ISSN: 2513-2512

R4TLI Conference Proceedings 2016
Paper Reference: *R4TLI-C41*

Use of the Baltic Dry Index as a Leading Economic Indicator to Predict Asian Share Market Performance

C. Akalanka Samarasena,
University of Moratuwa, Sri Lanka

Indika Sigera
University of Moratuwa, Sri Lanka

1. Introduction

The London-based Baltic Exchange measures changes in the cost of transporting raw materials such as metals, grains and fossil fuels by sea, through the Baltic Dry Index (BDI). Dry bulks represent initial or intermediary steps of the production cycle. Shipping of dry bulks therefore happens even before the production cycle begins. This allows the use of BDI as a practical leading economic indicator. This research attempts to prove that the BDI has predictive ability for a range of major Asian stock market returns.

The following formula is used to calculate the BDI,

$$BDI \qquad \frac{CT+PT+ST+HT}{4} * 0.110345333 \qquad (1)$$

T = Time charter average (TCavg)

The value 0.113473601 is the multiplier introduced to standardise the calculation and was first applied when the BDI replaced its predecessor BFI (Baltic Freight Index). Time charter average (TCavg) on routes measured covering Handysize (HT), Supramax (ST), Panamax (PT), and Capesize (CT) ships. These dry bulk carriers carry a range of commodities including coal, iron ore and grain in the 23 routes tracked by the BDI.

2. Research Methodology

To prove that BDI is a leading economic indicator in Asian context it should be established that Asian share market prices have a correlation with BDI. The ideal relationship would be share prices being a function of BDI. Linear regression was used to determine correlation between various share market indexes and the BDI. Correlation coefficient for the BDI return was analysed using the method detailed in the research design to derive the relationship between the BDI and stock market returns.

2.1 Research Design

This research analysed data related to the Baltic Dry Index with the main Asian Stock Exchanges of India, Japan, China, Hong Kong, Thailand, Malaysia, South Korea, Sri Lanka and Singapore. MSCI World, Dow Jones and S&P 500 were used to observe any deviations from the observations of Asia. MSCI AC Asia ex Japan index which captures the gist of Asian share markets were used for gain an overall view. Data were fed into IBM SPSS Statistical Application in order to observe the outcomes using simple linear equation model.

$$b1r \qquad b2r \qquad (2)$$

The lag period of one month was predicted through the extensive researches done on the delayed diffusion of information across the markets. Here $r_{s,t}$ was taken as the end-of-the-month logarithmic return of a countries' Share Index, s, at time t. The independent variable was the end-of-the-month logarithmic return of the Baltic Dry Index, included in the regression at time t-i months. Moreover, b was considered as the constant and $\varepsilon_{s,t}$ as the error term.

2.2 Testing for Non- Stationarity and Autocorrelation

Durbin Watson test was performed to exclude the concerns relating to autocorrelation in the considered dataset. The constructed time series on BDI raw data and selected indices appeared to portray significant levels of autocorrelations depicted by having Durbin-Watson values closer to zero. To eliminate the autocorrelation, logarithmic returns of the BDI and share index returns were used.

2.3 Improving the data set

To improve non-stationarity, the data set was converted into one with log changes. Log changes are an accepted method in predictive regressions conducted in financial and economic research and has been used by Alizadeh and Muradoglu [1], Oomen [2] and Bakshiet el [3].

The t month logarithmic return (r_t^{BDI}) was calculated as below,

$$r_t^{BDI} = \ln(BDI_t) - \ln(BDI_{t-i}) \qquad (3)$$

3. Findings and Conclusion

This research was limited to five years with 60 monthly observations. Considered period from 2009 to 2014 was after the global recession and it can be considered as a unique phase in economic cycle where the global economy was recovering.

Table 1: Regression Output of the Improved Dataset

Index	R	R Sq	Durbin-Watson	F	Sig
CSE	0.185	0.034	1.692	2.055	0.157
STI	0.241	0.058	2.265	3.585	0.063
TWII	0.248	0.062	2.207	3.803	0.056
FTSE BUR	0.017	0	2.290	0.017	0.896
Hang Seng	0.136	0.019	2.425	1.098	0.299
KOSPI	0.274	0.075	2.233	4.718	0.034
SPBSESSX	0.030	0.001	2.201	0.052	0.821
SS COMP	0.118	0.014	2.033	0.816	0.370
NIKKEI 225	0.036	0.001	1.944	0.075	0.786
MSCI Asia	0.146	0.021	2.108	1.255	0.267
SP 500	0.015	0	2.206	0.013	0.908
DOW	0.024	0.001	2.248	0.034	0.854

According to the results of the regression analysis summarised in Table 1, no significant correlation is found between the BDI and share market indices considered, as the highest reported correlation value (R square) was a mere 0.075 in Korea. The research confirms the delayed diffusion of information and the optimality of lesser time periods to derive the predicative quality of BDI.

BDI returns distribution showed a significantly skewed nature. Prevailing overcapacity in the shipping industry was suggested as the reason behind this behaviour. The results indicate that the slope coefficients in predictive regressions of stock market returns on the BDI growth rate are overwhelmingly negative and statistically non-significant for a number of markets, in an in-sample analysis. Second, the R^2 statistic is very low for all indexes than reported in the extant literature. All these findings lead to lower the economic significance and predictability of BDI as a viable economic indicator in predicting Asian share market returns.

Finally, it should be noted that BDI's viability as an economic indicator is subjected to the time period considered. Empirical evidence supporting the conjecture that a higher BDI return will one month later result in a higher stock market return appeared only in researches for the period 2001-2007.

Therefore, it can be recommended to investors and interested sectors that BDI predictability is highly subjective to the time period considered and long time periods tend to provide false signals on the returns of share market.

References

1. Alizadeh , H. A. & Muradoglu, G., 2011. *G. Stock market returns and shipping freight market information: Yet.* [Online]
Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1905590
[Accessed 08 March 2015].

2. Bakshi, G., Panayotov, G., Skoulakis, G. 2011. The Baltic Dry Index as a Predictor of Global Stock Returns, Commodity Returns, and Global Economic Activity. Working Paper Series, Available at SSRN.

3. Oomen, 2012. BDI a predictor of stock exchange. p. 22.

Keywords: *Baltic Dry Index, global stock markets, global real economic activity, predictive regressions*