The Determinant Factors Of Sectoral Stock Return In Bullish And Bearish Condition At Indonesian Capital Market

Defrizal, Sucherly, Yuyun Wirasasmita, Sulaeman Rahman Nidar

Abstract: this study aims to explain determinant factors of sectoral stock return in bullish and bearish condition at Indonesian capital market. This study used a multi-factor asset pricing model with sectoral stock return as the dependent variable and stock market return, interest rates, and exchange rate as independent variables. The Identification of stock market condition by using a Markov Switching Models, which are also used as the basis for segmenting the data into bullish and bearish conditions. Estimates of the model used the robust least square method. This study used data from Indonesian Stock Exchange to the observation period from January 1996 to December 2013. The results of this study were (1) simultaneously, stock market return, interest rates, and exchange rate affected the sectoral stock return in bullish and bearish condition. (2) Partially, the stock market return positively effect and is as a main factor in determining the sectoral stock return in all industries in either bullish condition or bearish condition, while the effect of the interest rates and exchange rate do not consistently affect the sectoral stock return in different industries and market conditions.

Index Terms: Market Condition, Multi Factor Asset Pricing Model, Markov Switching Model, Robust Least Square

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1   INTRODUCTION

There is a widespread belief among the investors, policy makers and academicians that the low-frequency trend exists in the stock market. Traditionally, the positive and negative trends of low frequency have been known respectively as bullish and bearish. If these trends exist, it is important to extract them from the data, analyze their characters and consider their uses as the input for investment decision and risk assessment (Maheu et al, 2012). Bullish is generally understood as a long period of gradual price increases while Bearish is characterized by falling prices. Stock market volatility tends to be higher when prices are falling. It provides another difference between bullish and bearish. Besides, asset prices behave quite differently during the period of bullish and bearish, and then the investment risk varies depending on market sentiment (Kole et al, 2012). Based on the belief that the behavior of stock prices in a bullish condition is different from the bearish condition, a lot of researches have been conducted as it is done by Fabozzi et al. (1977); Kim et al. (1979), Chen, (1982), Khalid et al. (2013). These researches use a simple method based on the cut-off point in the determination of bullish and bearish conditions to the use of more sophisticated econometric methods such as using a Markov switching model conducted by Hamilton (1989), Schwert (1989) and Hamilton and Susmel (1994) Turner, et al (1989), Ang and Bekaert (2002) and Guidolin and Timmermann (2004), Ismail, et al, (2008), Martin P.H. Panggabean (2010) and Kole et al. (2012). Several studies have been conducted in determining bullish and bearish regime by refering to some previous researchers such as, Fabozzi et al. (1977); Kim et al. (1979) and Chen, (1982)which defines a simple bullish and bearish. This definition does not

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reflect the dependencies of the stock price in the long term and ignores the information about trends in the level of stock prices (Lunde et al., 2004).Financial time series data, especially the stock price, has always had an episode in which the behavior of series seems to change quite dramatically due to the economic crisis and finance. This phenomenon refers to regime shifts or structural breaks and cannot be modeled by the linear time series model of a single equation, and this condition is motivating the use of regime switching models The stock market condition is very closely related to the economic conditions of a country. Changes in economic conditions will affect the stock market that make an uncertainty for investors to invest their funds. Some researchers tried to connect the stock return with some common risk factors, such as the stock market return (Sharpe, 1964; Butt et al, 2010), interest rate, (Maysami et al., 2000; et al., 2004; Gan, et al 2006) and the exchange rate (Maysami et al., 2000; Gan, et al 2006). Based on these studies, these variables are associated with stock returns and used to predict stock returns. In connection with an investment in the common stock, the investors will be exposed to a wide selection of industrial sectors. An analysis of sectoral investment is important to be conducted to make it easier for investors in determining the investment option (Jones, 2007). All listed the issuers on the Indonesia Stock Exchange (IDX) are classified into nine sectors. They are: agriculture, mining, basic industry, miscellaneous industry, consumer goods, property and real estate, infrastructure, finance, trade and service. In this paper, the author limits only to the finance sector and trade and service sector. The author considers that these sectors are the highest number of issuers than other sectors with 78 issues (16%) and 111 issues (23%).

2 THEORETICAL FRAMEWORK

Arbitrage pricing model (APT) is a theory developed by Stephen A. Ross in 1976. The APT model is also called a risk factor model. APT states that the expected return of certain assets is based on the sensitivity of the assets on one or more systematic factors (Megginson, 1997) Bodie et al. (2009) states that it explicitly indicates the possibility of a different sensitivity to systematic risk and different stocks. Therefore, models that allow the multiple factors or multi-factor models can give a better description for stock returns. The linkage

between stock returns with economic factors is based on two reasons. The stock price is a reflection of the expectations of profits, dividends and interest rates. Therefore, the investors are trying to estimate this variable. The second, capital markets react to various major indicator sets or leading indicators, so that the investors are trying to adjust the stock price with the expectation of leading indicators variety (Brown and Reilly, 2009). The selection of these factors is based on the consideration that these factors can affect directly or indirectly on cash flow and discount rate of investment activities as well as investment interest investors. These variables are as follows: stock market return (MR), interest rates (IR) and exchange rate (ER). The previous research has seen the stock price as the dependent variable on the market return only when it tries to explain about the effect of the up and down market and at ordinary stock price (Fabozzi et al. (1977). This research has been carried out using the single factor CAPM modifications to the model to be separated exposures of individual stocks in both market trends, up market and down market Fabozzi and Francis (1977) reached the conclusion that the level of market optimism did not significantly affect both the intercept and the slope of the regression coefficients, this study found that the null hypothesis of did not have any interaction with the type of market was correct. Khalid, et al (2013) conducted research on the Stock Exchange Karachi, Pakistan, by using the model formulated by Fabozzi and Francis (1977). Their research results concluded that all stocks in the oil sector showed a significant beta difference between bullish and bearish conditions, while in banking sector, the three out of eight stocks refused showed no difference. The results of this study indicate that stock returns might have the different response to factors affecting the different stock market conditions. In this paper, the author uses multiple factors asset pricing model to see the determinant factor of sectoral stock return in different market conditions. They are bullish stock market condition and bearish stock market condition. The determination of the factors that affect stock returns is based on some of the researchers who try to connect the stock return with some common risk factors, such as the stock market return (Sharpe, 1964 and Lintner, 1965, Butt et al, 2010), interest rates (Maysami et al., 2000; Mysami et al., 2004; Gan, et al, 2006), and exchange rate (Maysami et al., 2000; Gan, et al, 2006). From these studies, these variables are associated with stock returns and used to predict stock returns. Turner et al (1989), Maheu, et al (2000), Ismail, et al (2008), Pangabean (2010) and Kole et al. (2012) can capture non-linear structure in the mean and variance of return by using a Markov-switching model. The model returns sorting into two conditions, namely high returns and stable condition, and low and volatile returns condition, which are then labeled as bullish conditions (high returns and low volatility) and bearish conditions (low returns and high volatility).

3 METHODOLOGY

Parametric method which is based on Markov Switching Model (MSM) was introduced in finance by Hamilton (1989). Hamilton and Lin (1996); Turner et al. (1989), Maheu et al. (2000), Ismai, et al. (2008), Chen (2009), Martin PH. Pangabean (2010), Kole et al. (2012) to identify the regime of bullish and bearish on the stock market.

r_t = stock market return at t time, is calculated from the logarithmic change of $IHSG_i$ (Y_{it})

$$r_t = 100 \cdot \ln(Y_{it}/Y_{it-1}) \tag{1}$$

$S_t = i$, is variable market conditions, $r_i = 1; 2$
$S_t = 1$, bullish condition
$S_t = 2$, bearish conditions
Then the Markov-Switching Model with two conditions (two-state Markov Switching Model), which describes the evolution of the data $r_t = \{r_1, r_2, r_3, \dots r_t\}$ is as follows:

$$r_t = \mu_1 S_t + \mu_2(1-S_t) + [\sigma_1 S_t + \sigma_2(1-S_t)]\varepsilon_t \tag{2}$$

Where εt is the error term, and $\varepsilon t \sim$ i.i.d. N (0, σst) Variable Conditions St is assumed and governed by the first order Markov chain process with transition probabilities, p_{ij}, given by

$$P\{ S_t = j \mid S_{t-1} = i\} = p_{ij} \quad \forall \quad i,j = 1,2 \tag{3}$$

In particular, $p_{11}=P\{ S_t = 1 \mid S_{t-1} = 1\}$ indicates the possibility of starting in a bullish condition and ended up in the same condition and $p_{22}=P\{ S_t = 2 \mid S_{t-1} = 2 \}$ is the probability of a bearish condition considering that previous condition is also bearish. Parameters and the probability are estimated by maximum likelihood. Furthermore, the identification results of the stock market conditions by using a Markov switching models will estimate the influence of stock market return, interest rate and exchange rate to sectoral stock return either bullish or bearish condition.

Bullish Condition:

$$[r_{it}]_{bullish} = \beta_{i,0} + \beta_{i,1}MR_t + \beta_{i,2}IR_t + \beta_{i,3}ER_t + \varepsilon_t \tag{4}$$

$$\varepsilon_t \sim N(0,1)$$

Bearish Condition:

$$[r_{it}]_{bearish} = \alpha_{i,0} + \alpha_{ii,1}MR_t + \alpha_{i,2}IR_t + \alpha_{i,3}ER_t + \varepsilon_t \tag{5}$$

$$\varepsilon_t \sim N(0,1)$$

Where:
r_i = Sectoral stocks return
MR = Stock market return
IR = Interest rate
ER = Exchange rates
Sector 1= Finance sector
Sector 2= Trade and service sector

Operational Variables
Fully operational variables are as follows:

Table. 1
Variables Operationalization

Variable	Variable Concept	Indicator	Unit
Sectoral stock return (r)	Yields in general of sectoral stock in the Indonesian	$r_i = (\ln SSI_{it} - \ln SSI_{it-1})*100$ SSI$_i$ = sectoral stock	%

	capital market	index i	
Stock market return (MR)	Yields in general from the investment in the Indonesian capital market	MR = (lnIHSG$_t$– lnIHSG$_{t-1}$)*100	%
Interest rate (IR)	The interest rate of Bank Indonesia Certificates (SBI) in one month.	IR = (ln(SBI$_t$) - ln(SBI$_{t-1}$))*100 Proxy increase of Indonesian interest rate for one month	%
Exchange rates (ER)	The exchange rate of rupiah against US dollar	ER = (ln(kurs$_t$)– ln(kurs$_{t-1}$))*100 Proxy increase in the exchange rate rupiah against the US dollar	%

Data source is taken from Indonesia Stock Exchange (Indonesian Stock Exchange) and Bank Indonesia with the observation period from January 1996 through December 2013.

4.1 Result and Discussion
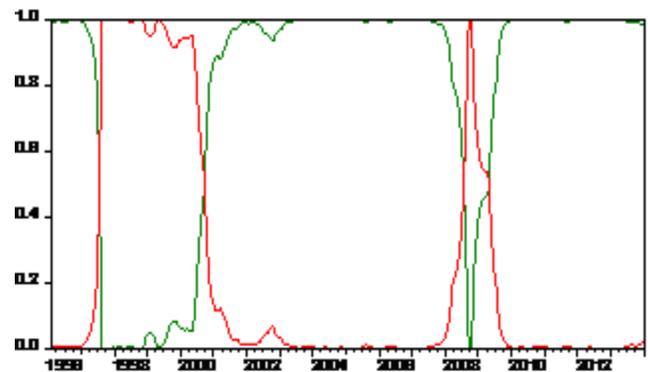
Bullish and Bearish Identification

The Identification of bullish and bearish conditions is based Indonesian stock market returns which use the Markov regime switching models. Based on the proposed model, the values of model parameters have been obtained as follows:

Table 2
The Parameter of Markov Regime Switching Model Indonesian Stock Market Return Period of January 1996-December 2013

Par.	Coefficient	Error Standard	Z statistic	Probability
μ_1	1,7007	0,5004	3,3987	0,0007
μ_2	-1,7708	2,2046	-0,8032	0,4218
S_1	5,7973	0,0632	27,793	0,0000
S_2	14,1327	0,1229	21,551	0,0000
P_{11}	0,9860	0,7637	5,5710	0,0000
P_{22}	0,9437	0,7385	-3,8179	0,0001

Based on the data results in Table 2, it can be seen that the 6 parameters which are estimated almost significant at the 1 percent level, only µ2 is insignificant either at the 1 percent or 5 percent level. Although there is insignificant from these

parameters model, however the interpretation of this model remains attractive. This model shows that we can divide the Indonesian stock market conditions into two regimes. The State 1 showed the average monthly return is positive (1.70% per month or equivalent to 20.40% profit per year). In contrast, the state 2 showed an average negative return month (-1.77% per month, equivalent to 21.24% loss per year). The standard deviation of state 1 is 5.80%, while the standard deviation of state 2 is 14.13%. It means that means in terms of the state 1 volatility is considered to have a lower volatility than the state 2. Based on the data results in table 2, µ1 value is significant at 1 percent significance level, however, µ2 value is not significant. The value of S1 and S2 are both significant at the 1 percent significance level. Under these circumstances, we can conclude that the regime switching occurred in the Indonesian stock market is due to the difference in volatility. Thus, the first regime is characterized by positive returns with low volatility (low risk) and the second regime is characterized by a negative return with high volatility (high risk). The author refers to previous studies such as Turner, et al (1989), Maheu et al. (2000), Ismail et al. (2008), Martin PH. Pangabean (2010), Kole et al. (2012). Then the state 1 was identified as the bullish condition and the state 2 was identified as the bearish conditions. The results of the estimation using Markov switching models can be used to divide the historical data observations into bullish and bearish periods as shown in Figure 1. Figure 1 shows the smoothed regime probabilities return IHSG during the period of February 1996 to December 2013.

Gambar 1
Smoothed Regime Probabilities return IHSG
P(S(t= 1)   P(S(t= 2)

Source: *Results of data processing*

Table 3
Bullish and Bearish period Indonesia Stock Exchange February 1996 - December 2013

Bullish Period		Bearish Period	
- February 1996 – July 1997	18 months	- August 1997 – September 2000	38 months
- October 2000 – July 2008	94 months	- August 2008 – April 2009	9 months
- May2009 – December 2013	56 months		

78%		22%	47
	168 months		months

Based on figure 1 and table 3, it can be concluded that during the observation period of February 1996 to December 2013 (215 observations), Indonesian stock market experienced a 78 percent (168 observations) bullish conditions and 22 percent (47 observations) bearish conditions.

Table 4
Descriptive Statistical Study Variables
Period of February 1996 - December 2013

Parameter	R_Sector1	R_Sector2	MR	IR	ER
Bullish Condition (168 observations)					
Mean	1,97	1,59	1,68	-0,303	0,174
Std Dev.	6,85	6,39	5,72	3,161	2,999
Bearish Condition (47 observations)					
Mean	-3,66	-1,66	-1,76	-0,144	2,933
Std Dev.	15,30	17,80	14,52	14,073	16,886

Mean stock returns sector 1, stock returns sector 2 and stock market returns have an average higher point during the bullish than bearish period. The interest rate experienced an average greater reduction in bullish period. It indicates that the interest rate is relatively lower during the bullish condition. Exchange rate rupiah against the US dollar on average experienced a larger increase in the bearish periods which indicate more rupiah needed for every dollar that is required. In general, the bearish period shows the variables standard deviation is higher than the bullish period, which means that in the bearish period, all variables have higher volatility.

Stationary Test and Normality Data
The stationary testing data of stock market return, interest rate and exchange rate used the Augmented Dickey Fuller (ADF) and Phillips-Perron test (PP) test. While the data normality testing used the Jarque Bera (BB) test. The test results of stationary and normality of data are shown in table 5.

Table 5
The Result of Stationary and Normality Data
Stock Market Variables and Macroeconomic

Var.	JB *Test*		ADF *Test*		PP *Test*	
	Jarque-Bera	Prob.	t-stat	Prob	Adj. T-stat	Prob
MR	215,894	0,000	-12,270	0,000	-12,270	0,000
IR	2263,584	0,000	-6,562	0,000	-6.600	0,000
ER	15060,.730	0,000	-12.857	0.000	-12.771	0.000

Table 5 shows the ADF test and PP test are significant at the 1 percent level for all variables. It means that the data stock market and macroeconomic variables as a research variable are in a stationary condition. The data test normality shows that the JB test of stock market and macroeconomic variables did not meet the normality conditions. This condition prompted the authors to use robust least square. Robust Regression analysis provides an alternative to the least squares regression when the underlying assumptions are not fulfilled by the nature of the data (normality assumption). The most common general method of Robust Regression is M-estimation, which was introduced by Huber (1964), which is almost as efficient as OLS (Alma, 2011).

Table 6
Regression results using robust least square

Parameters	Financial Sector	Trade, Service and Investment Sector
Bullish Condition		
βMR	***0.992643	***0.937546
βIR	-0.120229	-0.033479
βER	-0.134605	0.059655
R_W^2	0.8199	0,7377
$R_N^2 Statistic$	***564.8683	***354.8271
Bearish Condition		
αMR	***0.780042	***1.032899
αIR	0.041378	**-0.144700
αER	***-0.270355	***-0.413888
R_W^2	0.706895	0.906551
$R_N^2 Statistic$	***84.68922	***310.4821

***) significant at 1% level**) significant at 5% level

The data processing results using a robust least square method can produce the R_W^2 value, which indicates the goodness of fit. The value of R_W^2 indicates the ability of independent variables in the model to explain the variation of dependent variable. Renaud and Victoria-Feser (2010) proposed the R_W^2 statistics. They provide simulation results that show the R_W^2 become a measure of goodness of fit better. For a simultaneously hypothesis test, the R_N^2 statistics is used which is a robust version for *Walt test*. The value of R_N^2 statistic for the finance sector and trade and service sector are significant at 1 percent level, both on the bullish and bearish condition of the stock market conditions. This condition indicates a strong rejection from the null hypothesis that all the coefficients of non-intercept are equal to zero, thereby, stock market return, interest rate, and exchange rate, affect together on sectoral stock returns in bullish and bearish condition. These results are consistent with research done by Mysami et al., 2004; Gan et al., 2006, and Butt et al., 2010, which concluded that the macroeconomic variables and stock market affect the stock price or stock return. These results proved that the Indonesian capital market investors generally consider the stock market variables and macroeconomic in deciding to invest in common stock. In general, the changes in the stock

price index, interest rate and exchange rate still become determinants of sectoral stock returns in the Indonesian capital market. Investors still consider the stock market and macroeconomic variables can affect cash flow, discount rate and the investors' interest in order to invest the stock in Indonesian capital market. Based on this research, the stock market return positively affects the stock returns of finance sector and trade and services sector both in bullish and bearish conditions. The results of this study are in line with the theory developed by Sharpe (1964) and Litner (1965), which implies a positive linear relationship between the stock market return or market risk and stock returns. The results of this study also supports the findings of Butt, et al (2010) which has been influenced by positive stock market return to the examined sectoral stocks return. The positive influence from the stock market return on sectoral stock return either in bullish or bearish condition reflects a favorable investment climate in the stock market, so investors will respond positively to the capital market. Thus, investors will tend to perform buying and selling action of the traded stocks based on stock market index occurred. These results also confirm that the stock market return factor is the main factor in determining the sensitivity of stock returns of finance sector and trade and services sector, in the Indonesian capital market. Based on this study, the effect of the interest rate varies with the stock return of finance sector and trade and service sector, in bullish and bearish condition. On bullish conditions, the effect of interest rates is not significant to stock return of finance sector and trade and service sector. This result consistent with the research conducted by Butt et al. (2010) who found that the effect of the risk-free interest rate is not significant in most of the different sector stocks. This condition can occur due to the bullish conditions of interest rate is 1-month SBI rate is relatively stable. It can be seen from the volatility or standard deviation during the bullish condition is relatively low, and the average growth rate with large negative scores which indicates the level of interest rate is at a low level. With volatility and low interest rates, investors will pay more attention to other risk factors to consider the investment. While in the bearish conditions, sectoral stock return which is significantly and negatively affected by interest rate is the trade and service sector. The results of this study are in line with findings of Maysami, et al. (2004) on the Singapore stock market, which has found that interest rates have a significant effect on the general stock market index. The increase of interest rates during the bearish period will be considered to disturb or interfere the income issuers in this sector. Industries, such as retail will be a lot associated with short-term funding needs such as working capital loans and consumer credit. This condition causes the interest rate negatively affect the stocks returns of trade and service sector. Based on this research, in a bullish market condition, the exchange rates did not significantly influence on the stock return of the finance sector and trade and service sector. This result is in line with the research conducted by Butt, et al (2010) on Pakistan's stock exchanges where it is also found that the exchange rate did not significantly influence on the stock returns from the studied sectors. Negative and significant impact of exchange rates against the stock return of finance sector and trade and servicet sector in bearish condition. These results concur with those of Gan et al. (2006) in the New Zaeland's stock exchanges which concluded that the effect of the exchange rate to stock return is negative. While in the bearish period, the negative influence of exchange rates against the stocks return happens due to the stock investors on that sector see the rise in the exchange rate in bearish condition is larger. It could have an impact on price increasing of the imported goods which are used as raw materials or merchandise. The increasing number of paid foreign loans in dollars, will impact on the level of corporate profits in the future. This condition will be responded negatively by investors that could lead to the decline in stock prices and stock returns in these sectors.

5 CONCLUSION

By using Markov switching models, the stock market conditions can be divided into two conditions, namely bullish and bearish conditions. The difference of conditions is due to the difference in market volatility. The stock market return, interest rate and exchange rate are the factors that jointly affect the stock return in finance sector and trade and service sector in Indonesian capital market either in bullish or bearish condition. The stock market return is a main factor in determining the stock return of the finance sector and trade and service sector. In bullish conditions, the Interest rate and the exchange rate against the US dollar is not a significant factor to be taken into consideration by the investors to invest their stocks in finance sector and trade and service sector in the Indonesian capital market. In bearish condition, the interest rate factor becomes the factors that need to be taken into account by the stock investors in trade and service sector, while the exchange rate against the US dollar is a factor that needs to be taken into account by investors who will invest the stocks in the finance sector and trade and service sector..

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