

STOCK INDEX OPTIONS IN GLOBAL DERIVATIVES MARKETS-SOME ISSUES

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ABSTRACT

In global markets options are one of the derivatives familiarized known as the option contracts. Option is the right but not an obligation. The main objectives of this paper are to test whether there is any significant difference between one region of exchange to another region of exchange in terms of number of contracts traded of stock index options, national value of contracts and option premium of stock index option and also wanted to know the relationship between each other along with the suitable suggestions to have a better performance of stock index options. The data extracted from the SEBI-Hand Book statistics 2018 and the whole data synchronized in to three regions namely Americas, Asia-Pacific and Europe–Africa and Middle East. The study found that weak relationship, and negatively correlated between the regions of Americas exchanges to the Asia – Pacific exchanges, and also found that there was a significant difference between each other. Finally, it is suggested to introduce the new product mix along with the stock index options to view a better per formation regarding the minimization of risk.

Key words: *derivates, significance, contracts, SEBI handbook, correlated, negatively, stock index.*

- 1. Introduction:** Derivative is a financial instrument, which derives its value from some other asset which is called as the underlying asset. The underlying asset consists of commodities, foreign exchange, bonds, stock

indices etc. in case of pepper derivatives pepper futures the underlying asset is pepper¹. The best examples of derivatives are futures, options, swaps options, interest rate derivatives and others such as credit derivatives, exotic options etc. Option is the right, but not an obligation. Option holder may be perform or may not perform the option at maturity date. To acquire such a beautiful right the option holder has to pay the option premium to the other party². Where the right is belong to the purchase of security, it is called as call option, where it is relevant to sale of security, it is called as put option. The option premium consists of intrinsic value and time value. In buyer's point of view, where $CMP > EP$ exercise price is considered as a In -The-Money, where $CMP = EP$, are neutral or AT-The-Money the money and $CMP < EP$ is out of the money. In seller's point of view In- The- Money is relevant to $EP > CMP$. At the money $EP = MP$ and out of the money $EP < CMP$. The stock index option is the one of the beautiful options contracts in the international derivatives market. The present study more emphasized on stock index option in different regions of the stock exchanges³.

2. **Review of the Literature** : Shigenori Shiratsuka(2001)⁴,opined that the information contained in an implied probability distribution is difficult to interpret automatically as an information variable for monetary policy, and further studies are needed on how to make use of information contained in implied probability distributions ZH. (2003)⁵ conclude that index option can reduce effectively the system risk of the investment portfolio with the lower cost. Liyan H. and Jie W. (2009)⁶ show that the stock index option has a promotion effect to stock index futures and formulate the stock index option and futures portfolios. ,Hankuk ,In Joon

Kim , Yonsei and Seung Oh Nam , Asian, South Korea (2009)⁷ found that stock index prices lead implied index prices estimated from option prices using both BS and Heston⁸ models. In regards to the OTM options, the lead-effect of real stock index to implied index prices holds and also it was shown that there was a weak rise in the lead effect of the options to the stock index, but the lead effect of stock index market rules over that of the options market. Janne Aijo (2011)⁹ emphasized that option-implied return distributions become more left skewed throughout the week, whereas kurtosis of the expected return distribution decreases on Tuesdays and increases on Fridays. Some of this variation in market expectations across the week can be explained by the clustered information, i.e. scheduled macroeconomic news announcements, and by investors learning process. Once these impacts are taken into account the DOW effect diminishes, suggesting that the effect is largely caused by the arrival and processing of information reflected in trading patterns. Haim Shalit, Doron Greenberg(2013)¹⁰, emphasized that increasing the risk aversion used in the computation reduces the size of the hedge ratio, implying that less put options are needed to hedge away each and every security. Jerry Coakley, George Dotsis, Xiaoquan Liu, Jia Zhai¹¹ opined that the growth index option prices are affected by sentiment measures. There was a significant positive relationship between sentiment measures and the RNS estimated from four growth index options and a negative relationship had taken place between two value index options. The results are economically significant since an associated long-short trading strategy contributes high abnormal returns and these returns provide evidence of a value premium type anomaly in the index options markets¹².

3. Objectives of the study: After studying the existing literature the following objectives were framed

- 1) To test whether there is any significant difference regarding number of contracts traded of stock index options of American exchanges to the number of contracts traded of Stock Index options of Asia – Pacific exchanges.
- 2) To test whether there is any significant difference regarding notional value of contracts traded of Stock Index Options of Americas exchanges to the notional value of contracts traded of Stock Index Options of Asia – Pacific and from the region of Asia – Pacific to the Europe – Africa and Middle East to the Americas.
- 3) To know the relationship between from one region of exchanges to another region of exchanges in terms of number of contracts traded, notional value of contracts traded, open interest in number of contracts, option premium of Stock Index Options.
- 4) To offer a suitable suggestions to better performance of Stock Index Options under the purview of the International Derivatives Market.

4. Methodology of the Study : The data collected from the SEBI hand book statistics of 2013 PP.236, the whole data synthesized into a three regions namely, Americas, Asia – Pacific and Europe – Africa and Middle East. The American, BM&FBOVESPA, Bourse de Monteral, CBOE, CME, ICE futures US, ISE, Mexder, NASDAQ OMX, NASDAQ OMX PHLX, NYSE Euronext (US) constitute the American exchanges. The ASX derivatives trading, ASX SFE derivatives trading, Hongkong, Osaka, Tokyo, Korea, Singapore, TAIFEX and Thailand constituted as a Asia – Pacific exchanges. The Athense, BME Spanish, BORSA Italiana, Deutsche Borse¹³, Johannesburg, London, NASDAQ OMX Nordic, NYSE Euronex (Europe), Oslo Bars, Tel Aviv, Warsaw and Wiener Borse¹⁴ constituted as a Europe – Africa and Middle

East exchanges. The SPSS 16.0 version was used to derive the results. The paired sample statistics, paired sample correlations and paired samples tests applied to derive the results.

5. Hypothesis :

Hypothesis-1 :

Null Hypothesis (Ho) : There is no significant difference between number of contracts traded of Stock Index Options of Americas exchanges to the number of contracts traded of Asia – Pacific exchanges.

Hypothesis-2 :

Null Hypothesis (Ho) : There is no significant difference between number of contracts traded of Stock Index Options of Asia – Pacific exchanges to the number of contracts traded of Europe – Africa and Middle East.

Hypothesis-3 :

Null Hypothesis (Ho) : There is no significant difference between Europe – Africa and Middle East exchanges to America's exchanges in terms of number of contracts traded of Stock Index Options.

Hypothesis-4 :

Null Hypothesis (Ho) : There is no significant difference between notional value of contracts traded of Stock Index Options of Americas exchanges to the notional value of contracts traded of Stock Index options of Asia – Pacific exchanges.

Hypothesis -5 :

Null Hypothesis (Ho) : There is no significant difference between notional value of contracts traded of Stock Index Options of Asia – Pacific exchanges to the notional value of contract traded of Stock Index Options of Europe – Africa and Middle East exchanges.

Hypothesis-6 :

Null Hypothesis (Ho) : There is no significant difference between notional value of contracts traded of stock index options of Europe – Africa and Middle East exchanges to the national value of contracts traded of Stock Index Options of American exchanges.

Table 1: Information Regarding International Derivatives Market(Stock Index Options- Number of Contracts Traded) of the Various Exchanges of Different Regions in the World from the Year 2013-2021(US\$Million)

Year	Americas	Asia-Pacific	Europe-Africa-Middle East
2013	227282070	2647013324	314665733
2014	221176224	2551305413	379077460
2015	299298297	2851550553	558147817
2016	323119996	2905913010	711374155
2017	247905520	3043838229	563857508
2018	265825187	3685245824	527916176
2019	395319097	3871637032	636139045
2020	383511161	1766467489	506751475
2021	480381705	785793747	443447570

Source: World Federation of Exchanges, Hand Book Statistics 2021,SEBI,PP:232

Analysis: The above table reflects the information of Stock Index Options with reference to number of contracts traded in various exchanges which are located in different regions, there exchanges are consolidated in to a Americas Exchanges, Asia-Pacific exchanges and Europe – Africa and Middle East exchange.

Out Put Table 2: Paired Samples Statistics of America,Asia-Pacific and Europe-Africa-Middle East Exchanges

Pair No	Name of Region	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Americas	3.1598 E8	9	8.81880E7	2.93960E7
	Asia-Pacific	2.6788 E9	9	9.40981E8	3.13660E8
Pair 2	Asia-Pacific	2.6788 E9	9	9.40981E8	3.13660E8
	Europe-Africa-Middle East	5.1571 E8	9	1.23210E8	4.10699E7
Pair 3	Europe-Africa-Middle East	5.1571 E8	9	1.23210E8	4.10699E7
	Americas	3.1598 E8	9	8.81880E7	2.93960E7

Source: SPSS

Output Table-2 : The above table depicts that the paired samples statistics of America, Asia – Pacific and Europe – Africa and Middle East exchanges. The mean value (3.1598) of Americas exchange was higher than that of the Asia – Pacific exchanges, it was evident that the higher number of contracts traded in Americas exchanges than Asia – Pacific exchanges, exchanges of Europe – Africa and Middle East was higher than the Asia – Pacific

exchanges and the Europe – Africa and Middle East was higher than the Americas. Hence, it can be concluded that the higher number of contracts traded of Stock Index happened regarding Europe – Africa and Middle East, followed by the Americas and Asia – Pacific exchange.

Out Put Table 3: Paired Samples Correlations of Americas, Asia-Pacifics and Europe-Africa-Middle East Exchanges

Pair No	Name of Region	N	Correlation	Sig.
Pair 1	Americas & Asia-Pacific	9	-.512	.159
Pair 2	Asia-Pacific & Europe-Africa-Middle East	9	.425	.254
Pair 3	Europe-Africa-Middle East & Americas	9	.284	.460

Source: SPSS

Output Table-3: The above table shows that the relationship between the two exchanges. It tells us that the Americas exchanges and Asia – Pacific exchanges were negatively correlated with each other and in significant between each other. There was a weak relationship existed between exchanges of Asia – Pacific to the exchanges of Europe – Africa and Middle East, and these were also insignificant to each other, and the moderate relationship existed between Europe – Africa and Middle East to the Americas exchanges. Finally, it can be concluded that there was no strong relationship between number of contracts traded in one stock exchange to another stock exchange.

OutPut Table 4: Paired Samples Test of Americas, Asia-Pacific and Europe-Africa-Middle East Exchanges.

Pair No	Name of Region	Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Americas - Asia-Pacific	-2.36277E9	9.89034E8	3.29678E8	-3.12301E9	1.60253E9	-7.167	8	.000
Pair 2	Asia-Pacific - Europe-Africa-Middle East	2.16304E9	8.95606E8	2.98535E8	1.47462E9	2.85147E9	7.246	8	.000
Pair 3	Europe-Africa-Middle East - Americas	1.99729E8	1.29592E8	4.31974E7	1.00115E8	2.99342E8	4.624	8	.002

Source: SPSS

Output Table-3 : The above table tests whether there is any significant difference from one exchanges to another exchanges.

Null Hypothesis (Ho) : There is no significant difference between number of contracts traded of Stock Index Options of Americas exchanges to the number of contracts traded of Stock Index Options of Asia – Pacific exchanges.

Alternative Hypothesis (Ha) : There is a significant difference between number of contracts traded of Stock Index Options of Americas exchanges to the number of contracts traded of Stock Index Options of Asia – Pacific exchanges.

Analysis : The value of t was -7.167, df was 8 and significant value was 0.000, hence, it can be concluded that the proposed null hypothesis was rejected and alternative hypothesis was accepted and inferred that there was a significant difference from Americas exchanges to the Asia – Pacific exchanges.

Hypothesis-2 :

Null Hypothesis (Ho) : There is no significant difference between number of contracts traded of Stock Index Options of Asia – Pacific exchanges to the number of contracts traded of Europe – Africa - Middle East.

Alternative Hypothesis (Ha) : There is no significant difference between number of contracts traded of Stock Index Options of Asia – Pacific exchanges to the number of contracts traded of Europe – Africa - Middle East

Analysis : The value of t was 7.246, df was 8 and significant value was 0.000, hence, it can be concluded that the proposed null hypothesis was not accepted and alternative hypothesis presumed as accepted and confirmed that there was a significant difference from Americas exchanges to the Asia – Pacific exchanges.

Hypothesis-3 :

Null Hypothesis (Ho) : There is no significant difference between Europe – Africa and Middle East exchanges to America's exchanges in terms of number of contracts traded of Stock Index Options.

Alternative Hypothesis (Ha) : There is no significant difference between Europe – Africa and Middle East exchanges to America's exchanges in terms of number of contracts traded of Stock Index Options

Analysis : The value of t was 4.624, df was 8 and significant value was 0.02, hence, it can be concluded that the proposed null hypothesis was rejected and alternative hypothesis was accepted and came to know that there was a significant difference from Americas exchanges to the Asia – Pacific exchanges.

Input Table 5: Information Regarding International Derivatives Market (Stock Index Options- Notional Value of Contracts Traded) of the Various Exchanges of Different Regions in the World from the Year 2013-2021 (US\$ Million)

Year	Americas	Asia-Pacific	Europe-Africa-Middle East
2013	14851203	35407830	9089392
2014	22821889	45951017	16150233
2015	35950525	65851173	31029519
2016	32392287	37666134	31298590
2017	20234618	49589512	20104089
2018	27735531	74538124	21974253
2019	34117523	86995128	22119458
2020	33143610	45474621	18183696
2021	10216078	74225945	18777189

Source: World Federation of Exchanges, Hand Book Statistics 2021, SEBI, PP233

Input Table-5: This table reflects the information of notional value of contracts traded of Stock Index Options from the year 2013 to 2021 in terms of US & Million. There was a mixed response from the date of one year to another year.

Output Table-6 : Paired Samples Statistics of Different Exchanges

Pair No	Name of Region	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Americas	2.5718 E7	9	9.19147E6	3.06382E6
	Asia-Pacific	5.7300 E7	9	1.84777E7	6.15924E6
Pair 2	Asia-Pacific	5.7300 E7	9	1.84777E7	6.15924E6
	Europe-Africa- Middle East	2.0970 E7	9	6.96333E6	2.32111E6
Pair 3	Europe-Africa- Middle East	2.0970 E7	9	6.96333E6	2.32111E6
	Americas	2.5718 E7	9	9.19147E6	3.06382E6

Output Table-6: This table shows the paired samples statistics of different exchanges in terms of mean, N, Standard deviation and Std. error mean. The notional value of Stock Index Options regarding Asia – Pacific exchanges were higher than the exchanges of the Americas exchanges and the Asia – Pacific exchanges were higher than that of Europe – Africa and Middle East, and Americas exchanges were higher than that of Europe – Africa and Middle East.

Output Table-7: Paired Samples Correlations of Different Exchanges of Different Regions

Pair No	Name of Region	N	Correlation	Sig.
Pair 1	Americas & Asia-Pacific	9	.150	.701
Pair 2	Asia-Pacific & Europe-Africa-Middle East	9	.245	.526
Pair 3	Europe-Africa-Middle East & Americas	9	.673	.047

Source : SPSS

Output Table-7: This table shows the relationship between Americas exchanges to the Asia – Pacific exchanges. The study observed that there was no relationship existed between Americas exchanges to the Asia – Pacific exchanges, and the moderate relationship existed between Asia – Pacific exchanges to the Europe – Africa and Middle East and the strong relationship existed between Europe – Africa and Middle East exchanges to the Americas exchanges.

Output Table-8: Paired Samples Test of Different Exchanges of Different Regions

Pair No	Different Region	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Americas - Asia-Pacific	-3.15818E7	1.93657E7	6.45524E6	-4.64676E7	-1.66960E7	-4.892	8	.001
Pair 2	Asia-Pacific - Europe-Africa-Middle East	3.63303E7	1.80809E7	6.02698E6	2.24321E7	5.02286E7	6.028	8	.000
Pair 3	Europe-Africa-Middle East - Americas	-4.74854E6	6.84141E6	2.28047E6	-1.00073E7	5.10234E5	-2.082	8	.071

Source : SPSS

Output Table-8:

Null Hypothesis (Ho) : There is no significant difference between notional value of contracts traded of Stock Index Options of Americas exchanges to the notional value of contract traded of Stock Index Options of Asia – Pacific exchanges.

Alternative Hypothesis (Ha) : There is a significant difference between notional value of contracts traded of Stock Index Options of Americas exchanges to the notional value of contracts traded of Stock Index Options of Asia – Pacific exchanges.

Analysis : The value of t was 4.892 at df was 8 and significant at 0.001, hence it can be evident that the proposed null hypothesis was rejected and the alternative hypothesis was accepted and concluded that there was a significant difference between Americas exchanges to the Asia – Pacific exchanges.

Null Hypothesis (Ho) : There is no significant difference between notional value of contracts traded of Stock Index Options of Asia – Pacific exchanges to the notional value of contracts traded of Stock Index options of Europe – Africa and Middle East exchange.

Alternative Hypothesis (Ha) : There is a significant difference between notional value of contracts traded of Stock Index Options of Asia – Pacific exchanges to the notional value of contracts traded of Stock Index Options of Europe – Africa and Middle East Exchange.

Analysis : The value of t was 6.028 at df was 8 and significant value was 0.000, hence the proposed null hypothesis was accepted and confirmed that there was a significant difference from Asia – Pacific exchanges to the Europe – Africa and Middle East exchanges.

Null Hypothesis (Ho) : There is no significant difference between Europe – Africa and Middle East exchanges to the Americas exchanges.

Alternative Hypothesis (Ha) : There is a significant difference between exchanges of Europe – Africa and Middle East to the Americas exchanges in terms of Notional Value of contracts traded of Stock Index Options.

Analysis : The value of t was -2.082 at df was 8 and significant value was 0.071, and observed that the proposed null hypothesis was rejected and alternative hypothesis was accepted and confirmed that there was a significant difference from exchanges of Europe – Africa and Middle East to the exchanges of Americas.

Findings of the Study:

- 1) The higher number of contracts traded of Stock Index happened regarding Europe – Africa and Middle East followed by the Americas and Asia – Pacific exchanges.

- 2) The study found that the weak relationship existed between the number of contracts traded of Stock Index options of Europe – Africa and Middle East exchanges to the Americas exchanges and the moderate relationship existed between Asia – Pacific to Europe – Africa and Middle East and negatively correlated from the Americas exchanges to the Asia – Pacific exchanges.
- 3) There was a significant difference from number of contracts traded of Stock Index Options of Europe – Africa -Middle East exchanges to the Americas exchanges , and from Americas exchanges to the Asia – Pacific exchanges, and also from Europe – Africa - Middle East exchanges to the Americas exchanges.
- 4) The study also found that notional value of contracts traded of Stock Index Option regarding Asia – Pacific exchanges were more than the Americas exchanges and Europe – Africa - Middle East exchanges.
- 5) The study also found that there was a strong relationship existed between Europe – Africa -Middle East exchanges to the Americas exchanges, and no relationship was existed between Americas exchanges to the Asia – Pacific exchanges and the weak relationship existed between Asia – Pacific and Europe – Africa - Middle East.
- 6) The study also observed that there was a significant difference between Americas exchanges to the Asia – Pacific exchanges and from Asia – Pacific exchange to the Europe – Africa -Middle East, but there was no significant difference between Europe – Africa -Middle East to Americas exchanges in terms of notional value of contracts traded of Stock Index options.
- 7) The study also came to know that notional value of contracts traded of Stock Index Options shows the strong relationship between Europe – Africa - Middle East exchanges to the Americas exchanges, and there was no relationship between Americas exchanges to the Asia – Pacific exchanges and hold a moderate relationship between Asia – Pacific exchanges to the Europe – Africa - Middle East exchange, and also found that there was a significant difference between each other.

Conclusion and Suggestions : Finally concluded that there was a weak relationship between one region of exchange to another region of exchanges in terms of number of contract traded ,notional value of contracts traded, open interest in number of contracts and option premium of stock index options. Hence, it is suggested to introduce the new product mix along with the Stock Index Option to view a better performance in the international derivatives market.



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