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The Relevance of Gordon's Model and Earnings Multiplier Approaches in Emerging Stock Market: Test with Appropriate Refinements

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Abstract

Applying a newer and more robust methodology, this paper tests the Gordon's Model developed by Gordon (1956) and the Earnings Multiplier approach developed by Basu (1977) to appraise the stock value of selected components stocks of Bursa Malaysia. This study also extends earlier work of Annuar and Shamsher (1993) by incorporating the analysis to include three different economic conditions. We believed this is one of the earliest studies employing multi-companies pooled time series panel data approach. In addition, the study also employs the normal traditional cross section analysis for comparison purpose and completion of analysis. Based upon cross sectional analysis the evidence seems to support the Gordon's Model only during the economic crisis. However, using multi-companies pooled time series panel data approach, the general result does not discriminate which model is more superior for three different economic conditions. On the contrary, the panel data approach seems to support the Gordon's Valuation Model for the overall market. In extending the analyses based upon ranking of DPSt and EPSt, both valuation models show practical usefulness depending upon economic conditions. We conclude that both models are relevant in appraising stock value though Gordon's model tends to exhibit more superiority based upon cross sectional and panel data results.

Keywords: Dividends, Earnings, Gordon's Model and Earnings Multiplier Approach, Asian Financial Crisis.

I. Introduction

For decades, both financial analysts and statisticians spend many hours trying to find suitable models to value shares. Stock valuation can be approached in several ways, two of which, are popular among analysts are the Dividend Discount Model and the Earnings Multiplier approach. Standard textbooks in finance indicate that the DDM is the most popular technique employed by the fundamentalists. In theory, the DDM is theoretically appealing. In summary the DDM postulates that the best estimate of the current value of a company's common stock is the present value of the estimated/future dividends

to be paid by company to its shareholders. Some analysts and investors feel that this model has limited usefulness. Miller and Modigliani (1961) argued that, under few strict assumptions, dividend is irrelevant to the firm's value. Furthermore, no one can forecast dividends into the distant future with great accuracy. Technically, the model calls for an estimate of all dividends from now to infinity, which is an impossible task. Finally, many investors prefer capital gain and not dividends, so for some investors, focusing solely on dividend is less desirable.

Based on these objections, the earnings multiplier or P/E model remains a popular approach to valuation. It is less sophisticated, less formal, more intuitive model and easy to use. In fact understanding the P/E model helps investors to understand DDM. Since dividend is paid out of earnings, investors must estimate the growth in earnings before they can estimate the growth in dividends or dividends themselves (Basu, 1977).

According to Shamsher, Annuar and Chotigeat (1999), about 86% of analysts employed Earnings Multiplier Approach as a tool in appraising stock values. In contrast to that, only about 56% of the analysts used dividend to estimate share prices. However, Mansor and Lim (1992) revealed that the fundamental method of appraising stock is only relevant during bearish market and analysts' act as speculators during boom and recovery periods. Norhayati (2005) found that most companies in the main board of Bursa Malaysia exbihit stable dividend payout. The total number of announcements constitutes a no-change in dividend led the pack with a total number of 1314 announcements which indicates that about 46% of listed firms on main board prefer a stable dividend policy. This is followed by 799 of announcements of dividend increases and 768 announcements of dividend decreases from 1990 until 2000.

The main objectives of this study are (i) to isolate the value drivers associated with stock prices using the Gordon's Model and Earnings Multiplier approaches, and (ii) to test the applicability of both models over different economic conditions (before, during and after the financial crisis 1997). This study employes the more recent methodology of panel data analysis and compare the results with the findings from the traditional cross sectional analysis.

The next section outlines the empirical model of both valuation approaches followed by the data and methodology section as dwelled in section III. Section IV discusses the analyses of findings and a brief conclusion follows in section V.

II. Empirical Model

Gordon's Valuation Model

This model was developed by Gordon in 1956. Let P_0 = a share's price at t= 0, let D_t = the dividend expected at time, and let k = the required rate of return. Then the rate of profit on a share of stock is the value of k that satisfies

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)} \quad (1)$$

It is mathematically convenient to assume that the dividend is paid and discounted continuously at the annual rates D_t and k, in which case

$$P_0 = \int_0^{\infty} D_t e^{-kt} dt. \quad (2)$$

Since P_0 is known, estimating the rate of profit at which a share of stock is selling requires the determination of D_t, t =1,2…∞. At the outset, it should be clear that, the objective of this is not to find the rate of required return that will actually be earned by buying a share of stock. This requires information of the dividends that will be paid in the future, the price at which the share will be sold and when it will be sold. However, such information is not available. The rate of required return here is a relation between present known price and the expected future dividends. Thus, by expected future

dividends can estimate from known data in an objective manner, derived by methods that appear reasonable which not in conflict with common sense knowledge of corporation financial behavior and used to arrive a manageable measure of the rate of required return implicit in the expectation.

Gordon arrives at D_t by means of two assumptions. One, a corporation is expected to retain a fraction of income after tax which is denoted as b and two; a corporation is expected to earn a required rate of return on book value of its common equity. Let Y_t equal a corporation's earnings per share after tax at t time. Then the expected dividend at t time is

$$D_t = (1 - b)Y_t \quad (3)$$

The Earnings per share at t time is the income at (t – 1) plus r percent of the income at (t -1) retained, or

$$Y_t = Y_{t-1} + rbY_{t-1} \quad (4)$$

Equation (4) is simply a compound interest expression so that, if Y, grows continuously at the rate g =br,

$$Y_t = Y_0 e^{gt} \quad (5)$$

From equation (3) and (5), through double equation technique can produce

$$D_t = D_0 e^{gt} \quad (6)$$

Substituting the expression of Dt into equation (2) and integrating, yields is

$$P_0 = \int_0^{\infty} D_0 e^{gt} \quad e^{-kt}\, dt.$$

$$= D_o \int_0^{\infty} e^{-t\,(k-g)}\, dt.$$

$$= \frac{D_1}{k - g} \quad (7)$$

According to Gordon Model, the condition for solution is k > g, a condition that is easily satisfied, for otherwise, P_0 would be infinite or negative. Thus, the k in this situation will be measured by using the Capital Asset Pricing Model (CAPM). The model also explains that the higher the dividends, the greater the value of the firm's common stock and the higher the required rate of return, the lower the value of the stocks.

In the equation (7), the model is often defended as the model that arises from the following assumptions: (1) the firm will maintain a stable dividend policy (dividends grow at a constant rate into the indefinite future) (ii) and earn stable return on new equity investment over time. The model can be stated under non linear as shown as follows:

$$\text{Log } P_t = a + b_1 \text{ Log } DPS_t + b_2 \text{ Log } (k-g)_t + e_t \quad (8)$$

Earnings Multiplier Model

Earnings Multiplier Model (E/P) is a common measure used to indicate market assessment of a company's earnings to their current stock price. The rationale underlying the basic concept is that value of any investment is the present value of future earnings.

Basically, the idea of Earnings multiplier model derived from the dividend discount model , which is forward looking and recognizes both risk levels and growth projections and can be calculated as:

$$P_0 = \frac{D_1}{k - g}$$

Assuming the dividend is paid 100% and the Earnings Multiplier can be restated as:

$$P_0 = \frac{EPS_1}{k - g} \quad (9)$$

where EPS_1 = Expected Earnings per share, k= level of risk and g = future growth of earnings

In order to get the earnings multiplier, the formula can be stated as :

$$k - g = \frac{EPS_1}{P_0} \quad (10)$$

Thus, under non linear empirical model, it can be tested as follows:

$$\text{Log } E_1/P_0 = \alpha + \beta 1 \text{ Log } (k\text{-}g)_t + e_t \quad (11)$$

From equation (11) reveals that the greater the level of risk of a stock, the lower the earning mulplier (E/P), but high growth prospects may offset the risk and lead to higher Earnings Mulplier. Consequently, the rational investors, the Earnings mulplier reflect their expectation about the growth potential of a stock and the risk involved.

III. Data and Methodology

The data comprises of 82 continually traded companies. Monthly and yearly closing stock price (P_t), dividend per share (DPS), Return on Equity (ROE), Dividend Payout Ratio (DPR) and Earnings Per Share (EPS) on the selected companies listed on main board of Bursa Malaysia. In this study, the data on DPS and EPS were ranked into high and low groups for further investigation.

The monthly and yearly data is chosen because the daily and weekly data show constants variation as the information on financial report on DPS, ROE, and DPR available in yearly basis. Furthermore, Bursa Malaysia stock traded considers as a thinness trading which leads to the problem of non synchronous trading bias especially when dealing with data in daily basis [(Annuar et al. (1994) and Cheng 2000)]. Therefore, the thin trading bias is corrected using Dimson-Fowler Rorke (1983) method. Ariff et al.'s investigate beta using two lead and lag specification model on month end price data over a four to five year interval and specifying two leads and two lags of market returns in the market model. Based on Dimson's (1979) the estimation of unbiased $*\beta^t 1_{\text{dim}}$ for stock i on t time is shown as follows:

$$R_{it} = \alpha + \beta_{-2} R_{m,\, t-2} + \beta_{-1} R_{m,\, t-1} + \beta_t R_{m,\, t} + \beta_{+1} R_{m,\, t+1} + \beta_{+2} R_{m,\, t+2} \quad (11)$$

However, Fowler and Rorke (1983) argued that Dimson's beta value is biased and suggested that the beta coefficients should be weighted by serial correlation in the market return in order to yield a consistent and unbiased beta coefficient. Therefore, the first and second order autoregressive schemes are conducted to obtain the correlation of one month and two month lags market return.

It can be restated as follows

$$R_{m,\, t} = \rho_0 + \rho_1 R_{m,\, t-1} + \rho_{-2} R_{m,\, t-2} + u_t \quad (12)$$

Thus, the Adjusted Beta based on Dimson –Fowler Rorke (1983) is:

$$*\beta^t_{1(DFR)} = W2\,(\beta_{-2}) + W1\,(\beta_{-1}) + \beta_t + W1\,(\beta_{+1}) + W2\,(\beta_{+2}) \quad (13)$$

The weights (W) for correcting the beta coefficient will be:

$$W_1 = (1 + 2\,\rho_1 + \rho_2) / (1 + 2\,\rho_1 + 2\,\rho_2) \quad (14)$$

$$W_2 = (1 + \rho_1 + \rho_2) / (1 + 2\,\rho_1 + 2\,\rho_2) \quad (15)$$

Substitute the $*\beta^t_{1(DFR)}$ at the following formula to estimate the required rate of return.

$$R_{it} = R_f + *\beta^t_{1(DFR)}\,(R_m - R_f) \quad (16)$$

The analysis of data are based on both cross sectional and panel data techniques. This study break up the period into three sub- sample based on economic conditions (Before, During and After Financial crises 1997). The time range of economic conditions is based on the country's performance on the Kuala Lumpur Composite Index performance (KLCI).

Table1: Time range of analysis based on Economic Conditions

Bil.	KLCI Performance	Economic Conditions
1	1990 –1996	Before Financial Crisis 1997
2	1997 – 1998	During Recession
3	1999 – 2003	After Financial Crisis 1997
4	1990-2003	Overall

There are 8 nature of hypotheses testing based on period of study and the economic conditions. They are as follows:

Hypothesis 1, 2, 3 and 4

H_0 : Actual price of firms listed is not formed in accordance to Gordon's Dividend Valuation Model ($\beta_1 = \beta_2 = 0$)

H_1 : Actual price is formed in accordance to Gordon's Dividend Valuation Model. The alternative is specified as another choice of the null hypothesized is rejected. ($\beta_1 = \beta_2 \neq 0$)

Hypothesis 5, 6, 7 and 8

H_0 : Actual price of firms listed is not formed in accordance to Earning Multiplier ($\beta_1 = \beta_2 = 0$)

H_1: Actual price of firms listed is formed in accordance to Earning Multiplier. The alternative is specified as another choice of the null hypothesized is rejected. ($\beta 1 = \beta 2 \neq 0$)

Therefore, the following table shows the summary of the hypotheses testing.

Table 2: Summary of Hypotheses Testing For Gordon's Dividend Valuation Model and Earning Multiplier Approach

Economic conditions	Model	Hypothesis	Model	Hypothesis
Overall Market (1990-2003)	Gordon's Model	1	Earning Multipier Model	5

Economic conditions	Gordon' Model	Hypothesis	Earning Multiplier Model	Hypothesis
Before Economic Crisis	1990-1996	2	1990-1996	6
During Economic Crisis	1997-1998	3	1997-1998	7
After Economic Crisis	1999-2003	4	1999-2003	8

Notes: N/A = Not Applicable, 1=hypothesis 1, 2 = hypothesis 2, 3 = hypothesis 3 , 4 = hypothesis 4, 5= hypothesis 5, 6 =hypothesis 6, 7= hypothesis 7 and 8 = hypothesis 8.

IV. (a) Analyses of Findings : Overall, Before, During and After the economic Crisis

The main purpose of this study is to investigate the relevance of Gordon's dividend valuation and earnings multiplier approaches using cross sectional and multi companies pooled time series panel data techniques. Based on the analyses, the tests conducted referred to the eight nature of hypotheses (Refer to table 2). Thus, the overall summaries are revealed in table 3 and 4.

Table 3: Summary of Hypotheses Testing For Gordon's Dividend Valuation Model and Earnings Multiplier Approach based on Cross Sectional Analysis

Model	Gordon's Dividend Valuation Approach			Earnings Multiplier Approach		
Economic conditions	**Period**	**Hypothesis**	**Decision**	**Period**	**Hypothesis**	**Decision**
Overall Market	1990-2003	1	Reject H_1	1990-2003	5	Reject H_1
Before Economic Crisis	1990-1996	2	Reject H_1	1990-1996	6	Reject H_1
During Economic Crisis	1997-1998	3	**Reject H_0**	1997-1998	7	Reject H_1
After Economic Crisis	1999-2003	4	Reject H_1	1999-2003	8	Reject H_1

Notes: 1=hypothesis 1, 2 = hypothesis 2, 3 = hypothesis 3 , 4 = hypothesis 4, 5= hypothesis 5, 6 =hypothesis 6, 7= hypothesis 7 and 8 = hypothesis 8. The results are based upon the decision make at 5% level.

As shown in table 3, the crosses sectional analyses seem to support the Gordon's Model only during the economic crisis as the decision on null hypothesis was rejected with the R^2 value of 76.44% (Refer to table 6) . The results for other economic situations failed to reject the null hypotheses which indicate that the Gordon's model is not relevant in appraising Malaysian stock prices. On the other hand, the earnings Multiplier approach showed impractically on the three different economic situations as well the overall market.

Table 6: Results on Gordon's Dividend Valuation Model based on Cross Sectional Approach Dependent Variable: Log P_t- Log Share Prices at t time.

Variables/Statistics	Before Economic Crisis (1990-96)	During Economic Crisis (1997-98)	After Economic Crisis (1999-2003)	Overall Market (1990- 2003)
Log DPSt = Log Dividend Per Share				
β	0.1174	0.6344	0.4478	0.3452
t-stat	1.177	5.266	6.225	4.047
p-value	(0.245)	(0.001)***	(0.0001)***	(0.0001)***
Log lkgt = Log Discount measured of Dividend				
β	0.0726	0.3792	0.4124	0.1391
t-stat	0.896	2.644	0.897	1.993
p-value	(0.375)	(0.027)**	(0.376)	(0.055)**
α	0.8289	1.6212	0.9237	1.0798
t –stat of a	5.027	6.751	9.443	6.399
	(0.0001)***	(0.0001)***	(0.0001)***	(0.0001)***
F- Statistic	0.82	14.60	22.35	8.24
p- values of F-statistic	(0.4478)	(0.0015)***	(0.00001)***	(0.0013)***
R-Squared	0.0343	0.7644	0.5608	0.3471

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

Due to the 14 years time span of the panel data (1990-2003), the cross sectional estimator suffers from the shortage of degrees of freedom. The Hausman specification test rejected the null hypothesis and this indicates that the data does not reject the restriction of common long run coefficients.

Table 4: Summary of Hypotheses Testing For Gordon's Dividend Valuation Model and Earnings Multiplier Approach based on Multi-Companies Pooled Time Series Panel Data Technique.

Model	Gordon's Dividend Valuation Approach			Earnings Multiplier Approach		
Economic conditions	**Period**	**Hypothesis**	**Decision**	**Period**	**Hypothesis**	**Decision**
Overall Market	1990-2003	1	**Reject H_0**	1990-2003	5	Reject H_1
Before Economic Crisis	1990-1996	2	Reject H_1	1990-1996	6	Reject H_1
During Economic Crisis	1997-1998	3	Reject H_1	1997-1998	7	Reject H_1
After Economic Crisis	1999-2003	4	Reject H_1	1999-2003	8	Reject H_1

Notes: 1=hypothesis 1, 2 = hypothesis 2, 3 = hypothesis 3 , 4 = hypothesis 4, 5= hypothesis 5, 6 =hypothesis 6, 7= hypothesis 7 and 8 = hypothesis 8. The results are based upon the decision make at 5% level.

Hence, the cross sectional estimator is not useful for the empirical purpose whereas only the panel data estimator appears to be an informative method of analysis. The individual Breusch Pagan LM test for the independent variables also demonstrate that the pooling restrictions cannot be rejected for three independent variables (DPS_t, K_{t-gd} and K_{t-ge}), which implies that the data of the sample companies can be pooled except during the financial crisis 1997 to 1998.

Referring to table 4, the multi companies pooled time series panel data seems to support Gordon's Dividend Valuation approach as the result on the overall market reject the null hypothesis. However, the earnings multiplier approach showed insignificants to all economic conditions as well as the overall market. This can be seen through the analysis on the hypothesis testing tend to reject the alternative hypothesis and means that the earnings multiplier approach was not relevant in appraising Malaysian stock prices (Refer to tables 12 and 13).

Table 12: Results on Gordon's Dividend Valuation Approach Based on Multi-Companies Pooled Time series Panel Data Approach Dependent Variable: Log Pt- Log Share Prices at t time.

Variables/Statistics	Before Economic Crisis (1990-96)	During Economic Crisis (1997-98)	After Economic Crisis (1999-2003)	Overall Market (1990- 2003)
Log DPSt = Log Dividend Per Share				
β	0.1609	0.5309	-0.0007	0.2416
t-stat	1.563	5.685	-0.010	6.110
p-value	(0.120)	(0.0001)***)	(0.992)	(0.0001)***
Log lkgt = Log Discount measured of Dividend				
β	0.1969	0.1574	0.0127	0.1411
t-stat	4.903	1.245	0.345	4.361
p-value	(0.0001)***	(0.231)	(0.732)	(0.0001)***
α	0.9400	1.2907	0.4606	0.9515
t-stat	7.913	7.453	4.857	16.836
p-value of a	(0.0001)***	(0.0001)***	(0.0001)***	(0.0001)***
Wald Chi Square	-	-	-	-
p-value of Wald chi Squared				
F- Statistic	13.81	18.44	0.06	26.74
p- values of F-statistic	(0.00001)***	(0.0001)***	(0.9417)	(0.00001)***
R-Squared	0.0960	0.6974	0.1113	0.2956
Hausman Test	9.02		17.09	10.49
p-Values	(0.0110)***	N/A	(0.0002)***	(0.0053)***
Brush Pagan LM Test	13.64	N/A	33.12	64.11
P-Values	(0.0002)***		(0.00001)***	(0.00001)***

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.
N/A denotes the data set can not be pooled. The result is taken based on OLS.

Table 13: Results on Earnings Multiplier Aprroach Based on Multi-Companies Pooled Time Series Panel Data Approach Dependent Variable: Log E/Pt- Log Earnings Multiplier at t time.

Variables/Statistics	Before Economic Crisis (1990-96)	During Economic Crisis (1997-98)	After Economic Crisis (1999-2003)	Overall Market (1990- 2003)
Log keg = Log discount measured of Earnings (+)				
β	-0.2032	-0.1966	-0.1986	-0.2319
t-stat	-4.810	-0.796	-3.039	-6.210
p-value	(0.0001)***	(0.437)	(0.002)***	(0.0001)***
α	-1.4582	-2.0279	-1.3273	-1.4762
t- Statistic	-26.248	-9.780	-16.750	-29.833
p- values of t-statistic	(0.0001)***	(0.0001)***	(0.0001)***	(0.0001)***
R- Squared	0.0724	0.0360	0.0528	0.0719
Hausman Test	0.33		0.35	0.98
p-Values	(0.5656)	N/A	(0.5550)	(0.3232)**
Breusch Pagan LM Test	82.85		25.07	167.62
P-Values	(0.00001)***	N/A	(0.00001)***	(0.00001)***

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.
N/A denotes the data set can not be pooled. The result is taken based on OLS regression

(b) Analyses of findings: High and Low DPS_t and EPS_t

The findings obtained from the table 3 and 4 led us to extend our investigation about the effectiveness of the valuation approaches. Data on DPS_t and EPS_t were ranked according to high and low groups and run the analysis using cross sectional regression.

Referring to table 5, the results suggest that for before the economic crisis both models are not relevant in appraising stock prices. However, during the economic crisis, the Gordon's model is a

suitable approach to value the stock price based upon low and high dividends. As mentioned in theory, high dividends are able to explain the earnings multiplier approach and it is proven by rejecting the null hypothesis (Refer to table 8,9,10 and 11). This corroborated Norhayati (2005) study, who found that about 228 companies on the Main Board preferred stable dividend from 1997- 1998 compared to decrease (176 companies) and increase (96 companies) dividend policies during the economic crisis. Furthemore, Mansor and Lim (1992) suggested that the fundamental appraisal method of stock is only relevant during the bearish market. In addition, they revealed that about 75% of the analysts' in Malaysia behave as speculators.

Table 7: Results on Earnings Multiplier Approach based on Cross Sectional Approach Dependent Variable: Log E/Pt- Log Earnings Multiplier at t time.

Variables/Statistics	Before Economic Crisis (1990-96)	During Economic Crisis (1997-98)	After Economic Crisis (1999-2003)	Overall Market (1990- 2003)
Log keg = Log discount measured of Earnings (+)				
β	-0.0587	0.2475	0.1309	0.2263
t-stat	-0.351	1.840	1.067	0.990
p-value	(0.728)	(0.081)*	(0.298)	(0.339)
α	-1.3302	-0.8284	-0.9245	-0.8217
t- stat	-6.770	-5.856	-6.508	-2.761
	(0.0001)***	(0.0001)***	(0.0001)***	(0.015)**
R-squared	0.0034	0.1512	0.0514	0.0655

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.

Table 8: Results on Models for Before Economic Crisis based on Rank of DPS_t and EPS_t using Cross Sectional Approach

Variables/Model	Rank Based on DPSt				Rank Based on EPSt			
	Gordon's Approach		Earnings Multiplier Approach		Gordon's Approach		Earnings Multiplier Approach	
	Low	High	Low	High	Low	High	Low	High
Log DPSt = Log Dividend Per Share (+)								
β	0.2901	-0.0118	N/A	N/A	0.0314	-0.1051	N/A	N/A
t-stat	1.397	-0.054			0.2446	-0.713		
p-value	(0.178)	(0.957)			(0.809)	(0.485)		
Paired Sample T-Test	18.399		N/A		4.648		N/A	
p-value	(0.0001)***				(0.000)***			
Log lkgt = Log Discount measured of Dividend (-)								
β	0.2823	-0.3094	N/A	N/A	0.2446	-0.3255	N/A	N/A
t-stat	2.680	-3.020			2.898	-2.379		
p-value	(0.014)***	(0.006)***			(0.008)***	(0.029)**		
Paired Sample T-Test	-1.566		N/A		-1.591		N/A	
p- value	(0.132)				(0.127)			
Log lkegt = Log Discount measured of Earningss (+)								
β			-0.3041	0.1573			-0.2529	-0.2529
t-stat	N/A	N/A	-0.941	1.174	N/A	N/A	-1.016	-1.016
p-value			(0.361)	(0.255)			(0.325)	(0.325)
Paired Sample T-Test	N/A		-0.058		N/A		-0.180	
p-value			(0.954)				0.859	
F- Statistic	3.75	4.80	N/A	N/A	4.26	2.86	N/A	N/A
p- values of F-statistic	(0.0415)**	(0.0178)**			(0.0256)	(0.0837)		
R-Squared	0.1998	0.1935	0.0558	0.0677	0.2541	0.2409	0.0606	0.0552

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level
N/A denotes the variable is not included in both models tested

Table 9: Results on Models for During the Economic Crisis based on Rank of DPS_t and EPS_t using Cross Sectional Approach

Variables/Model	Rank Based on DPS_t				Rank Based on EPS_t			
	Gordon's Approach		Earnings Multiplier Approach		Gordon's Approach		Earnings Multiplier Approach	
	Low	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Log DPSt = Log Dividend Per Share (+)								
β	-0.6182	0.7877	N/A	N/A	0.0314	-0.1051	N/A	N/A
t-stat	-1.279	2.574			0.244	-0.713		
p-value	(0.291)	(0.082)*			(0.809)	(0.485)		
Paired Sample T-Test	9.483		N/A		4.648		N/A	
p-value	(0.0001)***				(0.0001)***			
Log lkgt = Log Discount measured of Dividend (-)								
β	0.5159	-0.0245	N/A	N/A	0.2446	-0.325	N/A	N/A
t-stat	4.392	-0.067			2.898	-2.379		
p-value	(0.022)**	(0.951)			(0.008)***	(0.029)**		
Paired Sample T-Test	-2.144		N/A		-1.591		N/A	
p- value	(0.085)*				(0.127)			
Log lkegt = Log Discount measured of Earningss (+)								
β			-0.1476	0.2843			-0.2529	0.1461
t-stat	N/A	N/A	-4.519	1.871	N/A	N/A	-1.016	1.026
p-value			(0.139)	(0.080)*			(0.325)	(0.319)
Paired Sample T-Test	N/A		-1.1779		N/A		-0.180	
p-value			(0.217)				(0.859)	
F- Statistic	9.91	3.95	N/A	N/A	4.26	2.86	N/A	N/A
p- values of F-statistic	(0.0477)**	(0.1443)			(0.0256)**	(0.0837)*		
R-Squared	0.8685	0.7248	0.1796	0.9533	0.2541	0.2409	0.0606	0.0552

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.
N/A denotes the variable is not included in both models tested

Table 10: Results on Models for After the Economic Crisis based on Rank of DPSt and EPSt using Cross Sectional Approach

Variables/Model	Rank Based on DPSt				Rank Based on EPSt			
	Gordon's Approach		Earnings Multiplier Approach		Gordon's Approach		Earnings Multiplier Approach	
	Low	High	Low	High	Low	High	Low	High
Log DPSt = Log Dividend Per Share (+)								
β	0.2881	0.5271	N/A	N/A	0.2946	0.4916	N/A	N/A
t-stat	2.301	2.271			2.338	1.933		
p-value	(0.065)*	(0.036)**			(0.036)**	(0.071)*		
Paired Sample T-Test	13.191		N/A		9.801		N/A	
p-value	(0.0001)***				(0.0001)***			
Log lkgt = Log Discount measured of Dividend (-)								
β	0.2719	0.1219	N/A	N/A	0.2683	-0.0944	N/A	N/A
t-stat	1.283	2.271			1.330	-0.440		
p-value	(0.224)	(0.546)			(0.206)	(0.666)		
Paired Sample T-Test	5.729		N/A		-4.445		N/A	
p- value	(0.0001)***				(0.0001)***			
Log lkegt = Log Discount measured of Earningss (+)								
β			-0.2237	0.2281			-0.2995	0.3474
t-stat	N/A	N/A	-0.535	2.280	N/A	N/A	-1.043	2.932
p-value			(0.609)	(0.042)**			(0.337)	(0.012)***
Paired Sample T-Test	N/A		1.708		N/A		-1.222	
p-value			(0.126)				(0.261)	
F- Statistic	2.39	2.76	N/A	N/A	2.92	2.17	N/A	N/A
p- values of F-statistic	(0.1334)	(0.0914)*			(0.0899)*	(0.1471)		
R-Squared	0.2852	0.2453	0.0393	0.3023	0.3097	0.2131	0.1534	0.3981

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.
N/A denotes the variable is not included in both models tested

Table 11: Results on Models of Overall Market based on Rank of DPSt and EPSt using Cross Sectional Approach

Variables/Model	Rank Based on DPSt				Rank Based on EPSt			
	Gordon's Approach		Earnings Multiplier Approach		Gordon's Approach		Earnings Multiplier Approach	
	Low	High	Low	High	Low	High	Low	High
Log DPSt = Log Dividend Per Share (+)								
β	0.12224	0.4726	N/A	N/A	0.2136	0.3997	N/A	N/A
t-stat	0.979	2.141			1.898	1.089		
p-value	(0.340)	(0.061)*			(0.070)*	(0.337)		
Paired Sample T-Test	16.430		N/A		9.801		N/A	
p-value	(0.0001)***				(0.0001)***			
Log lkgt = Log Discount measured of Dividend (-)								
β	0.4176	0.0589	N/A	N/A	0.1819	0.2319	N/A	N/A
t-stat	3.745	0.736			2.070	1.505		
p-value	(0.001)***	(0.480)			(0.049)**	(0.207)		
Paired Sample T-Test	-2.968		N/A		-4.445		N/A	
p- value	(0.013)***				(0.0001)***			
Log lkegt = Log Discount measured of Earningss (+)								
β	N/A	N/A	0.1157	0.5967	N/A	N/A	0.3583	0.3594
t-stat			2.544	2.325			13.603	1.488
p-value			(0.238)	(0.040)**			(0.005)***	(0.168)
Paired Sample T-Test	N/A		-1.850		N/A		-1.222	
p-value			(0.206)				(0.261)	
F- Statistic	7.78	2.30	N/A	N/A	3.72	1.80	N/A	N/A
p- values of F-statistic	(0.0034)***	(0.1561)			(0.0391)**	(0.2767)		
R-Squared	0.4504	0.3382	0.8662	0.3296	0.2367	0.4740	0.9893	0.1813

Notes: figures in the parentheses are the p-values. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level.
N/A denotes the variable is not included in both models tested

Table 5: Summary of hypotheses testing for Gordon dividend and Earnings Multiplier approaches using cross sectional method: Data ranked by EPS_t and DPS_t

Indicators	Ranked by DPSt				Ranked by EPSt			
Model	**Gordon's Model**		**Earnings Multiplier**		**Gordon's Model**		**Earnings Multiplier**	
Rank	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Before economic crisis	Reject H_1	Reject H_1	Reject H_1	Reject H_1	Reject H_1	Reject H_1	Reject H_1	Reject H_1
During economic crisis	**Reject H_0**	**Reject H_0**	Reject H_1	**Reject H_0**	Reject H_1	Reject H_1	Reject H_1	Reject H_1
After economic crisis	Reject H_1	**Reject H_0**	Reject H_1	**Reject H_0**	Reject H_1	**Reject H_0**	**Reject H_0**	Reject H_1
Overall market	Reject H_1	Reject H_1	**Reject H_0**	**Reject H_0**	Reject H_1	Reject H_1	**Reject H_0**	Reject H_1

The results are based upon the decision make at 5% level.

In the case of ranking by EPS_t, the hypotheses testing on high and low EPS_t resulted in insignificant findings and revealed that the E/P approach is unlikely relevant in appraising stock prices. This may probably be true as most companies did not declare dividend or declare very low dividend due to low or negative earnings. During period after the economic crisis, both Gordon's and Earnings

Multiplier Approaches were explained by high dividend. In case of ranking by EPS_t, high earnings supported Gordon's model while low earnings corroborates Earnings Multiplier approach.

V. Conclusion

In conclusion, based upon the cross sectional analysis the evidence seems to support Gordon's Dividend Valuation Model only during the economic crisis. Test for heteroscedasticity using the Breusch Pagan Godfrey's method shows that we cannot reject the null hypothesis that the variances of residuals are constant at company's level tests. Using multi-companies pooled time series panel data approach, the general result does not discriminate which model is more superior for three different economic conditions. In contrary, the panel data approach is deemed to support the Gordon's Valuation Model for the overall market.

Extending the analyses based on ranking of DPS_t and EPS_t produced mixed results. The overall market seems to support the earnings multiplier approach on high dividends and high earnings. Interestingly, in the case of ranking by DPS_t both valuation models fulfill the models' assumptions during the economic crisis, which indicates that both models are practical during the bearish market and supported Mansor and Lim (1992). We concluded that both models are relevant though Gordon's Model exhibit more superiority based upon cross sectional and panel data results.

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