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An Analysis on BALTIC DRY INDEX

Authors**

G.Divya
MBA II year
Villa Marie P.G. College

C.Vikas
MBA II year
St.Joseph's P.G. college

Abstract: The following article helps to understand the Baltic Dry Index, which has been considered as a global economic indicator by the investment bankers across the world. This article attempts to study the behaviour of various economic factors in the near future with the help of BDI. Various world economic factors such as World GDP, World Inflation, World Exports, World Imports, Global Bond Index, Manufacture New Orders Index, Harpex Index, Gold Price, MSCI, Commodities movement are considered.
Key words: GDP, Global bond index, Gold, Harpex, inflation, MSCI.

Introduction

This index is one of the purest leading indicators of economic activity. It measures the demand to move raw materials and precursors to production. Consumer spending and other economic indicators are backward looking, meaning they examine what has already occurred. The BDI offers a real time glimpse at global raw material and infrastructure demand. This could also be gleaned from looking at commodity prices, but there are substitution effects and futures contracts that make it difficult to interpret the impact of commodity price fluctuations. Additionally, nearly all commodities are seeing severe increases in prices in 2008 regardless of supply situations as investors seek to hedge their inflation exposure with hard assets.

Unlike stock and commodities markets, the Baltic Dry Index is totally devoid of speculative players. The trading is limited only to the member companies, and the only relevant parties securing contracts are those who have actual cargo to move and those who have the ships to move it. The BDI will show how much a company or country is willing to pay to import raw materials immediately

The Baltic Dry Index is a daily average of prices to ship raw materials. It represents the cost paid by an end customer to have a shipping company transport raw materials across seas on the Baltic Exchange, the global marketplace for brokering shipping contracts. The index is quoted every working day at 1300 London time. This index can be used as an overall economic indicator as it shows where end prices are heading for items that use the raw materials that are shipped in dry bulk

The Baltic Dry Index can expose Trends relative to…

- Shipping costs of Raw Materials
- Global Margin Pressures
- Commodity Demand Trends
- Capital Deployment Commitments and General Business Confidence
- Decoupling the US Dollar Value within the BDI and Global Commerce

Objectives

1. Baltic dry index and Harpex Index relationship with gold and equities.
2. To find the effect of world gdp and inflation on Baltic dry index with Phillip-Perron test.

3. To study the exports and imports movements with BDI.
4. To find the impact of BDI on MSCI and global bond index.
5. Performance analysis between with BDI and MSCI.(Sterling and MAR ration)

Scope: The study has been focused for the period 2009-2013 data of various economic factors of the world economy. As BDI has been accepted by the experts that is the purest and best economic indicator of the world economy. The analysis has been emphasized to find the real picture of the world economy with BDI and how it reacts with world select economic factors.

Literature review

FotisPapailias, Dimitrios D. Thomakos: The cyclical properties of the annual growth of the Baltic Dry Index (BDI) and their implications for short-to-medium term forecasting performance are investigated. We show that the BDI has a cyclical pattern which has been stable except for a period after the 2007 crisis. This pattern has implications for improved forecasting and strategic management on the future path of the BDI. To illustrate the practicality of our results, we perform an investment exercise that depends on the predicted signs. The empirical evidence supports the presence of the cyclical component and the ability of using forecast signs for improved risk management.

Gurdip Bakshi, George Panayotov: The goal of this paper is to show that the growth rate of the Baltic Dry Index (BDI) has predictive ability for a range of stock markets, which is demonstrated through in-sample tests and out-of-sample statistics. The documented stock return predictability is also of economic significance, as seen by examining the certainty equivalent returns and Sharpe ratios of portfolio strategies that exploit the BDI growth rate. In addition, the BDI growth rate predicts the returns of commodity indexes, and we find some evidence for joint predictability of stock and commodity returns in a system of predictive regressions. Finally, the BDI growth rate predicts the growth in global economic activity, establishing further BDI's role in revealing a link between the real and financial sectors.

Lin, Faqin, Sim, Nicholas C.S: Does trade improve the income levels of the poor and less developed nations? Focusing on the Least Developed Countries (LDCs) designated by the United Nations, we construct a new measure of trade cost, based on the Baltic Dry Index (BDI), as an instrument for trade. The BDI reflects the cost of utilizing dry bulk carriers, which are specially designed vessels for transporting primary goods internationally, where these goods dominate the output and export sectors of the LDCs. We find that a 1% expansion in trade raises GDP per capita by approximately 0.5% on average. This estimate is much larger than previously found in the literature and its quantitative significance emphasizes the importance of trade towards the economic development of low income countries.

Faqin Lin , Nicholas: In their seminal paper, Brückner and Ciccone (2011) document that a significant effect of democratic change may be triggered by negative transitory economic shocks, and that rainfall can open a democratic window of opportunity in sub-Saharan Africa (SSA). As a complement, this paper uses within-country variation in the Baltic Dry Index (BDI) as a source of transitory negative income shocks to SSA countries. The BDI reflects the cost of utilizing dry bulk carriers, which are specially designed vessels for transporting primary goods internationally, where these goods dominate the output and export sectors of the SSA economies. We find that positive BDI cost shocks are followed by significant contraction in income through trade channel and significant improvement in democratic institutions, where BDI can open a window of opportunity for democratic improvement. Instrumental variables estimates indicate that following a negative income shock of one percentage point, democracy scores improve by around 4–5 percentage points on average.

K P B Cullinane, K J Mason and M Cape: The Baltic Freight Index (BFI) is a widely recognised barometer of dry bulk freight rates. As such, its composition is monitored

continuously. In 1993, all handy size trades were expunged from the BFI. This paper tests whether the change in the composition of the BFI has altered its underlying behaviour. This is achieved by applying a Box-Jenkins methodology to a BFI database covering a period following this pivotal change and comparing the properties of the resulting ARIMA model to those of a model previously estimated by applying the same methodology to data from an earlier period. On the basis of a range of criteria, the two models prove to be remarkably similar and the paper concludes that the behaviour of the BFI has not been radically altered even following this radical revision

Andreas G. Merikas, Anna Merika, Nikos Paltalidis: Treating the Baltic Dry Index (BDI) as an alternative asset class and as an important tool that influences risk management decisions for ship-owners and fund managers, we study the behavior of the Index, forecasting and calculating its movements. Using an unobserved components model, we combine convergence and launch stylized facts with a common trend and cycles with the aim to produce accurate assessment of market risk. We claim that demand and supply factors pertinent to the industry as well as financial markets and risk factors are leading indicators for the movement of BDI. In that context we investigate if the Nasdaq stock market index, the Crude Oil, the Volatility Index, the Fleet size and the Seaborn Trade are the main driving forces of the BDI's movements. Particularly, we show that these components are able to predict the movement of the BDI on the basis of the information criteria AIC, BIC and CV. Moreover, within a Markov regime switching unobserved component framework, we observe contagion effects characterized by nonlinearity with two distinct regimes. The watershed of the two regimes occurs during the start of the bubble period in 2003 as well as around the start of the credit crunch period in 2008. These periods characterized by high volatility and fluctuations due to economic and financial shocks, reveal that within a regime dependent impulse response function when high volatility regime dominates the movement of the BDI, it is highly affected by the movement of all the components used in our study.

Jonaton Perraton: Hirst and Thompson's Globalization in Question is the key text questioning claims of economic globalisation. This review of its revised second edition examines its main claims: that contemporary levels of international integration fall short of the Gold Standard period; genuinely global companies remain exceptional; capital mobility is not shifting economic activity to developing countries wholesale; international economic activity is primarily regional rather than global; and that international economic activity is sanctioned by nation states and remains subject to their political power. This review argues that, while their evidence provides a useful corrective to extreme globalisation views, focusing on this view understates changes in the international economy.

Michael E .Potter: Economic geography during an era of global competition involves a paradox. It is widely recognized that changes in technology and competition have diminished many of the traditional roles of location. Yet clusters, or geographic concentrations of interconnected companies, are a striking feature of virtually every national, regional, state, and even metropolitan economy, especially in more advanced nations. The prevalence of clusters reveals important insights about the microeconomics of competition and the role of location in competitive advantage. Even as old reasons for clustering have diminished in importance with globalization, new influences of clusters on competition have taken on growing importance in an increasingly complex, knowledge-based, and dynamic economy. Clusters represent a new way of thinking about national, state, and local economies, and they necessitate new roles for companies, government, and other institutions in enhancing competitiveness.

Empirical Study: In this analysis we have dealt with correlation, kurtosis, regression equation, sequence charts, Sterling ratio and Mar ratio for below variables:

- World gdp
- World inflation

- World exports
- World imports
- Global bond index
- Manufacture new orders index
- Harpex index
- Gold price
- MSCI
- Commodities movement

Research methodology: The analysis is descriptive method. The analysis will be based on secondary source data. The following statistical tools/formula's has been applied.

- Correlation
- Kurtosis
- Linear regression analysis
- Regression equation
- Phillip perron test
- Sequence charts
- Mar ratio
- Sterling ratio

Limitations

- Global inflation figures may be the combination of CPI, WPI, or PPI. For this analysis it has been assumed that Global inflation has followed CPI.
- For GBI Pimco has been considered for the analysis purpose.
- Harpex index inception took place in the year 2010. But BDI values have been considered from 2009.
- All the economic variables and indices were averaged to yearly.
- BWI values were not considered for this analysis purpose

Data analysis:

Data:

year	exports	imports	bdi	harpex	gdp	msci
2009	48.5	45.1	946.7345	nul	107.3	27.3733
2010	57.8	55.1	1139.31	697.3038	111.5	32.6325
2011	55.3	53.6	1268.89	697.9882	114.9	34.8275
2012	51.4	51.4	945.0379	399.3378	116.6	33.345
2013	54.3	55	795.5928	389.2359	117.7	35.13667

year	cpi	gold price	inflation	gbi	ordersinde
2009	120.7233	972.98	0.224167	96.00467	51.9
2010	152.3075	1224.67	0.1225	104.4999	59.3
2011	192.4058	1568.33	0.244167	117.0863	56.4
2012	186.2617	1668.98	0.145	124.716	53.1
2013	183.3167	1630.47	0.125833	125.2988	57.2

Correlation between BDI and Harpex:

year		bdi		harpex
2010		1139.31		697.3038
2011		1268.89		697.9882
2012		945.0379		399.3378
2013		795.5928		389.2359

Correlation= 0.929322

Interpretation:

From the above correlation analysis, it is clear that BDI and Harpex are positively very high correlated.

Correlation between BDI and MSCI:

year		bdi		msci
2009		946.7345		27.3733
2010		1139.31		32.6325
2011		1268.89		34.8275
2012		945.0379		33.345
2013		795.5928		35.13667

Correlation= 0.136184

Interpretation:

From the above analysis it is clear that BDI and MSCI are positively very low correlated.

Correlation between BDI and gold:

year		bdi		gold price
2009		946.7345		972.98
2010		1139.31		1224.67
2011		1268.89		1568.33
2012		945.0379		1668.98
2013		795.5928		1630.47

Correlation= -0.08719

Interpretation:

From the above analysis it is clear that BDI and gold are negatively very high correlated.

Correlation between Harpex and MSCI:

year		harpex		msci
2010		697.3038		32.6325
2011		697.9882		34.8275
2012		399.3378		33.345
2013		389.2359		35.13667

Correlation= -0.26022

Interpretation:

From the above correlation analysis it is clear that Harpex and MSCI are negatively low correlated.

Correlation between Harpex and gold:

year		harpex		gold price
2010		697.3038		1224.67
2011		697.9882		1568.33
2012		399.3378		1668.98
2013		389.2359		1630.47

Correlation= -0.71623

Interpretation:

From the above analysis it is clear that Harpex and Gold are negatively very high correlated.

1. **Linear regression analysis (BDI – MSCI , BDI – Gold)**

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.482[a]	.232	-.536	229.77095

a. Predictors: (Constant), MSCI, GOLD

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31933.537	2	15966.769	.302	.768[a]
	Residual	105589.379	2	52794.689		
	Total	137522.916	4			

a. Predictors: (Constant), MSCI, GOLD

b. Dependent Variable: BDI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-123.529	1683.719		-.073	.948
	GOLD	-.628	.841	-1.024	-.746	.533
	MSCI	62.131	81.228	1.050	.765	.524

a. Dependent Variable: BDI

Interpretation:
The above table shows that R square is 23% which is slightly correlated and less than the slap value i.e; 60% and whereas gold t-stat value is negative and MSCI t-stat value is positive which indicates that the MSCI is expected to go upside and at the same point of time gold is expected to go downside in near future.

Regression analysis (Harpex – MSCI , Harpex – gold)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.940[a]	.884	.769	138.22719

a. Predictors: (Constant), GOLD, MSCI

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	292327.988	2	146163.994	7.650	.116[a]
	Residual	38213.515	2	19106.757		
	Total	330541.502	4			

a. Predictors: (Constant), GOLD, MSCI

b. Dependent Variable: HARPEX

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.082	138.024		.001	1.000
	MSCI	52.680	21.266	2.792	2.477	.132
	GOLD	-.817	.460	-2.000	-1.774	.218

a. Dependent Variable: HARPEX

Interpretation:

The above analysis of weighted least square method has been applied to MSCI and gold movements with harpex index. The multiple R is found to be above the base value (60%)

which is 88%. MSCI t-stat value is positive and the gold value is negative with less standard error which shows that MSCI is expected to go upside and gold is expected to fall.

Investment Bankers across the world started accepting Harpex index that it is more pure indicator than the BDI. In the above analysis harpex weightage is found to be more than BDI when calculating the weight estimation in regression analysis.

Philip Peron test:

Null Hypothesis: BDI has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.862364	0.6794
Test critical values:	1% level	-6.423637	
	5% level	-3.984991	
	10% level	-3.120686	

Interpretation:

The above analysis of Phillip-Perron test has been applied in order to find the effect to integrate the time series analysis on BDI with GDP. The adjusted t-stat value is negative but the value is more than all critical levels. It shows that GDP has affected the BDI during the analysis period.

Residual variance (no correction)	31960.70
HAC corrected variance (Bartlett kernel)	31960.70

Phillips-Perron Test Equation

Dependent Variable: D(BDI)

Method: Least Squares

Sample (adjusted): 2 5

Included observations: 4 after adjustments

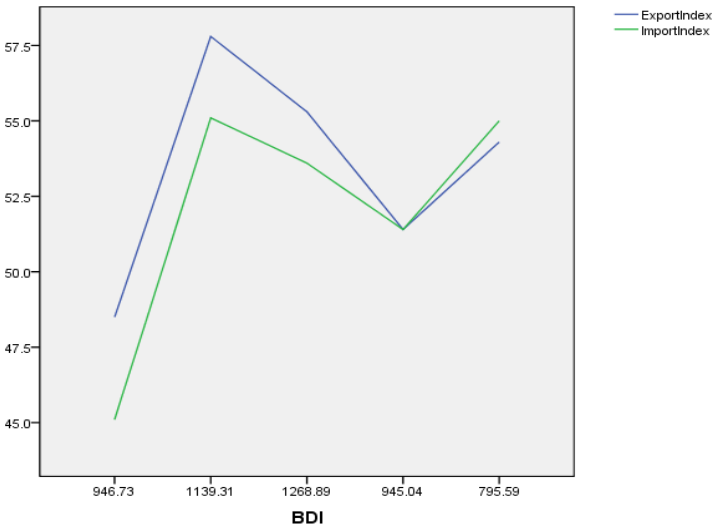
Variable	Coefficient	Std. Error	t-Statistic	Prob.
BDI(-1)	-0.795751	0.922755	-0.862364	0.4794
C	817.6410	999.9773	0.817660	0.4995

R-squared	0.271050	Mean dependent var	-37.78542
Adjusted R-squared	-0.093425	S.D. dependent var	241.7846
S.E. of regression	252.8268	Akaike info criterion	14.21014
Sum squared resid	127842.8	Schwarz criterion	13.90329
Log likelihood	-26.42028	Hannan-Quinn criter.	13.53677
F-statistic	0.743672	Durbin-Watson stat	1.077936
Prob(F-statistic)	0.479375		

Interpretation:

The above analysis of Phillip-Perron test has been used to find the inflation effect on BDI and it has been observed that t-statistic value is negative with lower probability which indicates that the BDI movement was not influenced with these figures.

Sequence chart of BDI with exports and imports :



Interpretation:

The above chart depicts the picture of sequence movements of exports and imports with BDI. It has been observed that initially exports dominated the imports, but at the end of the period imports have taken over the exports.

Impact of BDI on MSCI and global bond index:

year		bdi		gbi
2009		946.7345		96.00467
2010		1139.31		104.4999
2011		1268.89		117.0863
2012		945.0379		124.716
2013		795.5928		125.2988

Skewness = 0.221554
Kurtosis = -2.09968
Regression equation :
x-intercept = 1426.76
slope = -3.59093
y=125.2988+((-3.59093)*1426.76)

Interpretation:

The above analysis of skewness is positively right skewed, which indicates that BDI (economy) may influence the bond market (GBI)

The kurtosis analysis has been applied between BDI and GBI and the value is negative which is plato cut. Hence the data is not normally distributed.

Regression equation has been applied between BDI and GBI, the 'y' value is nearly 5000 which indicate that the GBI index is expected to perform very well in near future.

year		bdi	msci
2009		946.7345	27.3733
2010		1139.31	32.6325
2011		1268.89	34.8275
2012		945.0379	33.345
2013		795.5928	35.13667

Skewness = 0.190015
Kurtosis = -2.17214
Refression equation :
x-intercept : 755.8171
slope : 8.060986
y=35.13667+(8.060986*755.8171)

Interpretation:

The above analysis of skewness is positively right skewed, which indicates that BDI (economy) may influence the MSCI (equity)

The kurtosis analysis has been applied between BDI and MSCI and the value is negative which is plato cut. Hence the data is not normally distributed.

Regression equation has been applied between BDI and MSCI, the 'y' value is nearly 6128 which indicate that the MSCI index is expected to perform very well in near future.

Sterling and mar ratio

year		bdi	msci
2009		946.7345	27.3733
2010		1139.31	32.6325
2011		1268.89	34.8275
2012		945.0379	33.345
2013		795.5928	35.13667

Variables	Compounded annual return =sum of all returns	Maximum possible loss=lowest return	Max possible loss in %	Sterling ratio= Compounded annual return/(max possible loss – 10%)

BDI	5095.565	795.5928	15.61344	907.7445
MSCI	163.315	27.37333	16.76106	24.15523

Variables	Compounded annual return =sum of all returns	Maximum drawdown= Highest return- Lowest return	Max drawdown in %	Mar ratio= Compounded annual return/(max drawdown loss – 10%)
BDI	5095.565	473.2972	9.288414	5096.277
MSCI	163.315	7.76334	4.753599	-31.129

Interpretation:

For the above analysis of BDI and MSCI performance measure tools has been applied. Sterling and Mar ratio shows that BDI performance is superior to the MSCI. It has been proven again that BDI is pure economic indicator than MSCI.

Findings:

1. From sterling and mar ratio it has been proven that BDI is pure economic indicator than MSCI.
2. BDI may influence the bond market (global bond index).
3. From the regression equation, it has been observed that the global bond index may perform very well in near future.
4. By observing the sequence charts it was clear that initially exports dominated imports but by the end of the analysis period imports had over took exports.
5. From the Phillip-Perron test it was observed that GDP has affected the BDI during the analysis period.
6. From Phillip-Perron test it has been observed that inflation has not affected BDI during the analysis period.
7. By observing the weighted least square method it was clear that MSCI has a positive value and gold has a negative value which indicates that MSCI is expected to perform well in near future and gold prices are expected to fall.

8. From the weighted least square method by comparing BDI and Harpex it was clear that Harpex was pure and better economic indicator than BDI
9. From skewness between BDI and MSCI it has been observed that BDI may influence MSCI.
10. From the regression equation of BDI and MSCI it was observed that MSCI may perform well in near future.
11. From the correlation analysis between BDI and Harpex it was clear that BDI and Harpex are positively very high correlated.
12. From the correlation analysis between BDI and MSCI it was found that BDI and MSCI are positively very low correlated, whereas between Harpex and MSCI it was clear that Harpex and MSCI are negatively low correlated.
13. From the correlation analysis between BDI and gold it was clear that BDI and gold are negatively very high correlated, whereas between Harpex and gold it can be observed that Harpex and gold are negatively very high correlated.

Conclusion:

I conclude the analysis of Baltic Dry Index where it has been proven through my analysis once again that BDI is better economic indicator of the future market. Gold investors can depend on BDI to find the future movements. In the year 2012 Baltic Dry Index predicted the downfall of international gold prices. My analysis with inflation and world GDP has predicted that BDI will go upside and BDI predicted world equity market, employee's data and exports to fall in the year 2013. So there is further scope to do research in this area for the better usage of BDI to take inbound decision for the global investment.

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