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CAPITAL GAIN PREDICTABILITY USING FINANCIAL RATIOS: A CASE STUDY OFAGRIBUSINESS STOCKS

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Abstract:

The financial ratios are the key indicators to assess the strength and weaknesses of company performance. In the stock market, capital gain plays a pivotal role to attract investors in the value of a firm's stock investment, while the stock of agribusiness firms becomes a potential outlook to be investigated. The study aims to describe the predictability of capital gain by using financial ratios, namely dividend yield (DY), earnings yield (EY), a book to market (BM), debt-equity ratio (DER), and return on asset (ROA). The panel data model, generalized least square, ordinary least square, is applied to estimate the predictive regression both in separated and combined models. The result discloses that the majority of individual financial ratios can predict future capital gain on agribusiness stock except for the debt-equity ratio (DER). While the book to market value (BM) has the highest predictive power among other variables. Moreover, the predictability of capital gain is considerably enhanced by applying the combination of financial ratios.
Keywords: *Agro-Industrial Sector, Capital Market, Econometrics.*
JEL Codes: Q14

1. Introduction

The assumption of market practitioners explaining about stock return is closer and simpler as the sum of the dividend yield and the capital gain is also known as a total stock return. Nevertheless, capital gain as the predominant factors of stock return is normally active to investors who tend to create a short-term investment or be a speculator (Ehrmann and Rigobon, 2005). While the main purpose of investor to involve at stock market is to maximize wealth through the gain from the stock return (Musallam, 2018). Karami (2013) stated that about two decades ago, financial experts and economists have identified any possibilities of forecasting returns in the stock market. They have been sequenced looking for some parameters which have capabilities to predict future share price. As an investor perception, expecting the highest return with a lower risk of stock investment may be predicted by the trend of a stock and investors may use financial information as the essential approach to assist their potential future stock investment (Anwaar, 2016). Furthermore, stockholders, who play important roles in the capital market, are more likely to take a risk when it comes to involve at the stock market and find useful information or parameters in order to maximize their investment.

Financial ratios generally occupy the methods of calculating and constructing financial variables to examine and observe the firm's performance. The information on ratio analysis attaining from the firm's financial statements is necessary to shareholders, creditors, and the firm's own management. Both current and prospective shareholders are concerned with the firm's current and future level of risk and return, which is directly affecting their share price.

Stockholders are worried about all aspects of the firm's financial situation, and it would happen to the company which has a higher risk of running a business as agribusiness firms, while they highly rely on the season and uncertainty. Therefore, the objective of the study is to predict a future capital gain of agribusiness companies by using financial ratios namely Dividend Yield (DY), Earning Yield (EY), Book-to Market (BM), Debt-to-Equity Ratio (DER), Return on Asset (ROA).

2. Theoretical Framework

Gloy, (2005) acknowledged that the agribusiness sector primarily invests in commodity indices, or companies which are linked in the agricultural products value chain or a combination of indices and equities. The sector is generally sub-divided into three parts: upstream, midstream and downstream. Agribusiness includes all firms that are decisive inside and outside the farm gate and transporting products from the field to consumers. Agribusiness firms comprise not only of food production, but also incorporate other processes such as generation or attainment of production inputs, use of farm crops in dissimilar forms through processing and trading. Thus, agribusiness companies have begun specializing into different aspects of the agricultural industry process.
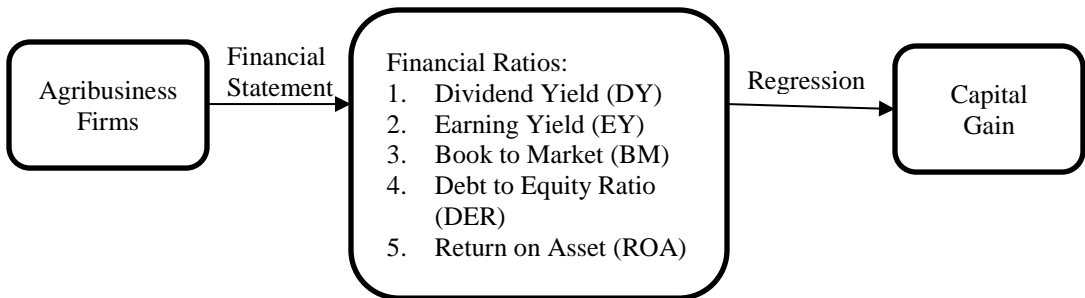

Figure 1. Theoretical Framework

Majority of all variables applied in this study utilizes the stock price of agribusiness firms in the actual formulation. The variables of financial ratios consist of dividend yield (DY), earning yield (EY), book to market (BM), debt equity ratio (DER), and return on asset (ROA). According to Browne, (2007), dividend yield measures as dividing dividend per share on market price per share. When market price is lower than dividend yield, it will be considered a high risk for investments. However the relationship between dividend yield and stock returns is still unresolved issue (Kim, 2021). Then, determining earning yield (EY) as earning per share divided by the price of share, earning yield may reveal the effectiveness of a market (Kheredyar et al, 2011). Next, book to market (BM) is the comparison of market value of a share to its book value. Dempsey, (2010) stated that If a firm offers high return and has a high book value than its market value, the firm possesses more risks and prospective returns of stock will be lowered than the present returns. Morever, debt equity ratio (DER) can be measured by dividing firm's total liabilities with the stockholders' equity. A high value of this ratio means that the firm has been aggressive in financing a company's growth by using debt (Nagaraju, 2011). And return on assest (ROA) is calculated by dividing a firm's annual earnings by its total assets as an indicator to explain the company profitability (Gitman, 2009).

The stock returns as capital gain are associated with several imperative influences of the macro-economics, interest rate, and financial performance deriving from financial information such as financial ratios (Cappiello, 2008). Wasendorf (2003) exemplifies that capital gain is

based on the change of stock price over a period as one of the predominant factors of stock return. Moreover, capital gain starts where the investor provides the company money in return for right to a share of the profits of the company or the issue of mean reversion of stock prices. Among the main studies in the past, Fama and French (1988, 1992, 1995); Kothari and Shanken (1997); Pontiff and Schall (1998); Lewellen (2004); Kheradyar and Ibrahim (2011); Khan (2012); Din (2017); Musallam (2018); Suciati (2018); Kurniawan (2021), uncover that stock return can be predicted by using financial ratios. Management uses ratios to observe the firm's performance from time to time (Gitman, 2009). Block et al (1981) add that financial ratios are used to consider and assess the firm's operating performance. Moreover, Kumbirai (2010) states financial ratios mostly prevail when comparing other numbers. As well as Kim (1997) observes the sample choice will specify capital gain validity.

3. Methodology

3.1 Type of Data and Data Collection

The research focused on agribusiness firms in Bursa Malaysia or Kuala Lumpur Stock Exchange (KLSE) Kuala Lumpur, Malaysia. The Kuala Lumpur Stock Exchange, pioneering both capital market and investment standard in Malaysia, possess a complete data on corporate finance and corporate stock in Malaysia. Therefore, selecting Kuala Lumpur Stock Exchange to gather the financial data on agribusiness firms is appropriate for this research. The data for this study are quantitative data, that is, secondary data on financial statements and stock price from agribusiness firms in the Kuala Lumpur Stock Exchange Statistics. The sampling method of this study uses purposive sampling that focuses on attaining the financial data and stock price of the agribusiness firms listed at KLSE. Hence, the sample of study is 40 agribusiness firms and comprises a period of 7 years.

3.2 Data Analysis

The panel data regression techniques are utilized as the original data collection based on cross-sectional and time series. Cross-sectional data reflect capital gain from the 40 agribusiness companies in Kuala Lumpur Stock Exchange, While the time-series applies the change of capital gain over time in a period of 7 years. The analytical tools, the study uses the STATA for analyzing panel data model and Ms. Excel as the calculation of financial ratios. Furthermore, Breusch and pagan test, Hausman test, Heteroskedasticity test, Durbin Watson test, the random effect model, and fixed effect model are also applied in this study. Following Khan et al, (2012) and S. Kheradyar et al, (2011), these studies employ panel data models to formulate prospective regressions and used straightforward regression model to assess the six hypothesises which are formulated on the foundation of association between the individual financial ratios and the combination financial ratios to capital gain. The simple regression models have the following form:

$$TCG_{it} = \beta_0 + \beta_i X_{i(t-1)} + \varepsilon_{it} \tag{1}$$

In where, CG_{it} is capital gain of i th stock in t time period, β_0 is the estimated constant, the formula for capital gains is utilized for calculating the return on a stock based only on the approval of the stock. The formula for capital gains yield does not consist of dividends paid on the stock. Then, β_1 is the coefficient for independent variable of the i th stock, $x_{i(t-1)}$ is represents one of financial ratios of the i th stock in t-1 and ε_{it} is error term.

Furthermore, another hypothesis to formulate the relationship between capital gain and the combination of financial ratios is applied by multiple linear regression. The multiple regression model of panel data set has the following form :

$$CG_{it} = \beta_0 + \beta_{i1}DY_{i(t-1)} + \beta_{i2}EY_{i(t-1)} + \beta_{i3}BM_{i(t-1)} + \beta_{i4}DER_{i(t-1)} + \beta_{i1}ROA_{i(t-1)} + \varepsilon_{it} \qquad (2)$$

In where, CG_{it} is capital gain of i th stock in t time period, β_0 is the estimated constant, β_1 is the coefficient for independent variable of DY the i th stock, β_2 is the coefficient for independent variable of EY the i th stock, β_3 is the coefficient for independent variable of BM the i th stock, β_4 is the coefficient for independent variable of DER the i th stock β_5 is the coefficient for independent variable of ROA the i th stock, $DY_{i(t-1)}$ is DY factor of the i th stock in t-1, $DY_{i(t-1)}$ is DY factor of the i th stock in t-1, $EY_{i(t-1)}$ is EY factor of the i th stock in t-1, $BM_{i(t-1)}$ is BM factor of the i th stock in t-1, $DER_{i(t-1)}$ is DER factor of the i th stock in t-1, $ROA_{i(t-1)}$ is ROA factor of the i th stock in t-1 and ε_{it} is error term.

4. Results

The descriptive statistics of each independent variables (DY, EY, B/M, DER, ROA) and dependent variables (CG) that is summarized by the mean, standard deviation, minimum and maximum value in panel data sets (Table 1). The type of data variables is used by percentage to provide a proportional data sets. In order to detect a reliable and reasonable data, the value of the mean and the standard deviation should be close as appropriate as the result provided. The result of standard deviation of capital gain in this study constituted 39.6%, indicating the percentage is nearly close to the stock return from U.S market (3.8%), hence the proportion of capital gain and stock return in U.S market samples had a similar trend in terms of standard deviation.

Table 1.Descriptive Statistics of the Effect Financial Ratios on Capital Gain

Variables	Mean	Std.Dev	Min	Max
Independent				
DY	3.9	3.1	0.2	20.8
EY	9.3	11.8	-59.7	55.4
B/M	130.2	108.4	2.8	953.1
DER	69.6	78.9	0.5	443.4
ROA	8.9	10.6	-45.5	72.4
Dependent				
CG	18.4	39.6	-87.1	214.1

Notes: DY, EY, B/M, DER, ROA and CG are respectively dividend yield, earning yield, book to market, debt equity ratio, return on asset and capital gain

In panel data analysis, the unit root is a general procedure to test the stationary variables and collect the sample to be more sizeable and power in analysis. The common tests of stationary are introduced as Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), Harris-Tzavalis (HZ) and Breitung test (BU). Those tests have a different procedure and identical assumption but the result have a similar meaning to strengthen the stationary of variables. Since the result of table 2 above show the proportional value of the overall root tests that is mainly contributing significant level at 1%, even though only two conditions of the Harris-Tzavalis and Breitung unit from debt equity ratio are not statistically significant, it still can be concluded that both of independent and dependent variables on the effect of financial ratios on the capital gain have existed stationary data sets.

Table 2. The Unit Root Test of the Effect Financial Ratios on Capital Gain

Unit root test	Independent					Dependent
	DY	**EY**	**B/M**	**DER**	**ROA**	**CG**
LLC						
Statistic	6.585	6.540	-2.373	-2.311	-8.212	-17.246
P-value	0.000	0.000	0.008	0.010	0.000	0.000
IPS						
Statistic	-2.509	-2.999	-2.243	-2.659	-2.645	-2.696
P-value	0.000	0.000	0.000	0.001	0.000	0.000
HT						
Statistic	0.679	0.361	0.839	0.995	0.775	0.052
P-value	0.000	0.000	0.000	0.447	0.000	0.000
BU						
Statistic	-4.717	-7.424	-2.198	0.308	-2.710	-9.327
P-value	0.000	0.000	0.014	0.619	0.003	0.000

Notes: 1) DY, EY, B/M, DER, ROA and CG are respectively dividend yield, earning yield, book to market, debt equity ratio, return on asset and capital gain. 2) LCC, IPS, HT, and BU are respectively Levin-Lin-Chu, Im-Pesaran-Shin, Harris-Tzavalis and Breitung unit root tests.

4.1 Simple Predictive Regression Model

The result on table 3 showed that the financial ratio variables of dividend yield, earning yield, and book to market ratio have a similar proportion for testing the Hausman test. The Hausman test of those variables resulted 0.000 indicating the fixed effect is more appropriate than random effect model since the p-value of Hausman test is less than 5%. Where the fixed effect model had been chosen, the Breusch and Pagan test is not required to test in the model of DY, EY and BM, excepting both of DER and ROA variables that using random effect model in the Hausman test. The Breusch and Pagan test of DER and ROA ratios resulted that those variable is more appropriated to deal with ordinary least square model (OLS), since p-value is higher than 5%. Next, the p-value of heteroskedasticity of DY, EY, BM and DER variables attained less than 0.05, indicating the heteroskedasticity is existed in those models. Hok (2013) suggested that the presence of heteroskedasticity may be handled by using "robust" option in the model. Thus, the variables of DY, EY, BM and DER applied robust option in the regression model. Conversely, the robust usage is not implemented to ROA ratio, since the p-value is 0.148 or less than 0.05, indicating the heteroskedasticity is not presented. Moreover, the autocorrelation tests for all financial ratios showed the value more than 2. Born & Breitung (2010) emphasized the positive correlation may be considered if the Durbin Watson value is more than 2. Thus, there is no autocorrelation in those variables.

The table 4 above shows the simple predictive regression sets for testing the five hypotheses from each independent financial ratios to the capital gain as dependent variable. The four null hypotheses of DY, EY, BM and ROA have been rejected since the p-value of those variables resulted less than 5%, and 1% respectively. Thus there are significant relationships between future capital gain and the individual financial ratios of DY, EY, BM, and ROA. On the other hand, the p-value of DER predictive regression model attained 0.87 or more than 10%, indicating the future capital gain may not be predicted by debt equity ratio. Next, the result also indicated that there are negative and positive relation between each financial ratios and future capital gain. A negative relationship was provided by the variables of DY, EY and BM constituted -3.8, -0.9, and -0.2 respectively. It can be assumed if those variables increased by 10%, the value of capital gain will decrease -38%, -9%, and -2% respectively. Conversely, the variable of return on asset show a positive association which is

indicated if the ROA increased by 10% will increase the future capital gain as 5%. Furthermore, the attention of adjusted R^2 results that the predictive power of BM is highest among DY, EY, DER and ROA ratios constituting 25.3%. This is indicated that 25.3% the total variance of capital gain is explained by book market ratio and the rest of 15%, 15.5%, 1.8% are explained by DY, EY and ROA respectively, excepting the variable of DER which cannot explain the future of capital gain since the percentage of adjust R^2 resulted 0%.

Table 3.The Hausman, Breusch & Pagan, Heteroskedasticity and Autocorrelation Tests of Each Independent Variables To The Capital Gain

Tests	DY	EY	B/M	DER	ROA
Hausman test					
p-value	0.004	0.000	0.001	0.269	0.622
Decision	FE	FE	FE	RE	RE
*Breusch & Pagan test					
p-value	-	-	-	0.272	0.108
Decision	-	-	-	OLS	OLS
Heteroskedasticity test					
p-value	0.000	0.000	0.000	0.000	0.148
Decision	Robust	Robust	Robust	Robust	NH
Autocorrelation test					
DW	2.152	2.205	2.113	2.269	2.246
Decision	NA	NA	NA	NA	NA

Notes: 1) * the test may be applicable if the RE is the appropriate option in Hausman test and also can be indicated to evaluate heteroskedasticity. 2) DY, EY, B/M, DER, and CG are respectively dividend yield, earning yield, book to market, debt equity ratio, and capital gain. 3) FE, RE and OLS are respectively fixed effect, random effect models and ordinary least square. 4) Robust is the action to tackle heteroskedasticity and NH is there is no heteroscedasticity. 5) NA and EA are respectively no autocorrelation and existing autocorrelation.

Table 4: The Simple Predictive Regression Result of The Capital Gain

Variables	β_0	β_i	Adjust R^2(%)	p-value
Model DY	$CG_{it} = \beta_0 + \beta_i DY_{i(t-1)} + \varepsilon_{it}$			
Agribusiness firms	33.443	-3.784	15.0	0.003
Model EY	$CG_{it} = \beta_0 + \beta_i EY_{i(t-1)} + \varepsilon_{it}$			
Agribusiness firms	26.814	-0.899	15.5	0.014
Model B/M	$CG_{it} = \beta_0 + \beta_i BM_{i(t-1)} + \varepsilon_{it}$			
Agribusiness firms	46.619	-0.217	25.3	0.000
Model DER	$CG_{it} = \beta_0 + \beta_i DER_{i(t-1)} + \varepsilon_{it}$			
Agribusiness firms	17.945	0.006	0.0	0.867
Model ROA	$CG_{it} = \beta_0 + \beta_i ROA_{i(t-1)} + \varepsilon_{it}$			
Agribusiness firms	13.983	0.493	1.8	0.026

Notes: 1) DY, EY, B/M, DER, and CG are respectively dividend yield, earning yield, book to market, debt equity ratio and capital gain. 2) B_0 Is unsystematic predictable constant component or the estimated constant β_i is the predictable coefficient of the i th stock, ε_{it} is unsystematic error from the predicted CG_{it} terms $i = 1,2,3,...,n$.

4.2 Multiple Predictive Regression Model

The table 5 resulted the fixed effect is the appropriate model to examine the combination of financial ratios to the capital gain, since the p-value was less than 1% from the Hausman test. In this result showed that the Breusch and Pagan tests was not examined, by the reason of the model is not applying the random effect. As similar as the individual tests, the multiple regression model would also use robust option to settle the problem of heteroskedasticity, as the p-value is 0.000 or less than 0.01 that present heteroskedasticity. Furthermore, the DW test proceeded 2.011, indicating the autocorrelation was not existed in that the values is more than 2.

Table 5. The Hausman, Heteroskedasticity and Autocorrelation Tests of the Combination Independent Variables to the Capital Gain

	Hausman test		Heteroskedasticity test		Durbin Watson test	
Variable	**P-value**	**Decision**	**P-value**	**Decision**	**P-value**	**Decision**
Financial ratios						
(DY,EY,BM,DER &ROA)	0.000	FE	0.000	Robust	2.011	NA

Notes: 1) DY, EY, B/M, DER, and ROA are respectively dividend yield, earning yield, book to market, debt equity ratio, and return on asset. 2) FE, RE and OLS are respectively fixed effect, random effect models and ordinary least square. 3) Robust is the action to tackle heteroskedasticity and NH is there is no heteroscedasticity. 4) NA and EA are respectively no autocorrelation and existing autocorrelation.

As the outcome from table 6, the multiple predictive regression is statistically significant at 1% level, then the hypotheses (H_{12}) has been rejected. The result suggested that the combination of DY, EY, BM, DER, and ROA may predict future capital gain, since the slope coefficient of those ratios showed positive and negative denomination. The positive value is represented by DER and ROA which is illustrated if those variables increased by 1% will increase the value of capital gain by each coefficient of those variables. Contrarily, the variables of DY, EY and BM dragged negative relation to future capital gain when those variables increased. Moreover, the adjusted R^2 showed an increasing proportion, comparing by the simple predictive regression, which is resulted by 32.6%. It can be assumed that the 32.6% variance of capital gain was explained by the combination of financial ratios as dividend yield, earning yield, book to market, debt equity ratio and return on asset. In conclusion, the combination of the financial ratios namely DY, EY, BM, DER, and ROA can affect future capital gain and contribute a solid predictive power to the agribusiness firms.

Table 6. The multiple predictive regression result of the capital gain

Capital gain	β_0	β_{i1}	β_{i2}	β_{i3}	β_{i4}	β_{i5}	Adjust R^2(%)	p-value
Fixed effect model	$TSR_{it} = \beta_0 + \beta_{i1}DY_{i(t-1)} + \beta_{i2}EY_{i(t-1)} + \beta_{i3}BM_{i(t-1)} + \beta_{i4}DER_{i(t-1)} + \beta_{i5}ROA_{i(t-1)} + \varepsilon_{it}$
Agribusiness firms	50.58	-2.49	-0.94	-0.20	0.04	1.16	32.6	0.000

Notes: 1) DY, EY, B/M, DER, and ROA are respectively dividend yield, earning yield, book to market, debt equity ratio and return on asset. 2) B_0 Is unsystematic predictable constant component or the estimated constant $\beta_{i1}, \beta_{i2}, \beta_{i3}, \beta_{i4}$ and β_{i5} are respectively the predictable coefficient of the DY, EY, BM, DER and ROA factors of the *i* th stock, *i = 1,2,3,...,n.*

5. Conclusion

The information concerning capital gain's predictability would be worthwhile for any stockholders, mainly for them who have to plan to buy the agribusiness' stocks. The relationship between financial ratios on agribusiness firm and its capital gain is related, hence the investor may figure out the output of the company's financial ratios to appraise future stock investment. On the other hand, agribusiness firms should also consider sharing tremendous dividends in the short term and reducing the company's credit to attract more potential investors, since the result of the dividend yield (DY) and book to market (BM) presents a negative relationship to the capital gain. Furthermore, since the agribusiness firms disclosed unique industry that their financial performance may predict future return of stock, then, it could be a positive sign to potential investors in supplying enormous capitals to the agribusiness firms that can boost the performance of agribusiness firm. While, the huge amount capital received by the agribusiness firms may increase the expansion of production and fulfil the demand of agricultural products. Hence, the involvement of agribusiness firms should be supported by the policy makers at the capital market.

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