

22 July 2016 | Strategy

Quantitative Report

Correlation Study between Earnings and Price

KLCI: 1,657.54 points




2016 Year-end Target: 1,750 points

One of the basic equity investing strategies is to "follow the money". While in the shorter-term the word 'money' may mean the flow of liquidity, in the longer-term it is almost invariably refers to the underlying corporate earnings.

- The objective of this quantitative report is to examine the statistical significance of the aforementioned long-term investing mantra. The FBM KLCI 30 constituents are chosen due to their significance as the components of the main market benchmark. Furthermore, the correlation analysis is conducted over the past 1-, 3-, 5-, and 10-year time horizons.

FBM KLCI Constituents: Correlation between Earnings and Share Price Performance

SECTOR	CONSTITUENTS	10-year	5-year	3-year	1-year
BANKING	HONG LEONG FINANCIAL GROUP	0.67	0.41	0.25	-0.21
	MALAYAN BANKING BHD	0.69	0.42	0.12	-0.06
	AMMB HOLDINGS BHD	0.84	0.75	0.80	0.28
	CIMB GROUP HOLDINGS BHD	0.74	0.64	0.46	0.14
	PUBLIC BANK BERHAD	0.94	0.71	0.02	0.06
	HONG LEONG BANK BERHAD	0.91	0.45	-0.04	-0.45
	RHB CAPITAL BHD	0.75	0.36	0.57	0.68
PLANTATION	KUALA LUMPUR KEPONG BHD	0.42	-0.04	0.09	-0.08
	IOI CORP BHD	0.27	0.21	0.33	0.90
	PPB GROUP BERHAD	-0.22	-0.33	-0.31	-0.71
	SIME DARBY BERHAD		0.46	0.38	0.01
OIL & GAS	PETRONAS DAGANGAN BHD	0.18	-0.05	0.16	-0.67
	PETRONAS GAS BHD	0.58	0.31	-0.41	0.16
	PETRONAS CHEMICALS GROUP BHD		-0.06	0.08	-0.52
	SAPURAKENCANA PETROLEUM BHD			0.49	-0.59
TELCO	TELEKOM MALAYSIA BHD	-0.31	-0.47	-0.43	-0.24
	DIGI.COM BHD	0.84	0.59	0.40	-0.76
	AXIATA GROUP BERHAD		0.11	0.17	-0.09
	MAXIS BHD		-0.70	-0.62	-0.65
UTILITIES	TENAGA NASIONAL BHD	0.59	0.45	0.47	0.48
	YTL CORP BHD	0.40	0.10	-0.61	0.15
OTHERS	GENTING BHD	0.42	0.15	0.34	-0.83
	KLCCP STAPLED GROUP	0.01	-0.08	-0.08	-0.29
	MISC BHD	0.29	0.38	0.00	0.43
	GENTING MALAYSIA BHD	0.21	-0.46	-0.42	-0.77
	BRITISH AMERICAN TOBACCO BHD	0.53	0.63	0.61	0.97
	UMW HOLDINGS BHD	0.35	0.49	0.61	-0.62
	IHH HEALTHCARE BHD			0.42	0.72
	ASTRO MALAYSIA HOLDINGS BHD			-0.30	0.34
WESTPORTS HOLDINGS BHD				-0.19	

Source: Bloomberg, MIDFR; Note: (i)  statistical significance at $\alpha=5\%$ level;  data unavailability;  statistical insignificance at $\alpha=5\%$ level

(ii) Refer to Appendix for detailed test structure and results


FBM KLCI Constituents: Frequency of Statistically Significant Correlation Coefficients

Time Period	Positive Correlation	Negative Correlation
10-year	68.2%	0.0%
5-year	34.6%	11.5%
3-year	10.3%	6.9%
1-year	3.3%	0.0%

Source: Bloomberg, MIDFR

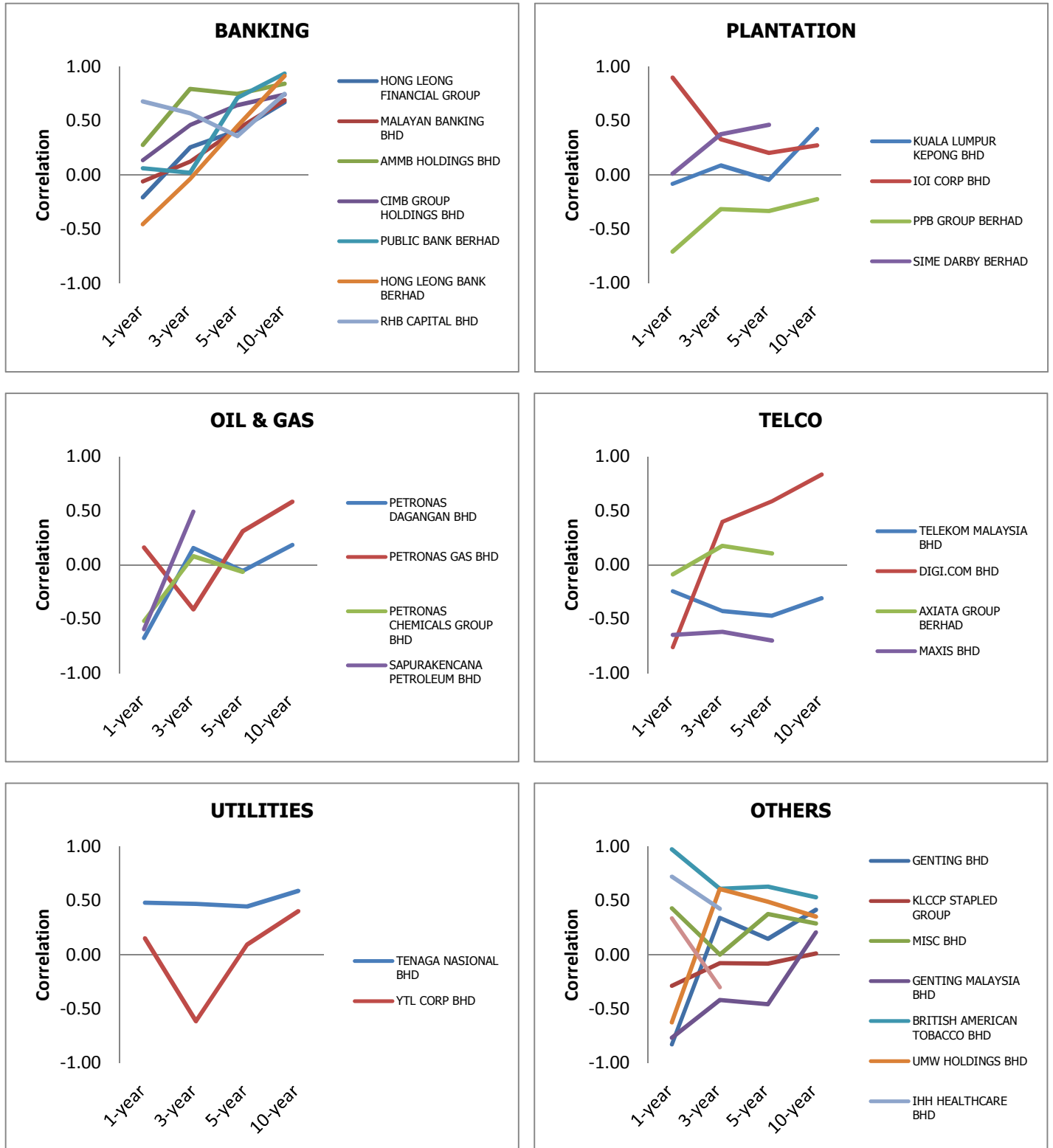
Note: The frequency is calculated using formula: $\left(\frac{\text{No of statistically significant correlation coefficients}}{30 - \text{No of constituents with data unavailability}}\right) \times 100\%$

Results Interpretation:

- Our test results indicate that positive correlation between earnings and share price performance among FBM KLCI 30 constituents is statistically more pronounced over a longer period of time with the positive correlation rising from 3.3% for 1-year period to 68.2% for 10-year period.
- However, it must be emphasized that the lack of statistically significant correlations over shorter time periods in our test results should not be interpreted as a conclusive corroboration to the absence of positive correlation between the two variables in the short run.
- Statistically speaking, sample statistics derived from smaller sample size (shorter time period) are more sensitive to random noises or outliers in the data. Hence, to compensate for this shortcoming, the hypothesis test places a larger discount factor on correlation coefficients derived from a shorter time period. Therefore, the bar to be proven statistically significant gets higher as the time period gets shorter.
- For instance, IOI Corporation Berhad manifests a 0.90 correlation in the past 1 year, which however is not proven statistically significant. On the contrary, a 0.61 correlation for UMW Holdings Berhad over a 3-year period is sufficient to be proven statistically significant. 

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FBM KLCI 30 Constituents: Correlation between Earnings and Share Price



Source: Bloomberg, MIDFR

APPENDIX:

Fisher Z-Transformation hypothesis test is applied in determining the statistical significance of correlation coefficient(r). Student's t-test could be applied instead in this context where $H_0: \rho=0$.

[r : Sample correlation coefficient; ρ : Population correlation coefficient]

However, for hypothesis testing where $H_0: \rho=i$, in which i is a real number other than 0 lying between, and inclusive of, -1 and 1, Fisher Z-Transformation should be used by virtue of its variance-stabilizing properties.

Fisher Z-Transformation Test's Assumption:

- (i) Both Net Income and Share Price data series are bivariate normally distributed.

Test Structure:




- (i) Test type: One-tailed test
- (ii) Hypotheses: $H_0: \rho=0$
 $H_1: \rho>0$ or $\rho<0$
- (iii) Significance level: 5%
Critical value: ± 1.96

Test Interpretation:

- (i) Reject H_0 : one fails to prove that there is no correlation between Net Income and Share Price.
- (ii) Fail to reject H_0 : one fails to prove that there is [positive/negative] correlation between Net Income and Share Price.
- (iii) Reject H_0 when test-statistics >1.96 , or <-1.96 .
- (iv) Fail to reject H_0 when $-1.96 < \text{test-statistics} < 1.96$.

FBM KLCI Constituents: Correlation Hypothesis Testing Results

Sector	CONSTITUENTS	Fisher-Z Transformation Test-statistic			
		10-year	5-year	3-year	1-year
BANKING	HONG LEONG FINANCIAL GROUP	4.98	1.79	0.78	(0.21)
	MALAYAN BANKING BHD	5.17	1.86	0.37	(0.06)
	AMMB HOLDINGS BHD	7.49	4.02	3.26	0.29
	RHB CAPITAL BHD	5.91	1.54	1.93	0.83
	CIMB GROUP HOLDINGS BHD	5.83	3.15	1.50	0.14
	PUBLIC BANK BERHAD	10.42	3.68	0.07	0.06
	HONG LEONG BANK BERHAD	9.47	2.00	(0.12)	(0.49)
PLANTATION	KUALA LUMPUR KEPONG BHD	2.75	(0.19)	0.27	(0.08)
	IOI CORP BHD	1.71	0.86	1.03	1.47
	PPB GROUP BERHAD	(1.38)	(1.42)	(0.98)	(0.88)
	SIME DARBY BERHAD		2.08	1.19	0.01
OIL & GAS	PETRONAS DAGANGAN BHD	1.13	(0.23)	0.47	(0.82)
	PETRONAS GAS BHD	4.07	1.33	(1.31)	0.16
	PETRONAS CHEMICALS GROUP BHD		(0.26)	0.24	(0.57)
	SAPURAKENCANA PETROLEUM BHD			1.62	(0.68)
TELCO	TELEKOM MALAYSIA BHD	(1.94)	(2.10)	(1.37)	(0.25)
	DIGI.COM BHD	7.33	2.78	1.26	(0.99)
	AXIATA GROUP BERHAD		0.44	0.53	(0.09)
	MAXIS BHD		(3.56)	(2.16)	(0.77)
UTILITIES	TENAGA NASIONAL BHD	4.12	1.98	1.53	0.52
	YTL CORP BHD	2.60	0.40	(2.14)	0.15
OTHERS	BRITISH AMERICAN TOBACCO BHD	3.59	3.06	2.13	2.15
	GENTING BHD	2.69	0.61	1.07	(1.18)
	KLCCP STAPLED GROUP	0.08	(0.34)	(0.23)	(0.30)
	MISC BHD	1.82	1.64	0.00	0.46
	GENTING MALAYSIA BHD	1.28	(2.03)	(1.34)	(1.01)
	UMW HOLDINGS BHD	2.24	2.21	2.12	(0.73)
	IHH HEALTHCARE BHD			1.36	0.91
	ASTRO MALAYSIA HOLDINGS BHD			(0.93)	0.35
WESTPORTS HOLDINGS BHD				(0.19)	

Source: Bloomberg, MIDFR; Note:  statistical significance at $\alpha=5\%$ level;  data unavailability;  statistical insignificance at $\alpha=5\%$ level

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MIDF AMANAH INVESTMENT BANK : GUIDE TO RECOMMENDATIONS

STOCK RECOMMENDATIONS

BUY	Total return is expected to be >15% over the next 12 months.
TRADING BUY	Stock price is expected to <i>rise</i> by >15% within 3-months after a Trading Buy rating has been assigned due to positive newsflow.
NEUTRAL	Total return is expected to be between -15% and +15% over the next 12 months.
SELL	Total return is expected to be <-15% over the next 12 months.
TRADING SELL	Stock price is expected to <i>fall</i> by >15% within 3-months after a Trading Sell rating has been assigned due to negative newsflow.

SECTOR RECOMMENDATIONS

POSITIVE	The sector is expected to outperform the overall market over the next 12 months.
NEUTRAL	The sector is to perform in line with the overall market over the next 12 months.
NEGATIVE	The sector is expected to underperform the overall market over the next 12 months.