,22%	4,39%
2021	6,38%	6,71%	0,17	0,26	2,61%	2,95%	5,75%	5,74%	4,70%
2022	11,56%	11,83%	0,21	0,29	4,13%	4,94%	10,01%	9,84%	8,76%
2023	8,93%	9,87%	0,18	0,27	3,81%	4,55%	7,99%	7,43%	6,87%
2024	9,28%	10,20%	0,16	0,28	4,34%	4,78%	8,48%	8,66%	7,60%
Average	**8,32%**	**8,90%**	**0,19**	**0,29**	**3,31%**	**3,87%**	**7,33%**	**7,29%**	**6,30%**

Source: http://pages.stern.nyu.edu/~adamodar/ , Calculations of the author

In order to use the fundamental model, the reinvestment rate (RIR), which is a rate to NOPAT, have to be expressed as a rate to EBITDA. The above equation (4) can be used for the purpose:

For USA:

$$\frac{Reinvestment}{EBITDA} = g/ROIC \times (1-T) \times \frac{EBIT}{EBITDA} = 0{,}5154 \times 0{,}7929 \times 0{,}61 = \mathbf{0{,}2493}$$

For Europe:

$$\frac{Reinvestment}{EBITDA} = g/ROIC \times (1-T) \times \frac{EBIT}{EBITDA} = 0{,}4761 \times 0{,}6976 \times 0{,}63 = \mathbf{0{,}2092}$$

The base input projections (variables) for the application of the **one-stage model** are shown in Table 4. Provided that all projections in this one-stage model are until infinity, the average numbers of the cost of capital for the period 2019-2024 do not seem appropriate. They are relatively low – 7,33% and 7,29%, as compared with long-term historic average. The 2024 values of 8,48% for USA and 8,66% for Europe are

used instead, as more reasonable. These values are much closer to long-term historic averages, which makes them more representative in the long run.

Table 4. Projections for the ONE-STAGE fundamental model of EV/EBITDA

Input Variables	(1-T)	DA/EBITDA	RIR (% of NOPAT)	Reinvestment /EBITDA	WACC	g	ROIC
k.1	k.2	k.3	k.4	k.5	k.6	k.7	k.8
USA	0,7929	0,39	51,54%	0,2493	8,48%	7,19%	13,95%
Europe	0,6976	0,37	47,61%	0,2092	8,66%	5,27%	11,07%

Source: http://pages.stern.nyu.edu/~adamodar/ , Calculations of the author

Table 5 shows the base input projections for the **two-stage model** for determining the fundamental EV/EBITDA. This fundamental model is developed from the more sophisticated two-stage DCF enterprise model for valuation of companies and common stocks. It is a lot more consistent with reality and is recommended for use most of the time. The model includes a 5-year high-growth period (stage 1), and a stable growth period (stage 2), starting at year 6.

Table 5. Projections for the TWO-STAGE fundamental model of EV/EBITDA

Input Variables	(1-T)	DA/EBITDA	RIR (% of NOPAT)	Reinvestment /EBITDA	WACC	g	ROIC
k.1	k.2	k.3	k.4	k.5	k.6	k.7	k.8
			STAGE 1 – High growth				
USA	0,7929	0,39	51,54%	0,2493	7,33%	7,19%	13,95%
Europe	0,6976	0,37	47,61%	0,2092	7,29%	5,27%	11,07%
			STAGE 2 – Stable growth				
USA	0,7929	0,39	52,00%	0,2515	8,48%	4,42%	8,50%
Europe	0,6976	0,37	48,00%	0,2110	8,66%	4,18%	8,70%

Source: http://pages.stern.nyu.edu/~adamodar/ , Calculations of the author

Comparative analysis of the level of actual EV/EBITDA ratios in terms of fundamentals

Table 6 illustrates the outputs of the application of the one-stage fundamental EV/EBITDA model for the US stock market. The derived fundamental EV/EBITDA ratio, under the projections shown in Table 4, is **18,17**. It is significantly skewed upwards due to the small difference between WACC and g in the denominator. This is a serious deficit of the one-stage model. For example, if the period-average WACC of 7,33% were used, the result would be even much higher – 167,41.

Table 6. Fundamental EV/EBITDA ratio for USA (one-stage model)

Values	Values of expected growth rate (g)										
of	3,6%	4,3%	5,0%	5,8%	6,5%	7,2%	7,9%	8,6%	9,3%	10,1%	10,8%
WACC											
		EV/EBITDA		***EV/EBITDA***		***EV/EBITDA***		***EV/EBITDA***			
4,2%	36,34	-316,73	-29,56	-15,50	-10,51	-7,95	-6,39	-5,34	-4,59	-4,02	-3,58
5,1%	15,70	30,28	426,15	-35,30	-16,95	-11,15	-8,31	-6,62	-5,50	-4,71	-4,11
5,9%	10,01	14,45	25,96	127,38	-43,81	-18,69	-11,88	-8,71	-6,87	-5,68	-4,83
6,8%	7,35	9,49	13,39	22,71	74,88	-57,73	-20,83	-12,71	-9,14	-7,14	-5,86
7,6%	5,81	7,06	9,02	12,47	20,19	53,03	-84,61	-23,53	-13,67	-9,63	-7,43
8,5%	4,80	5,63	6,80	8,59	11,67	18,17	41,05	-158,36	-27,03	-14,78	-10,17
9,3%	4,09	4,67	5,46	6,55	8,20	10,96	16,52	33,48	-1 234	-31,76	-16,09
10,2%	3,56	4,00	4,56	5,30	6,33	7,85	10,34	15,14	28,27	213,07	-38,49
11,0%	3,15	3,49	3,91	4,45	5,15	6,11	7,52	9,78	13,98	24,47	98,07
11,9%	2,83	3,10	3,43	3,83	4,34	5,01	5,91	7,23	9,28	12,98	21,56
12,7%	2,57	2,79	3,05	3,36	3,75	4,24	4,87	5,73	6,95	8,83	12,11

Source: Calculations of the author

The electronic model also gives the opportunity to illustrate how this fundamental ratio changes under different combinations of expected growth (g) and cost of capital (WACC). The results are extremely sensitive to small changes in these two input variables. Most of the ratios in the table are economically meaningless. The abnormally high numbers, as well as the negative numbers are the result of the deficits of the model. This version of the model can be very misleading and is not recommended for serious analyses. This deficit of the one-stage model illustrates how exaggerated fundamental EV/EBITDA ratios can often be determined and "justified". All this is due to the inconsistent assumption in the one-stage model that current high growth will continue until infinity.

The fundamental EV/EBITDA ratio for Europe under the one-stage model is much more modest – 6,79 (the table with results for Europe under the one-stage model is not displayed). It does not seem skewed upwards, which can be explained with the fact that the difference between WACC (8,66%) and g (5,27%) for Europe is much more significant than that for the USA. However, if we use the lower period-average WACC of 7,33%, the fundamental EV/EBITDA would go up to 11,40.

The two-stage model reflects reality much better and overcomes the above deficits of the one-stage model. This is why it is recommended as more reliable. The results of the two-stage model for the US, demonstrated in Table 7, look much more realistic and meaningful. They are very weakly sensitive to changes in the combinations between WACC and g. The reason is that the simulation of combinations refers only to stage 1 (the high-growth period). The stage 2 (stable-growth period) projections for all input variables are fixed long-term averages. The stage 2 WACC for US market is 8,48%, and the forecasted growth rate (g) is a function of a neutral RIR – at 52%, and ROIC, which is about equal to the forecasted WACC. The resulting g of 4,42% is quite moderate and realistic for the stable growth period.

Table 7. Fundamental EV/EBITDA ratio for USA (two-stage model)

Values	**Values of expected growth rate (g) - Stage 1**										
of	3,6%	4,3%	5,0%	5,8%	6,5%	7,2%	7,9%	8,6%	9,3%	10,1%	10,8%
***WACC* -**											
Stage 1		***EV/EBITDA***		***EV/EBITDA***		***EV/EBITDA***		***EV/EBITDA***			
3,7%	7,08	7,30	7,54	7,77	8,02	8,27	8,52	8,79	9,06	9,34	9,62
4,4%	6,85	7,07	7,29	7,52	7,76	8,00	8,25	8,50	8,76	9,03	9,30
5,1%	6,63	6,84	7,06	7,28	7,50	7,74	7,98	8,22	8,48	8,73	9,00
5,9%	6,42	6,62	6,83	7,04	7,26	7,49	7,72	7,96	8,20	8,45	8,71
6,6%	6,22	6,41	6,61	6,82	7,03	7,25	7,47	7,70	7,94	8,18	8,43
7,3%	6,02	6,21	6,40	6,61	6,81	7,02	7,24	7,46	7,69	7,92	8,16
8,1%	5,83	6,02	6,20	6,40	6,60	6,80	7,01	7,22	7,44	7,67	7,90
8,8%	5,65	5,83	6,01	6,20	6,39	6,59	6,79	7,00	7,21	7,43	7,65
9,5%	5,48	5,65	5,83	6,01	6,19	6,39	6,58	6,78	6,99	7,20	7,42
10,3%	5,31	5,48	5,65	5,83	6,00	6,19	6,38	6,57	6,77	6,98	7,19
11,0%	5,15	5,31	5,48	5,65	5,82	6,00	6,18	6,37	6,57	6,76	6,97

Source: Calculations of the author

There are a number of companies that have been outperforming the market for decades. It makes sense to forecast higher ROIC and g than average when making projections for such outperforming companies for a relatively longer period. However, it doesn't make sense to project that the market as a whole will outperform itself in the long run. Finally, consistent and meaningful forecasts for the market as a whole should assume that the return on capital and the cost of capital overlap over in the long term. This is why the forecasted ROIC after year 5 – during the stable growth period, is set to be about equal to the projected long-term cost of equity (WACC). This is the most realistic assumption. Thus, the fundamental EV/EBITDA from the two-stage model for the US is 7,02.

Table 8 illustrates the results of the two-stage model for Europe. For stage 1, the basic WACC is 7,29%, the basic g is 5,27%, and there are a number of other combinations between them. ROIC is the average of 11,07%, RIR is 47,61%. For stage 2, WACC is fixed at the level of 2024 – 8,66%, ROIC is 8,70%, fixed to be about equal to WACC, RIR is neutral – at 48%, and the resulting growth rate (g) is 4,18%. Thus, the fundamental EV/EBITDA from the two-stage model for Europe is 5,87. This ratio is logically lower than that for the US, mainly because of the lower expected growth rate, as well as the higher average tax rate.

Table 8. Fundamental EV/EBITDA ratio for Europe (two-stage model)

Values of *WACC* - Stage 1	**Values of expected growth rate (g) - Stage 1**										
	2,6%	3,2%	3,7%	4,2%	4,7%	5,3%	5,8%	6,3%	6,9%	7,4%	7,9%
		EV/EBITDA		***EV/EBITDA***		***EV/EBITDA***		***EV/EBITDA***			
3,6%	6,15	6,29	6,44	6,59	6,74	6,89	7,05	7,21	7,37	7,54	7,71
4,4%	5,95	6,09	6,23	6,37	6,52	6,67	6,82	6,97	7,13	7,29	7,46
5,1%	5,76	5,90	6,03	6,17	6,31	6,46	6,60	6,75	6,90	7,06	7,22
5,8%	5,58	5,71	5,84	5,98	6,11	6,25	6,39	6,54	6,68	6,83	6,99
6,6%	5,41	5,53	5,66	5,79	5,92	6,05	6,19	6,33	6,47	6,62	6,77
7,3%	5,24	5,36	5,48	5,61	5,74	5,87	6,00	6,13	6,27	6,41	6,55
8,0%	5,08	5,20	5,32	5,44	5,56	5,68	5,81	5,94	6,08	6,21	6,35
8,7%	4,93	5,04	5,15	5,27	5,39	5,51	5,63	5,76	5,89	6,02	6,15
9,5%	4,78	4,89	5,00	5,11	5,23	5,34	5,46	5,58	5,71	5,84	5,97
10,2%	4,63	4,74	4,85	4,96	5,07	5,18	5,30	5,42	5,54	5,66	5,78
10,9%	4,50	4,60	4,70	4,81	4,92	5,03	5,14	5,25	5,37	5,49	5,61

Source: Calculations of the author

Only the fundamental EV/EBITDA ratios, derived from the two-stage model, are representative and reliable enough, to be used as a benchmark. These fundamental EV/EBITDA for both US and Europe are a lot lower than the actual historical EV/EBITDA multiples on these stock markets, which are demonstrated in previous sections (Table 1).

The comparison between fundamental and actual EV/EBITDA ratios is shown in Table 9. The actual EV/EBITDA tell us at what price the shares are being sold, while fundamental ratios tell us at what price they should be sold. The idea here is that the fundamental EV/EBITDA ratios serve as benchmarks as to what the reasonable value of the ratios is. The actual average EV/EBITDA multiple of 14,72 for the period 2019-2024 for the US is by 110% higher than the corresponding fundamental EV/EBITDA ratio. The actual average multiple of 10,67 for Europe is by 82% higher than the corresponding fundamental ratio.

Table 9.Comparison between actual and fundamental EV/EBITDA ratios – US and Europe

Indicators	**Actual EV/EBITDA**	**Fundamental EV/EBITDA**	**Difference (k.2-k.3)**	**Difference in % (k.4/k.3)**
k.1	k.2	k.3	k.4	k.5
USA	14,72	7,02	7,7	**110%**
Europe	10,67	5,87	4,8	**82%**

Source: Calculations of the author

Having in mind that the projections of fundamental variables for the model are quite moderate, the significant excess of actual EV/EBITDA ratios over fundamental ones should mean a significant inflation of stock prices above their actual value – respectively by 110% and 82%. The key explanation for the much lower fundamental ratios under the two-stage model are the reasonable moderate projections for Stage 2.

CONCLUSIONS AND FUTURE RESEARCH

The study indicates that the fundamental EV/EBITDA ratios for the US and European stock markets can be determined at any time, given the availability of the relevant fundamental models and the necessary data for their application. The two-stage fundamental EV/EBITDA model is the one that gives the opportunity for consistent projections until infinity and produces reasonable results. The obtained fundamental EV/EBITDA ratios can be debated and examined in relation to the projections of the fundamental variables used. The electronic model gives the opportunity to test different combinations of input variables and the results can be adjusted if this is considered necessary.

The comparison indicates that the actual average EV/EBITDA of the US market for the analyzed period is by 38% higher than that of the European market. For both markets, the derived fundamental EV/EBITDA ratios do not support the significantly higher actual EV/EBITDA multiples, which are about twice as high. This difference is more pronounced for the US market. These findings are important in practical terms for actual and potential investors in the stock markets.

Future research is needed on the fundamental EV/EBITDA ratios as benchmarks. An essential part

of this research has to be focused on the consistency of projections for any of the key fundamental variables.

REFERENCES

Христозов, Я. 2020. *Състояние на фирмената задлъжнялост в България*, ИК на УНСС, София (Hristozov, Y. 2020. S*astoyanie na firmenata zadlazhnyalost v Bulgaria,* IK na UNSS, Sofia)

Морис, Ч.. 2009. *Мъдреците – Уорън Бъфет, Джордж Сорос и Пол Волкър.* Сиела (Moris, Ch. 2009. *Madrecite – Warren Buffett, George Sorros i Paul Wolker.* Siela)

Bagna, E., and E. Ramusino. 2017. Market Multiples and the Valuation of Cyclical Companies". *International Business Research,* 10(12).

Bancel, F., and U. Mittoo. 2014. The Gap between the Theory and Practice of Corporate Valuation: Survey of European Experts. Journal of Applied Corporate Finance, Columbia Business School, 26(4), Fall 2014.

Brigham, E., and I. Gapenski. 1994. *Financial Management – Theory and Practice.* The Dryden Press

Copeland, T., T. Koller, and J. Murrin. 2000. Valuation – Measuring and Managing the Value of Companies. John Wiley & Sons, New York.

Damodaran, A. 2012 Investment Valuation – Tools and Techniques for Determining the Value of Any Asset, John Wiley & Sons, New York.

Damodaran, A. 2019. January 2019 Data Update 9: The Pricing Game, 22 Feb, 2019 [blog post] http://pages.stern.nyu.edu/~adamodar/ , (accessed 9 July 2019)

Damodaran A. 2025. https://pages.stern.nyu.edu/~adamodar/ , accessed 17 July, 2025

Fernandez, P. 2017. Company Valuation Methods

Graham, B., and D. Dodd. 2009. Security Analysis – Principles and Technique", 6th ed., The McGraw-Hill Companies, Inc. (Foreword by Warren Buffett, Updated with New Commentary by Seth. A. Klarman, James Grant, Bruce Greenwald, and Others)

Graham, B. 2006. The Intelligent Investor – Revised Edition, First Collins Business Essentials edition (HarperCollins Publishers), (Preface to the fourth edition by Warren E. Buffett, Updated with New Commentary by Jason Zweig)

Hitchner, J. 2017.Financial Valuation – Applications and Models, John Wiley & Sons, Inc., 4th Ed., 2017

International Valuation Standards Committee. 2001. International Valuation Standards 2001", London 2001, (Standard 1)

International Appraisal Standards Board. 2020

Malkiel, B. G. 2015. A Random Walk Down Wall Street, 12th Edition (completely revised and updated), W.W. Norton & Company, Inc., New York, London

Nenkov, D. 2021a. The S&P 500 Current Record-High Levels against Fundamental PE and PBV Ratios. *Economic Studies Journal*, 30 (8): 93-113

Nenkov, D. 2021b. US Stock Market at the Background of the Covid-19 Pandemic: Implication for Valuation. *Finance, Accounting and Business Analysis*, 3(1): 56-66.

Nenkov, D. and Y. Hristozov. 2023. DCF Valuation: The Interrelation Between the Dynamics of Operating Revenue and Gross Investments. *Economic Studies Journal (Ikonomicheski Izsledvania),* 32 (7): 114-138

Pinto, J., T. Robinson, J. Stowe. 2019. Equity Valuation: A Survey of Professional Practice. *Review of Financial Economics*, 37(2): 219-233 (First published 19 Oct, 2018), https://www.cfainstitute.org/en/membership/professional-development/refresher-readings/free-cash-flow-valuation

O'Shaughnessy, J. P. 2005. What Works on Wall Street", McGraw Hill

Shiller, R. J. 2012. *Finance and the Good Society*. Princeton University Press, New Jersey

Shiller, R. J. 2015. *The Irrational Exuberance*. Princeton University Press, New Jersey

Zukin, J. H. 1990. *Financial Valuation: Businesses and Business Interests*. Warren Gorham Lamont, p.2-3