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Towards and Effective Financial Management: Relevance of Dividend Discount Model in Stock Price Valuation

Mugoša Ana[1], University of Montenegro, School of Economics, Podgorica
Popović Saša[2], University of Montenegro, School of Economics, Podgorica

ABSTRACT *– The aim of this paper is to analyze the relevance of dividend discount model, i.e. its specific form in stock price estimation known as Gordon growth model. The expected dividends can be a measure of cash flows returned to the stockholder. In this context, the model is useful for assessment of how risk factors, such as interest rates and changing inflation rates, affect stock returns. This is especially important in case when investors are value oriented, i.e. when expected dividends are their main investing drivers. We compared the estimated with the actual stock price values and tested the statistical significance of price differences in 199 publicly traded European companies for the period 2010-2013. Statistical difference between pairs of price series (actual and estimated) was tested using Wilcoxon and Kruskal-Wallis tests of median and distribution equality. The hypothesis that Gordon growth model cannot be reliable measure of stock price valuation on European equity market over period of 2010-2013 due to influence of the global financial crisis was rejected with 95% confidence. Gordon growth model has proven to be reliable measure of stock price valuation even over period of strong global financial crisis influence.*

KEY WORDS: *dividend discount model, Gordon growth model, stock valuation, European equity market*

Introduction

Valuation as a strategy is especially crucial in corporate finance whether it is the study of market efficiency, analysis of stock returns, or evaluation of different investments in process of capital budgeting. It is very important to assess current and future company's profitability in order to estimate its real market value. Once the stock value is determined, the investors will be able to decide whether the stock is overvalued or undervalued, which will consequently affect their investment choices and profit opportunities. Knowing how to estimate the value of a company and understanding its determinants seem to be prerequisites for making prudent investment decisions.

[1] Teaching Assistant, University of Montenegro, School of Economics, J. Tomasevica 37, suite 415, 81000 Podgorica, Montenegro, e-mail: ana.mugosa@ac.me (corresponding author)
[2] Associate Professor, University of Montenegro, School of Economics, J. Tomasevica 37, suite 211, 81000 Podgorica, Montenegro, e-mail: sasap@ac.me

Company valuation incorporates different goals, such as increasing value by changing financial and dividend policies, investment strategies or creating profitable portfolio that will generate high returns and therefore increase value of money invested. As noticed by Damodaran (Damodaran, 2006: 3) there are four approaches to valuation:

1. Discounted cash flow valuation - analysis of asset present value, calculated by discounting its expected future cash flows, at the rate that reflects the risk of future cash flows.
2. Liquidation and accounting valuation – valuation of existing assets or business of a firm based on accounting estimates and book values.
3. Relative valuation - valuation of comparable assets price relative to a common variable, such as earnings, sales and etc.
4. Option pricing model - an alternative or choice that becomes available with a business investment opportunity. Real options can include opportunities to expand and terminate projects if certain conditions arise amongst other options.

This paper focuses on discounted cash flows analysis at European equity markets applied on stock price valuation. When considering stock investment, investors can, in general, expect two types of cash flows: dividends and the price at the end of holding period. Based on the assumption that stock will be held indefinitely or that the expected price of stock is determined by future dividends, the easiest way to estimate the present value of stock is to discount its expected cash flows or dividends. Dividend discount models (DDM) are widely used in practice even though their reliability is often tested. The common application of DDM has been caused particularly by the fact that the investors' received return was the most incoming form of dividends in the past century. On the other hand, recent studies point out the importance of capital gains on investors' total returns and the need for method's combination in valuation process.

However, our goal is to analyze whether stable DDM, i.e. this specific form of the Gordon growth model (GGM), is reliable in stock valuation of the publicly traded European companies, using the year 2009 as a referent year for stock price estimation. Therefore, we posit as follows: *GGM cannot be used as a reliable measure of stock price valuation in European equity market over the period of 2010-2013 due to influence of the global financial crisis.*

The prices are estimated over period of four years, from 2010-2013, and, then, compared to the actual values in that period. Computing differences between estimated and actual prices and testing their statistical significance, we will observe whether GGM gives accurate estimates for future value of stocks.

The paper is structured as follows:

Section II reviews the literature of previous empirical analyses. Section III describes the theoretical approach. Section IV explains the data and methodology employed. Section V presents empirical results while Section VI offers concluding remarks.

Literature review

Mid past century, Lintner (Lintner, 1956) has discovered the importance of dividend interviewing managers from 28 companies and observing that long-term payout ratio was targeted. This means that companies tried to maintain a stable pattern in future cash-flows toward shareholder or dividends. Brav et al. (Brav et al., 2005) widen the study and find that managers do focus on a steady growth rate of dividends rather than a consistent payout ratio. Analyzing the Bank of Montreal over a period of more than 120 year, Foerster and Sapp (Foerster and Sapp, 2005) compare the actual share price to the expected price using several of the most commonly used fundamental valuation methods. The results showed that dividend discount model (DDM) and Gordon growth or constant growth model (GGM) both perform well at explaining the observed price for one firm that has a long history of paying dividends. These models perform better than commonly used earnings based models.

Apparently, fundamental analysis can be applied and results in accurate estimates of future stock price or expected returns. The relationship between volatility of earning and abnormal return was widely studied and analyzed in the past century (Ou and Penman, 1989; Lev and Thiagarajan, 1993). These studies demonstrated that the analysis of certain fundamental financial signals is very useful in stock price evaluation. Abarbanell and Bushee (Abarbanell and Bushee, 1997) find that risky portfolio that is created based on company's ranking using fundamental information can generate average cumulative abnormal return of 13%. The announcement of future earnings and dividend growth positively affects the present value of stock.

Shiller (Shiller, 1981) and Famma and French (Famma and French, 1988) argue that the volatility of stock prices is excessive and difficult to be explained by dividends. They state that variations in prices are much more expressed than variations in dividends. Even dividend yields are much more prone to volatility than absolute dividends.

So the evident problem is that there exists a significant difference between potential dividends and actual dividends, which additionally undermines and challenges the dividend discount models. The first to point out this problem are Fama and French (Fama and French, 2001). They demonstrate the significant gap between payout ratios at the end of the seventies and at the end of the nineties of the the XXth century (from 67% to 21% on average). These declines were only in a small part affected by company's characteristics. The scholars explain that possible reasons could be investors will to reinvest earnings or increase in idiosyncratic risk.

In the context of dividends payout decline, Baker and Wurgler (Baker and Wurgler, 2004) provide an explanation based on behavioral finance. During periods of high dividends fads, the payout ratios are high, whilst in periods of low dividend fads, payer valuations decline. These scholars argue that companies' dividend policies are synchronized with the periods of fads, and that dividend proxies explain on average 30% of changes in propensity to pay variable. This means that behavioral fads are the first-order determinants of disappearing dividends.

DeAngelo, DeAngelo and Skinner (DeAngelo, DeAngelo and Skinner, 2004) argue that dividends on aggregate level have not decreased. The dollar supply of dividends does not mimic the trend of the disappearing dividends. The cause of disappearing dividends can be found among smaller companies which represent fewer payers on the market and are not interested in paying dividends. Grullon and Michaely (Grullon and Michaely, 2002) reach same results, meaning that payouts to shareholders in the form of repurchases and dividends have not declined. The results are supported by evident growth of repurchases since low changes (US SEC, Rule 10b-18) for firm repurchasing shares.

Nevertheless, dividend discount models are widely used as there are variations of basic model. The gap between the potential and actually paid dividends could be narrowed by redefinition of the cash flow paid as dividends including stock buybacks or, even, including earnings as proxies to dividends (Damodaran, 2006).

Theoretical consideration

Dividend discount model (DDM)

The basic principle of dividend discount model is simple stocks trade from which investors expect future cash flows or dividends and expected price in case the stock is being sold. In order to compare the profit and cost of investment, this model uses time value of money to determine the present value of stock (based on discounted value of future cash flows). This generated value is called intrinsic value of stock as it is determined through fundamental analysis without including external factors such as its market value. If an investor buys a stock and holds it for one year, than the value of stock could be calculated as follows:

$$P_0 = \frac{D_1 + P_1}{1 + k_e} \tag{1}$$

where,
D_1 – expected dividend at the end of first year,
P_1 – value of stock at the end of first year,
k_e – cost of equity.

Because we do not have infinite required information on expected dividends, the stock is valued in two stages. The first stage determines the value of expected dividends based on available information over analyzed period, and the second stage determines terminal value or the last price. Considering both stages, the model can capture the effects of dividends as well as capital gain on stock price (Foerster and Sapp, 2005). In general, for the period of n years, the value of stock represents the sum of the present value of discounted expected dividends over n years and selling price at end of the n_{th} year:

$$P_0 = \frac{D_1}{(1+k_e)} + \frac{D_2}{(1+k_e)^2} + \dots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n} \tag{2}$$

Since the assumption that the expected price is determined by future expected dividends, the present value of stock held by an investor through infinity is:

$$P_0 = \sum_{n=1}^{\infty} \frac{D_n}{(1+k_e)^n} \tag{3}$$

where,
D_n – expected dividend per share in period n,
k_e – cost of equity.

As already noticed, the model calculates in a simple manner the present value of stock by using two variables – expected dividends and cost of equity. In order to calculate expected dividends, it is necessary to estimate future growth rates, by which the dividend will increase in the future. The cost of equity can be measured in various ways, but in majority of cases it is derived from Capital Asset Pricing Model (CAPM).

Different assumptions on dividend future growth caused the formulation of various dividend discount models:

- DDM with zero growth
- GGM
- two and three stage DDM

Brief explanation of those models follows.

Dividend discount model with zero-growth

Basic assumption of zero-growth DDM is that dividends are constant forever with no growth. Present value of stock, whose dividends are constant over time, will be equal to the present value of dividends, in perpetuity. If D_1 is the constant dividend which is expected to be paid through infinity ($D_1=D_2=\ldots=D_n$), and if k_e is cost of equity, then the present value of stock P_0 can be expressed as:

$$P_0 = \frac{D_1}{k_e} \quad (4)$$

Zero growth model represents the simplest DDM and assumes no inflation, no variation in cash flows, and no change in other external factors influencing future cash flows.

Dividend discount model with stable growth – the Gordon growth model (GGM)

Assuming that dividends grow at stable rate (rate that can be sustained indefinitely), Gordon (Gordon, 1959; Gordon and Shapiro, 1956) formulated the model known as Gordon growth model, which can be used to value a firm that is in a stable state. This model evaluates stock prices by using the constant growth of dividends in perpetuity. This means that the stock will be held by the investor indefinitely. Therefore, stock price can be valued as follows:

$$P_0 = \frac{D_1}{k_e - g} \quad (5)$$

where,
D_1 – expected dividend one year from now (next period)

g – infinite future constant growth rate in dividends
k_e – cost of equity, where $k_e > g$

Since the dividend growth rate is constant, it is expected that earnings grow at the same rate as dividends. Additionally, a growth rate which is stable has to be less or equal to the growth of GNP. The model implies that the stable infinite growth rate cannot be more than 1% or 2% greater than the growth rate of economy (Damodaran, 2004). In case when dividends grow at variable rate or when companies do not pay dividend, then other models must be applied, such as the valuation of free cash flow or residual income as well as two-stage or a three-stage model (Foerster and Sapp, 2006). Damodaran (STERN NYU 2014) estimates the upper and lower end of stable growth rate by following:

upper end: long term inflation rate + growth rate in real GNP
lower end: long term inflation rate + growth rate in real GNP

Damodaran estimates that the lower and upper end for stable dividend growth rate in the US is from 5%-8%, and, if the company is multinational, the real growth rate will be the growth rate of the world economy, which is about one percent higher.

The limitation of the model is obvious in that it relies on the basic assumption of stable dividend growth. Its assumption is difficult to prove, especially considering cyclical companies with high earnings deviations and volatility. Nevertheless, in specific cases when earnings are volatile but dividends on average have a constant growth rate, the Gordon's model could be applied. To summarize, Gordon growth model can be reliable in price valuation of companies whose growth rate is less or equal to nominal growth of economy, as well as for companies which have strategically defined future long-term stable dividend policies.

Two-stage and three-stage dividend discount model

When companies are unable to meet the assumption of stable dividend growth, stock can be valued using techniques of two or three-stage dividend growth (Damodaran, 2004). These models can be applied on companies that grow by certain, in most cases, higher rate in initial phase and have a stable growth rate in subsequent long-term period. Two-stage dividend discount model can be defined as follows:

Value of the stock = PV of dividends during extraordinary phase + PV of terminal price, or

$$P_0 = \sum_{t=1}^{s} \frac{D_s}{(1+k_{e,hg})^s} + \frac{P_n}{(1+k_{e,hg})^n}\text{, where } P_n = \frac{D_{n+1}}{(k_{e,sg} - g_n)^n} \quad (6)$$

where,
D_s = expected dividends per share in year *s*,
k_e = cost of Equity (*hg*: high growth period; *st*: stable growth period),
P_n = price (terminal value) at the end of year *n*,

g = extraordinary growth rate for the first *n* years,
g_n = steady state growth rate forever after year *n.*

Unlike classical two-stage growth model, the H-model was derived by Fuller and Hsia (Fuller and Hsia, 1984), where the initial period is characterized by decline in growth rate and than follows a stable pattern in a steady state over the long-term period. The three-stage dividend discount model represents a combination of two-stage and H-model, providing that company has high growth in initial phase, decline in rate in transition period and, afterward, a stable rate in the last phase (infinity).

The limitations of these models are determined by the question of how to define the length of initial growth phase; by the sudden transformation of initial growth rate to stable rate; and by cases of companies retaining profit and paying lower dividend in certain phases. In that context, these models can be suitable for companies that have modest growth rates that can be easily transformed to stable rates; companies that pay the majority of free cash flow to equity (FCFE) to shareholders; or companies that are specific and expected to grow higher in initial phase and be moderately stable afterwards.

Data and methodology

We analyzed firm-level data of 4,788 publicly traded companies on the European equity market off of the New York Stern University website (STERN NYU 2014). Due to the lack of data on dividend per share paid, 2009 was used as referent year for price estimation. The prices were estimated starting from year 2010 up to year 2013. The aim of this paper is to analyze whether Gordon growth model (GGM) is reliable in stock valuation, comparing the estimated with the actual stock price values and testing the statistical significance of price differences. Statistical difference between the two price series (estimated and actual) is tested using the tests of equality (equality of average value and variance).

In order to apply GGM, total available number of companies was reduced by excluding companies following the criteria:

- bank, financial, insurance, reinsurance and real estate companies, due to global financial crisis,
- where $k_e < g$,
- with dividend yield = 0% , and
- with $g < 0$ (payout ratio > 100%).

After following these criteria, we end up with the sample of 199 companies.

Cost of equity is estimated using CAPM – the required return equals risk free rate increased by the product of company's beta and market premium. Risk free rate of 3.68% represents ECB 10 year AAA-rated euro area central government bonds issued in 2009, whilst the market premium risk in 2009 amounted 5.2% (European Central Bank, 2014). Using companies' individual betas from the Damodaran's database, we generated k_e for each single company from the sample.

In Gordon's model, payout ratios of dividend paying companies tend to be stable, which means that growth rate of dividend g equals growth rate of earnings. Earnings will increase when a portion of net earnings is retained and when companies invest. This results in conclusion that growth rate of earnings, and therefore dividends, is a function of retention ratio (1 – payout ratio) and return on retained earnings (RORE). Because the details of future investment projects are not publicly available, it is difficult to estimate the ratio of return on retained earnings. Therefore, it is often assumed that the future projects will have the same expected rate as those from previous years. In that case, the expected project rate can be estimated using historical data of return on equity (Ross, Westerfiled and Jaffe, 2002). Dividend growth rate is estimated as product of return on equity (ROE) and retention ratio:

$$g = ROE * \text{retention ratio} \tag{7}$$

Again, using companies' individual ROE rates and retention ratios from the Damodaran's database, we generated gfor each single company from the sample.

Calculating the corresponding cost of equity k_e and dividend growth rate g, and discounting the initial dividend from the year 2009, the Gordon growth model was applied in price estimation for the period of 2010-2013. Table 1 reports the descriptive statistics of estimated firms' prices from the sample. From the results, it is evident that the data time series does not have normal distribution, which, consequently, implies the use of non-parametric tests of time series equality – Wilcoxon Signed-Rank test and Kruskal–Wallis tests.

Table 1. Descriptive statistics of estimated an actual prices in observation period 2010-2013

	P1E	P2E	P3E	P4E	P1A	P2A	P3A	P4A
Mean	93.07947	99.73328	106.9354	114.7341	42.39884	31.15342	36.90675	45.23538
Median	9.963856	10.40862	11.07812	11.79068	13.01000	9.800000	10.44000	13.40000
Maximum	4183.969	4619.661	5100.722	5631.878	1814.500	1080.560	1423.490	1387.260
Minimum	0.002846	0.003006	0.003175	0.003354	0.043000	0.047000	0.037000	0.090000
Std. Dev.	382.4551	415.7875	452.4644	492.8274	141.2007	87.77031	110.2661	115.2178
Skewness	7.968668	8.138462	8.311607	8.487132	10.45366	9.283313	10.33518	8.543701
Kurtosis	76.12060	79.49674	82.96460	86.50087	127.5103	106.2840	127.6493	95.17107
Jarque-Bera	46438.48	50717.55	55310.96	60201.82	132168.5	91310.29	132374.2	72862.90
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	18522.81	19846.92	21280.15	22832.08	8437.369	6199.530	7344.444	9001.840
Sum Sq. Dev.	28961832	34230091	40535361	48090019	3947653.	1525318.	2407405.	2628477.
Observations	199	199	199	199	199	199	199	199

Wilcoxon Two-Tailed Signed-Rank Test is applied when comparing two series or populations with paired observations. This test is an alternative to paired t-test in cases when data time series and the differences between observations are not normally distributed. Wilcoxon test does not only incorporate the sign differences analysis, but also tests their magnitude. This process is done by considering the ranks of these differences. The null and alternative hypotheses of Wilcoxon Signed-Rank Test are defined as follows:

H_0: μ_A-μ_E = 0, or the median difference between populations is zero

H_1: μ_A-$\mu_E \neq$ 0, or the median difference between populations is not zero

Suppose we have independent and identically distributed data X_1, X_2, . . .,X_n from some symmetric continuous distribution. Then, the assumptions of Wilcoxon non-parametric test are (Taheri and Hesamina, 2013):

- independence of differences (i.e., changes in prices are mutually independent)
- identical distribution (the data are paired and come from the same population)
- continuity (the continuity assumption assures that ties are impossible, and is
- necessary for the point estimate and confidence interval)
- symmetry.

In order to calculate the Wilcoxon T statistic, the difference D is calculated for each pair of data ($D=x_1-x_2$). The second step involves the rank of differences absolute values. In the next step, the ranks of the positive and negative differences are summed. The Wilcoxon T statistic is defined as the smaller of the two sums of ranks (Aczel, 1999: 689):

$$\mathrm{T} = min\left(\sum(+), \sum(-)\right) \tag{8}$$

where,

$\sum(+)$ is the sum of the ranks of the positive differences and

$\sum(-)$ is the sum of the ranks of the negative differences

Decision rule: If the test statistics T is less than the critical point from the table, for a given level of significance, the null hypothesis is rejected.

The Kruskal-WallisTest represents a non-parametric alternative to One-Way ANOVA in cases when the data time series and the differences between observations are not normally distributed. This test is an analysis of variance, using ranks of the observations rather than the data themselves. It is possible to conduct it under the assumption that the measurement scale is an interval and that populations are continuous (Meyer and Seaman, 2011). The null and alternative hypotheses for *k* population of The Kruskal-Wallis Test are defined as follows:

H_0: μ_A-μ_E = 0, all k populations have the same distribution

H_1: μ_A-$\mu_E \neq$ 0, not all k populations have the same distribution

The Kruskal-Wallis H statistics is given by the following formula (Aczel, 1999: 696):

$$H = \frac{12}{n(n-1)}\left(\sum_{j=1}^{k}\frac{R_j^2}{n_j}\right) - 3(n-1) \quad (9)$$

Decision rule: If the H statistics is too large, exceeding the critical point for a given level of significance, the null hypothesis is rejected.

Empirical results

In order to test the reliability of GGM, the research hypothesis was defined as follows: *Gordon growth model cannot be reliable measure of stock price valuation in European equity market over period of 2010-2013 due to influence of the global financial crisis.*

Our expectations are negative, taking into consideration that the global financial crises (GFC) started in 2008 and that our referent estimation year was one year after the crisis. The effects of GFC were the highest one year after. When we consider the effects of GFC, we assume several changes:

- decline in free cash flow to equity value,
- decline in dividends value,
- decline in payout ratios,
- decline in dividend and earnings growth rate,
- decline in market capitalization,
- increase in risk premium of securities,
- increase in market premium of securities.

The summary of empirical results, with probabilities assigned to each test by the observation period 2010-2013, is given in the next table.

Table 2. Summary of empirical results, 2010-2013

Method	**Probability (p-values)**			
	2010	**2011**	**2012**	**2013**
Wilcoxon/Mann-Whitney	0.4167	0.4162	0.7657	0.5646
Wilcoxon/Mann-Whitney (tie-adj.)	0.4167	0.4162	0.7657	0.5646
Med. Chi-square	0.2701	0.9201	0.9201	0.6162
Adj. Med. Chi-square	0.3161	1.0000	1.0000	0.6884
Kruskal-Wallis	0.4164	0.4159	0.7653	0.5643
Kruskal-Wallis (tie-adj.)	0.4164	0.4159	0.7653	0.5643

According to the assessed probabilities, shown in Table 2, and corresponding T and H statistic of the Wilcoxon Signed-Rank and Kruskal-Wallis Test (see Appendice, A-1, A-4), we accept the null hypothesis with 95% confidence (α=5%) and conclude that there is no statistically significant difference between the estimated and actual prices medians and distribution over observation period 2010-2013.

Concluding remarks

Reliability of Gordon growth model in stock price valuation is confirmed on the sample of 199 publicly traded EU companies. Referent year 2009 was chosen due to the lack of data on dividend per share paid.

Gordon growth model showed to be reliable measure of stock price valuation even over period of strong global financial crisis influence. Our confirmation of these results relies on two assumptions:

- First, only 11.5% of the companies from the sample have the growth rate greater than 8%. This means that the growth rate of the majority of the companies is inside the interval of Damodaran's lower and upper end for stable growth (5%-8%). The first assumption may make us conclude that the majority of companies from our sample represent mature companies with stable growth and high payout ratio.
- Second, as discussed in literature review, dividends were representing major cash flow and return to shareholders in the XXth century and these models performed better than commonly used earnings based models. We assume that this trend continues in the XXIst century and, therefore, it is reliable to measure stock prices using different types of dividend discount models.

Finally, as our focus on assessment of the model was the stable dividend growth rate, further research could involve analysis of the reliability of Gordon growth model by taking into account firms with stable leverage and beta over time; firms that pay out dividends that are high and come close to free cash flow to equity.

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Appendix: Detailed empirical results, 2010-2013

Table A-1. Statistical tests of equality between actual and estimated stock prices, 2010

Test for Equality of Medians Between Series
Date: 06/01/14 Time: 12:40
Included observations: 199

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.812208	0.4167
Wilcoxon/Mann-Whitney (tie-adj.)		0.812208	0.4167
Med. Chi-square	1	1.216080	0.2701
Adj. Med. Chi-square	1	1.005025	0.3161
Kruskal-Wallis	1	0.660389	0.4164
Kruskal-Wallis (tie-adj.)	1	0.660389	0.4164
van der Waerden	1	0.349390	0.5545

Category Statistics

Variable	Count	Median	> Overall Median	Mean Rank	Mean Score
P1E	199	9.963856	94	194.8141	-0.029281
P1A	199	13.01000	105	204.1859	0.029282
All	398	10.82336	199	199.5000	2.95E-08

Table A-2. Statistical tests of equality between actual and estimated stock prices, 2011

Test for Equality of Medians Between Series
Date: 06/01/14 Time: 12:43
Included observations: 199

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.813079	0.4162
Wilcoxon/Mann-Whitney (tie-adj.)		0.813079	0.4162
Med. Chi-square	1	0.010050	0.9201
Adj. Med. Chi-square	1	0.000000	1.0000
Kruskal-Wallis	1	0.661806	0.4159
Kruskal-Wallis (tie-adj.)	1	0.661807	0.4159
van der Waerden	1	1.074622	0.2999

Category Statistics

Variable	Count	Median	> Overall Median	Mean Rank	Mean Score
P2E	199	10.40862	100	204.1910	0.051353
P2A.	199	9.800000	99	194.8090	-0.051353
All	398	10.10757	199	199.5000	5.03E-08

Table A-3. Statistical tests of equality between actual and estimated stock prices, 2012

Test for Equality of Medians Between Series
Date: 06/01/14 Time: 12:44
Included observations: 199

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.298042	0.7657
Wilcoxon/Mann-Whitney (tie-adj.)		0.298042	0.7657
Med. Chi-square	1	0.010050	0.9201
Adj. Med. Chi-square	1	0.000000	1.0000
Kruskal-Wallis	1	0.089089	0.7653
Kruskal-Wallis (tie-adj.)	1	0.089089	0.7653
van der Waerden	1	0.211050	0.6459

Category Statistics

Variable	Count	Median	> Overall Median	Mean Rank	Mean Score
P3E	199	11.07812	100	201.2211	0.022758
P3A	199	10.44000	99	197.7789	-0.022758
All	398	11.01800	199	199.5000	2.98E-07

Table A-4. Statistical tests of equality between actual and estimated stock prices, 2013

Test for Equality of Medians Between Series
Date: 06/01/14 Time: 12:45
Included observations: 199

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.576040	0.5646
Wilcoxon/Mann-Whitney (tie-adj.)		0.576040	0.5646
Med. Chi-square	1	0.251256	0.6162
Adj. Med. Chi-square	1	0.160804	0.6884
Kruskal-Wallis	1	0.332324	0.5643
Kruskal-Wallis (tie-adj.)	1	0.332324	0.5643
van der Waerden	1	0.160077	0.6891

Category Statistics

Variable	Count	Median	> Overall Median	Mean Rank	Mean Score
P4E	199	11.79068	97	196.1759	-0.019818
P4A	199	13.40000	102	202.8241	0.019822
All	398	12.03400	199	199.5000	1.82E-06

Prema efektivnom finansijskom menadžmentu: Relevantnost modela diskontovanja dividendi u vrednovanju akcija

REZIME *– Cilj rada je analiza relevantnosti modela diskontovanja dividendi, tj. njegove specifične forme u procjeni vrijednosti akcija poznate kao Gordonov model rasta. Očekivane dividende mogu predstavljati mjeru slobodnih novčanih tokova prema akcionarima. U tom kontekstu, model je koristan u ocjeni uticaja faktora rizika, kao što su kamatne stope i stope inflacije, na cijene akcija. Procjena vrijednosti primjenom ovog modela je veoma važna za investitore orjentisane na vrijednost kompanije , tj. isplatu očekivanih dividendi. Na uzorku od 199 javno trgovanih Evropskih kompanija, u periodu od 2010.-2013. godine, upoređene su ocijenjene i stvarne cijene i testirana je statistička značajnost njihovih razlika. Testiranje razlika parova cijena (stavrnih i ocijenjenih) je izvršeno primjenom Wilcoxon i Kruskal-Wallis testova jednakosti srednjih vrijednosti. Hipoteza da Gordonov model rasta ne može biti pouzdan u procjeni vrijednosti akcija na evropskom tržištu kapitala, u periodu od 2010.-2013. godine, zbog uticaja globalne finansijske krize, je odbačena u intervalu povjerenja od 95%. Rezultati su pokazali da je Gordonov model rasta pouzdan u procjeni vrijednosti akcija, čak i u periodu jakog uticaja globalne finansijske krize.*

KLJUČNE REČI: *model diskontovanja dividendi, Gordonov model rasta, vrednost akcija. evropsko tržište akcija*

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