

A STUDY ON TESTING OF EFFICIENT MARKET HYPOTHESIS WITH SPECIAL REFERENCE TO SELECTIVE INDICES IN THE GLOBAL CONTEXT: AN EMPIRICAL APPROACH

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ABSTRACT

The word efficiency is quite difficult to get attached with stock market operations across the globe. The study of stock market efficiency has become a debatable issue since the last few years. The result of the debate ends with mixed evidence. Some studies in this area revealed that the stock markets are efficient at least in the weak form, other studies cast doubt on the above conclusion. The term market efficiency examines the degree, the pace and the accuracy of the available information being embedded in to security prices. Reilly and Brown (1997) define “an efficient market as one in which the stock prices adjust rapidly when new information arise and, therefore, the current prices of stocks have already reflected all information about the stock thus the market leaves more pattern to secure economic gains”. Fama (1970) defines “an efficient market as a market in which prices always reflect the recent available information and states that three different levels of efficiency exist based on available information – the weak, the semi strong and the strong forms”. Stock market efficiency at weak form suggests that the stock prices incorporate all information which implies that no one can exploit trading opportunities and end up with excess profit. In other words we can say that stock prices follow a random walk theory.

In this context, the efficiency of the various global stock markets is tested in this study by the way of taking the respective indices of the stock market and employ a relevant statistical tool to find out whether successive index change is independent or not. The basic notion of taking indices to test the efficiency of the stock market is to reveal that the index of a stock market is based on market capitalization, which in turn comprises of price of the select script and the volume of trading of the select script. Any change in the price of the script will lead to change the index of the market. The movement of the index in a way or other depends on price of the select scripts. By keeping the idea in the mind this paper is an attempt to trace the efficiency of the global stock market at weak form with the help of movement of indices over a period of time.

Key words: Efficient Market, Indices, Market Capitalization, Random Walk Theory.

Introduction

The word efficiency is quite difficult to get attached with stock market operations across the globe. The study of stock market efficiency has become a debatable issue since the last few years. The result of the debate ends with mixed evidence. Some studies in this area revealed that the stock markets are efficient at least in the weak form, other studies cast doubt on the above conclusion. The term market efficiency examines the degree, the pace and the accuracy of the available information being embedded in to security prices. Reilly and Brown (1997) define “an efficient market as one in which the stock prices adjust rapidly when new information arise and, therefore, the current prices of stocks have already reflected all information about the stock thus the market leaves more pattern to secure economic gains”. Fama (1970) defines “an efficient market as a market in which prices always reflect the recent available information and states that three different levels of efficiency exist based on available information – the weak, the semi strong and the strong forms”. Stock market efficiency at weak form suggests that the stock prices incorporate all information which implies that no one can exploit trading opportunities and end up with excess profit. In other words we can say that stock prices follow a random walk theory.

In this context, the efficiency of the various global stock markets is tested in this study by the way of taking the respective indices of the stock market and employ a relevant statistical tool to find out whether successive index change is independent or not. The basic notion of taking indices to test the efficiency of the stock market is to reveal that the index of a stock market is based on market capitalization, which in turn comprises of price of the select script and the volume of trading of the select script. Any change in the price of the script will lead to change the index of the market. The movement of the index in a way or other depends on price of the select scripts. By keeping the idea in the mind this paper is an attempt to trace the efficiency of the global stock market at weak form with the help of movement of indices over a period of time.

Objectives of the study

- To find the changes of index value with respect to selective global stock exchanges
- To test whether the successive index value changes are independent or not
- To test the stock market efficiency at weak form in the selective stock markets

Research methodology

- The study type is empirical
- The sample design is based on judgmental
- The type of data is secondary
- The sample size includes ten index values of different countries' stock markets
- Run test is applied to as to test the efficiency of the stock market at weak form at a given level of significance where $Z=1.96$

Research plan

In this paper so as to test the efficiency of the stock market at weak form, the weekly closing value of selective indices were taken from different countries' stock market from January 2010 to Dec 2010 and the run test was applied.

Run test: given a series of market indices changes, each index change is designated as a plus (+) if it represent an increase or a minus (-) if it represents a decrease. A run occurs when there is no difference between the sign of two changes. When the sign of change differs, the run ends and a new run begin (observed runs).

Limitations of the study

- The findings are on the basis of run test hence findings are subject to the limitation of non parametric test
- Findings are applicable in the situations which prevail during the year 2010. it should be taken in the light of the above fact

Table 1.1 showing the Weekly index value of stock exchanges of USA, Japan, China & South Korea from January 2010 to December 2010

NASDAQ-100			NIKKEI 225		SSE Composite Index		KOSPI Composite Index	
S.NO	DATE	VALUE	DATE	VALUE	DATE	VALUE	DATE	VALUE
1	28-Dec-09	1,878.18	28-Dec-09	10,634.23	28-Dec-09	1,186.20	28-Dec-09	1,685.59
2	4-Jan-10	1,892.59	4-Jan-10	10798.32	4-Jan-10	1,187.86	4-Jan-10	1,695.26
3	11-Jan-10	1,864.52	11-Jan-10	10982.1	11-Jan-10	1,226.72	11-Jan-10	1,701.80
4	19-Jan-10	1,794.82	19-Jan-10	10590.55	18-Jan-10	1,161.89	18-Jan-10	1,684.35
5	25-Jan-10	1,741.04	25-Jan-10	10198.04	25-Jan-10	1,120.45	25-Jan-10	1,602.43
6	1-Feb-10	1,746.12	1-Feb-10	10057.09	1-Feb-10	1,097.12	1-Feb-10	1,567.12
7	8-Feb-10	1,779.11	8-Feb-10	10092.19	8-Feb-10	1,130.52	8-Feb-10	1,593.66
8	16-Feb-10	1,823.32	16-Feb-10	10123.58	22-Feb-10	1,172.33	16-Feb-10	1,593.90
9	22-Feb-10	1,818.68	22-Feb-10	10126.03	1-Mar-10	1,161.42	22-Feb-10	1,594.58
10	1-Mar-10	1,888.56	1-Mar-10	10368.96	8-Mar-10	1,147.44	2-Mar-10	1,634.57
11	8-Mar-10	1,924.43	8-Mar-10	10751.26	15-Mar-10	1,181.50	8-Mar-10	1,662.74
12	15-Mar-10	1,932.43	15-Mar-10	10824.72	22-Mar-10	1,186.23	15-Mar-10	1,686.11
13	22-Mar-10	1,952.63	22-Mar-10	10996.37	29-Mar-10	1,234.53	22-Mar-10	1,697.72
14	29-Mar-10	1,959.56	29-Mar-10	11286.09	6-Apr-10	1,249.88	29-Mar-10	1,723.49
15	5-Apr-10	1,994.43	5-Apr-10	11204.34	12-Apr-10	1,229.72	5-Apr-10	1,724.47
16	12-Apr-10	2,012.84	12-Apr-10	11102.18	19-Apr-10	1,204.44	12-Apr-10	1,734.49
17	19-Apr-10	2,055.33	19-Apr-10	10914.46	26-Apr-10	1,112.68	19-Apr-10	1,737.03
18	26-Apr-10	2,000.63	26-Apr-10	11057.4	4-May-10	1,064.17	26-Apr-10	1,741.56
19	3-May-10	1,849.44	3-May-10	10364.59	10-May-10	1,039.64	3-May-10	1,647.50
20	10-May-10	1,907.10	10-May-10	10462.51	17-May-10	1,008.48	10-May-10	1,695.63
21	17-May-10	1,822.77	17-May-10	9784.54	24-May-10	1,062.78	17-May-10	1,600.18
22	24-May-10	1,852.39	24-May-10	9762.98	31-May-10	1,034.93	24-May-10	1,622.78
23	1-Jun-10	1,832.04	1-Jun-10	9901.19	7-Jun-10	1,066.10	31-May-10	1,664.13
24	7-Jun-10	1,847.15	7-Jun-10	9705.25	17-Jun-10	1,011.66	7-Jun-10	1,675.34
25	14-Jun-10	1,913.48	14-Jun-10	9995.02	21-Jun-10	1,028.61	14-Jun-10	1,711.95
26	21-Jun-10	1,838.52	21-Jun-10	9737.48	28-Jun-10	925.68	21-Jun-10	1,729.84
27	28-Jun-10	1,728.34	28-Jun-10	9203.71	5-Jul-10	984.32	28-Jun-10	1,671.82
28	6-Jul-10	1,814.79	6-Jul-10	9585.32	12-Jul-10	969.47	5-Jul-10	1,723.01
29	12-Jul-10	1,803.48	12-Jul-10	9408.36	19-Jul-10	1,039.02	12-Jul-10	1,738.45
30	19-Jul-10	1,875.38	19-Jul-10	9430.96	26-Jul-10	1,075.45	19-Jul-10	1,758.06
31	26-Jul-10	1,864.00	26-Jul-10	9537.3	2-Aug-10	1,107.44	26-Jul-10	1,759.33
32	2-Aug-10	1,902.88	2-Aug-10	9642.12	9-Aug-10	1,102.80	2-Aug-10	1,783.83

33	9-Aug-10	1,818.80	9-Aug-10	9253.46	16-Aug-10	1,117.33	9-Aug-10	1,746.24
34	16-Aug-10	1,825.75	16-Aug-10	9179.38	23-Aug-10	1,128.49	16-Aug-10	1,775.54
35	23-Aug-10	1,791.64	23-Aug-10	8991.06	30-Aug-10	1,178.26	23-Aug-10	1,729.56
36	30-Aug-10	1,870.31	30-Aug-10	9114.13	6-Sep-10	1,187.44	30-Aug-10	1,780.02
37	7-Sep-10	1,892.34	7-Sep-10	9239.17	13-Sep-10	1,157.12	6-Sep-10	1,802.58
38	13-Sep-10	1,955.83	13-Sep-10	9626.09	20-Sep-10	1,144.55	13-Sep-10	1,827.35
39	20-Sep-10	2,023.84	20-Sep-10	9471.67	27-Sep-10	1,201.79	20-Sep-10	1,846.60
40	27-Sep-10	1,996.60	27-Sep-10	9404.23	11-Oct-10	1,212.67	27-Sep-10	1,876.73
41	4-Oct-10	2,027.03	4-Oct-10	9588.88	18-Oct-10	1,262.16	4-Oct-10	1,897.07
42	11-Oct-10	2,097.73	11-Oct-10	9500.25	25-Oct-10	1,303.85	11-Oct-10	1,902.29
43	18-Oct-10	2,104.21	18-Oct-10	9426.71	1-Nov-10	1,352.12	18-Oct-10	1,897.31
44	25-Oct-10	2,124.45	25-Oct-10	9202.45	8-Nov-10	1,296.95	25-Oct-10	1,882.95
45	1-Nov-10	2,186.71	1-Nov-10	9625.99	15-Nov-10	1,297.48	1-Nov-10	1,938.96
46	8-Nov-10	2,137.95	8-Nov-10	9724.81	22-Nov-10	1,332.90	8-Nov-10	1,913.12
47	15-Nov-10	2,135.27	15-Nov-10	10022.39	29-Nov-10	1,302.26	15-Nov-10	1,940.96
48	22-Nov-10	2,153.91	22-Nov-10	10039.56	6-Dec-10	1,298.25	22-Nov-10	1,901.80
49	29-Nov-10	2,191.17	29-Nov-10	10178.32	13-Dec-10	1,338.43	29-Nov-10	1,957.26
50	6-Dec-10	2,215.34	6-Dec-10	10211.95	-	-	6-Dec-10	1,986.14
51	13-Dec-10	2,212.59	13-Dec-10	10316.77	-	-	13-Dec-10	2,009.05

Source: www.finance.yahoo.com

Table 1.2 showing the Weekly index value of stock exchanges of Brazil, India, UK & France from January 2010 to December 2010

DOW JONES BRAZIL INDEX			BSE SENSEX		FTSE 100		CAC 40	
S.NO	DATE	VALUE	DATE	VALUE	DATE	VALUE	DATE	VALUE
1	28-Dec-09	1,774.34	29-Dec-09	17,401.56	29-Dec-09	5,412.90	28-Dec-09	3,936.33
2	4-Jan-10	1,841.38	4-Jan-10	17,540.29	4-Jan-10	5,534.20	4-Jan-10	4,045.14
3	11-Jan-10	1,775.39	11-Jan-10	17,554.30	11-Jan-10	5,455.40	11-Jan-10	3,954.38
4	18-Jan-10	1,669.41	18-Jan-10	16,859.68	18-Jan-10	5,303.00	18-Jan-10	3,820.78
5	25-Jan-10	1,595.87	25-Jan-10	16,357.96	25-Jan-10	5,188.50	25-Jan-10	3,739.46
6	1-Feb-10	1,535.16	1-Feb-10	15,790.93	1-Feb-10	5,060.90	1-Feb-10	3,563.76
7	8-Feb-10	1,612.22	8-Feb-10	16,152.59	8-Feb-10	5,142.50	8-Feb-10	3,599.07
8	15-Feb-10	1,692.66	15-Feb-10	16,191.63	15-Feb-10	5,358.20	15-Feb-10	3,769.54
9	22-Feb-10	1,663.94	22-Feb-10	16,429.55	22-Feb-10	5,354.50	22-Feb-10	3,708.80
10	1-Mar-10	1,748.46	2-Mar-10	16,994.49	1-Mar-10	5,599.80	1-Mar-10	3,910.42
11	8-Mar-10	1,774.08	8-Mar-10	17,166.62	8-Mar-10	5,625.60	8-Mar-10	3,927.40
12	15-Mar-10	1,724.40	15-Mar-10	17,578.23	15-Mar-10	5,650.10	15-Mar-10	3,925.44
13	22-Mar-10	1,699.11	22-Mar-10	17,644.76	22-Mar-10	5,703.00	22-Mar-10	3,988.93
14	29-Mar-10	1,806.96	29-Mar-10	17,692.62	29-Mar-10	5,744.90	29-Mar-10	4,034.23
15	5-Apr-10	1,815.28	5-Apr-10	17,933.14	6-Apr-10	5,771.00	6-Apr-10	4,050.54
16	12-Apr-10	1,786.96	12-Apr-10	17,591.18	12-Apr-10	5,744.00	12-Apr-10	3,986.63
17	19-Apr-10	1,776.69	19-Apr-10	17,694.20	19-Apr-10	5,723.60	19-Apr-10	3,951.30
18	26-Apr-10	1,758.95	26-Apr-10	17,558.71	26-Apr-10	5,553.30	26-Apr-10	3,816.99
19	3-May-10	1,536.10	3-May-10	16,769.11	4-May-10	5,123.00	3-May-10	3,392.59

20	10-May-10	1,593.91	10-May-10	16,994.60	10-May-10	5,262.90	10-May-10	3,560.36
21	17-May-10	1,453.12	17-May-10	16,445.61	17-May-10	5,062.90	17-May-10	3,430.74
22	24-May-10	1,522.14	24-May-10	16,863.06	24-May-10	5,188.40	24-May-10	3,515.06
23	31-May-10	1,519.18	31-May-10	17,117.69	1-Jun-10	5,126.00	31-May-10	3,455.61
24	7-Jun-10	1,582.35	7-Jun-10	17,064.95	7-Jun-10	5,163.70	7-Jun-10	3,555.52
25	14-Jun-10	1,628.56	14-Jun-10	17,570.82	14-Jun-10	5,250.80	14-Jun-10	3,687.21
26	21-Jun-10	1,618.84	21-Jun-10	17,574.53	21-Jun-10	5,046.50	21-Jun-10	3,519.73
27	28-Jun-10	1,558.54	28-Jun-10	17,460.95	28-Jun-10	4,838.10	28-Jun-10	3,348.37
28	5-Jul-10	1,623.24	5-Jul-10	17,833.54	5-Jul-10	5,132.90	5-Jul-10	3,554.48
29	12-Jul-10	1,575.92	12-Jul-10	17,955.82	12-Jul-10	5,158.90	12-Jul-10	3,500.16
30	19-Jul-10	1,689.20	19-Jul-10	18,130.98	19-Jul-10	5,312.60	19-Jul-10	3,607.05
31	26-Jul-10	1,719.15	26-Jul-10	17,868.29	26-Jul-10	5,258.00	26-Jul-10	3,643.14
32	2-Aug-10	1,730.30	2-Aug-10	18,143.99	2-Aug-10	5,332.40	2-Aug-10	3,716.05
33	9-Aug-10	1,676.19	9-Aug-10	18,167.03	9-Aug-10	5,275.40	9-Aug-10	3,610.91
34	16-Aug-10	1,689.98	16-Aug-10	18,401.82	16-Aug-10	5,195.30	16-Aug-10	3,526.12
35	23-Aug-10	1,674.10	23-Aug-10	17,998.41	23-Aug-10	5,201.60	23-Aug-10	3,507.44
36	30-Aug-10	1,731.26	30-Aug-10	18,221.43	31-Aug-10	5,428.10	30-Aug-10	3,672.20
37	6-Sep-10	1,732.40	6-Sep-10	18,799.66	6-Sep-10	5,501.60	6-Sep-10	3,725.82
38	13-Sep-10	1,745.06	13-Sep-10	19,594.75	13-Sep-10	5,508.50	13-Sep-10	3,722.02
39	20-Sep-10	1,771.20	20-Sep-10	20,045.18	20-Sep-10	5,598.50	20-Sep-10	3,782.48
40	27-Sep-10	1,873.18	27-Sep-10	20,445.04	27-Sep-10	5,592.90	27-Sep-10	3,692.09
41	4-Oct-10	1,896.18	4-Oct-10	20,250.26	4-Oct-10	5,657.60	4-Oct-10	3,763.18
42	11-Oct-10	1,937.50	11-Oct-10	20,125.05	11-Oct-10	5,703.40	11-Oct-10	3,827.37
43	18-Oct-10	1,847.41	18-Oct-10	20,165.86	18-Oct-10	5,741.40	18-Oct-10	3,868.54
44	25-Oct-10	1,870.54	25-Oct-10	20,032.34	25-Oct-10	5,675.20	25-Oct-10	3,833.50
45	1-Nov-10	1,946.63	1-Nov-10	21,004.96	1-Nov-10	5,875.40	1-Nov-10	3,916.73
46	8-Nov-10	1,850.10	8-Nov-10	20,156.89	8-Nov-10	5,796.90	8-Nov-10	3,831.12
47	15-Nov-10	1,862.06	15-Nov-10	19,585.44	15-Nov-10	5,732.80	15-Nov-10	3,860.16
48	22-Nov-10	1,793.47	22-Nov-10	19,136.61	22-Nov-10	5,668.70	22-Nov-10	3,728.65
49	30-Nov-10	1,846.59	29-Nov-10	19,966.93	29-Nov-10	5,745.30	29-Nov-10	3,750.55
50	6-Dec-10	1,790.31	6-Dec-10	19,508.89	6-Dec-10	5,813.00	6-Dec-10	3,857.35
51	13-Dec-10	1,825.07	13-Dec-10	19,799.19	13-Dec-10	5,882.20	13-Dec-10	3,880.19

Source: www.finance.yahoo.com

Table 1.3 showing the Weekly index value of stock exchanges of Hong Kong & Singapore from January 2010 to December 2010

HANG SENG INDEX			STRAITS TIME INDEX	
S.N	DATE	VALUE	DATE	VALUE
1	28-Dec-09	21,872.50	28-Dec-09	2,897.62
2	4-Jan-10	22,296.75	4-Jan-10	2,922.76
3	11-Jan-10	21,654.16	11-Jan-10	2,908.42
4	18-Jan-10	20,726.18	18-Jan-10	2,819.71
5	25-Jan-10	20,121.99	25-Jan-10	2,745.35

6	1-Feb-10	19,665.08	1-Feb-10	2,683.56
7	8-Feb-10	20,268.69	8-Feb-10	2,758.90
8	17-Feb-10	19,894.02	15-Feb-10	2,757.14
9	22-Feb-10	20,608.70	22-Feb-10	2,750.86
10	1-Mar-10	20,787.97	1-Mar-10	2,790.29
11	8-Mar-10	21,209.74	8-Mar-10	2,881.36
12	15-Mar-10	21,370.82	15-Mar-10	2,915.70
13	22-Mar-10	21,053.11	22-Mar-10	2,906.28
14	29-Mar-10	21,537.00	29-Mar-10	2,943.02
15	5-Apr-10	22,208.50	5-Apr-10	2,971.97
16	12-Apr-10	21,865.26	12-Apr-10	3,007.19
17	19-Apr-10	21,244.49	19-Apr-10	2,988.49
18	26-Apr-10	21,108.59	26-Apr-10	2,974.61
19	3-May-10	19,920.29	3-May-10	2,821.11
20	10-May-10	20,145.43	10-May-10	2,855.21
21	17-May-10	19,545.83	17-May-10	2,701.20
22	24-May-10	19,766.71	24-May-10	2,739.70
23	31-May-10	19,780.07	31-May-10	2,806.51
24	7-Jun-10	19,872.38	7-Jun-10	2,796.29
25	14-Jun-10	20,286.71	14-Jun-10	2,833.40
26	21-Jun-10	20,690.79	21-Jun-10	2,851.64
27	28-Jun-10	19,905.32	28-Jun-10	2,844.19
28	5-Jul-10	20,378.66	5-Jul-10	2,917.17
29	12-Jul-10	20,250.16	12-Jul-10	2,957.72
30	19-Jul-10	20,815.33	19-Jul-10	2,973.47
31	26-Jul-10	21,029.81	26-Jul-10	2,987.70
32	2-Aug-10	21,678.80	3-Aug-10	2,995.06
33	9-Aug-10	21,071.57	9-Aug-10	2,939.97
34	16-Aug-10	20,981.82	16-Aug-10	2,936.48
35	23-Aug-10	20,597.35	23-Aug-10	2,938.74
36	30-Aug-10	20,971.50	30-Aug-10	3,002.56
37	6-Sep-10	21,257.39	6-Sep-10	3,022.28
38	13-Sep-10	21,970.86	13-Sep-10	3,076.37
39	20-Sep-10	22,119.43	20-Sep-10	3,092.68
40	27-Sep-10	22,358.17	27-Sep-10	3,130.90
41	4-Oct-10	22,944.18	4-Oct-10	3,153.34
42	11-Oct-10	23,757.63	11-Oct-10	3,204.27
43	18-Oct-10	23,517.54	18-Oct-10	3,173.57
44	25-Oct-10	23,096.32	25-Oct-10	3,142.62
45	1-Nov-10	24,876.82	1-Nov-10	3,240.31
46	8-Nov-10	24,222.58	8-Nov-10	3,252.00
47	15-Nov-10	23,605.71	15-Nov-10	3,197.37
48	22-Nov-10	22,877.25	22-Nov-10	3,158.08
49	29-Nov-10	23,320.52	29-Nov-10	3,172.44
50	6-Dec-10	23,162.91	6-Dec-10	3,185.42
51	13-Dec-10	22,975.35	13-Dec-10	3,147.20

Source: www.finance.yahoo.com

Analysis and Inferences

Table 1.4 showing the Run test on Weekly index value of stock exchanges of USA, Japan, China & South Korea from January 2010 to December 2010

NASDAQ-100			NIKKEI 225		SSE Composite Index		KOSPI Composite Index	
S.NO	DATE	SIGN	DATE	SIGN	DATE	SIGN	DATE	SIGN
1	28-Dec-09		28-Dec-09		28-Dec-09		28-Dec-09	
2	4-Jan-10	+	4-Jan-10	+	4-Jan-10	+	4-Jan-10	+
3	11-Jan-10	-	11-Jan-10	+	11-Jan-10	+	11-Jan-10	+
4	19-Jan-10	-	19-Jan-10	-	18-Jan-10	-	18-Jan-10	-
5	25-Jan-10	-	25-Jan-10	-	25-Jan-10	-	25-Jan-10	-
6	1-Feb-10	+	1-Feb-10	-	1-Feb-10	-	1-Feb-10	-
7	8-Feb-10	+	8-Feb-10	+	8-Feb-10	+	8-Feb-10	+
8	16-Feb-10	+	16-Feb-10	+	22-Feb-10	+	16-Feb-10	+
9	22-Feb-10	-	22-Feb-10	+	1-Mar-10	-	22-Feb-10	+
10	1-Mar-10	+	1-Mar-10	+	8-Mar-10	-	2-Mar-10	+
11	8-Mar-10	+	8-Mar-10	+	15-Mar-10	+	8-Mar-10	+
12	15-Mar-10	+	15-Mar-10	+	22-Mar-10	+	15-Mar-10	+
13	22-Mar-10	+	22-Mar-10	+	29-Mar-10	+	22-Mar-10	+
14	29-Mar-10	+	29-Mar-10	+	6-Apr-10	+	29-Mar-10	+
15	5-Apr-10	+	5-Apr-10	-	12-Apr-10	-	5-Apr-10	+
16	12-Apr-10	+	12-Apr-10	-	19-Apr-10	-	12-Apr-10	+
17	19-Apr-10	+	19-Apr-10	-	26-Apr-10	-	19-Apr-10	+
18	26-Apr-10	-	26-Apr-10	+	4-May-10	-	26-Apr-10	+
19	3-May-10	-	3-May-10	-	10-May-10	-	3-May-10	-
20	10-May-10	+	10-May-10	+	17-May-10	-	10-May-10	+
21	17-May-10	-	17-May-10	-	24-May-10	+	17-May-10	-
22	24-May-10	+	24-May-10	-	31-May-10	-	24-May-10	+
23	1-Jun-10	-	1-Jun-10	+	7-Jun-10	+	31-May-10	+
24	7-Jun-10	+	7-Jun-10	-	17-Jun-10	-	7-Jun-10	+
25	14-Jun-10	+	14-Jun-10	+	21-Jun-10	+	14-Jun-10	+
26	21-Jun-10	-	21-Jun-10	-	28-Jun-10	-	21-Jun-10	+
27	28-Jun-10	-	28-Jun-10	-	5-Jul-10	+	28-Jun-10	-
28	6-Jul-10	+	6-Jul-10	+	12-Jul-10	-	5-Jul-10	+
29	12-Jul-10	-	12-Jul-10	-	19-Jul-10	+	12-Jul-10	+
30	19-Jul-10	+	19-Jul-10	+	26-Jul-10	+	19-Jul-10	+
31	26-Jul-10	-	26-Jul-10	+	2-Aug-10	+	26-Jul-10	+
32	2-Aug-10	+	2-Aug-10	+	9-Aug-10	-	2-Aug-10	+
33	9-Aug-10	-	9-Aug-10	-	16-Aug-10	+	9-Aug-10	-
34	16-Aug-10	+	16-Aug-10	-	23-Aug-10	+	16-Aug-10	+
35	23-Aug-10	-	23-Aug-10	-	30-Aug-10	+	23-Aug-10	-
36	30-Aug-10	+	30-Aug-10	+	6-Sep-10	+	30-Aug-10	+
37	7-Sep-10	+	7-Sep-10	+	13-Sep-10	-	6-Sep-10	+
38	13-Sep-10	+	13-Sep-10	+	20-Sep-10	-	13-Sep-10	+
39	20-Sep-10	+	20-Sep-10	-	27-Sep-10	+	20-Sep-10	+

40	27-Sep-10	-	27-Sep-10	-	11-Oct-10	+	27-Sep-10	+
41	4-Oct-10	+	4-Oct-10	+	18-Oct-10	+	4-Oct-10	+
42	11-Oct-10	+	11-Oct-10	-	25-Oct-10	+	11-Oct-10	+
43	18-Oct-10	+	18-Oct-10	-	1-Nov-10	+	18-Oct-10	-
44	25-Oct-10	+	25-Oct-10	-	8-Nov-10	-	25-Oct-10	-
45	1-Nov-10	+	1-Nov-10	+	15-Nov-10	+	1-Nov-10	+
46	8-Nov-10	-	8-Nov-10	+	22-Nov-10	+	8-Nov-10	-
47	15-Nov-10	-	15-Nov-10	+	29-Nov-10	-	15-Nov-10	+
48	22-Nov-10	+	22-Nov-10	+	6-Dec-10	-	22-Nov-10	-
49	29-Nov-10	+	29-Nov-10	+	13-Dec-10	+	29-Nov-10	+
50	6-Dec-10	+	6-Dec-10	+	-	-	6-Dec-10	+
51	13-Dec-10	-	13-Dec-10	+	-	-	13-Dec-10	+

Source: computed data

Table 1.5 showing the Run test on Weekly index value of stock exchanges of Brazil, India, UK & France from January 2010 to December 2010

DOW JONES BRAZIL INDEX			BSE SENSEX		FTSE 100		CAC 40	
S.NO	DATE	Sign	DATE	Sign	DATE	Sign	DATE	Sign
1	28-Dec-09		29-Dec-09		29-Dec-09		28-Dec-09	
2	4-Jan-10	+	4-Jan-10	+	4-Jan-10	+	4-Jan-10	+
3	11-Jan-10	-	11-Jan-10	+	11-Jan-10	-	11-Jan-10	-
4	18-Jan-10	-	18-Jan-10	-	18-Jan-10	-	18-Jan-10	-
5	25-Jan-10	-	25-Jan-10	-	25-Jan-10	-	25-Jan-10	-
6	1-Feb-10	-	1-Feb-10	-	1-Feb-10	-	1-Feb-10	-
7	8-Feb-10	+	8-Feb-10	+	8-Feb-10	+	8-Feb-10	+
8	15-Feb-10	+	15-Feb-10	+	15-Feb-10	+	15-Feb-10	+
9	22-Feb-10	-	22-Feb-10	+	22-Feb-10	-	22-Feb-10	-
10	1-Mar-10	+	2-Mar-10	+	1-Mar-10	+	1-Mar-10	+
11	8-Mar-10	+	8-Mar-10	+	8-Mar-10	+	8-Mar-10	+
12	15-Mar-10	-	15-Mar-10	+	15-Mar-10	+	15-Mar-10	-
13	22-Mar-10	-	22-Mar-10	+	22-Mar-10	+	22-Mar-10	+
14	29-Mar-10	+	29-Mar-10	+	29-Mar-10	+	29-Mar-10	+
15	5-Apr-10	+	5-Apr-10	+	6-Apr-10	+	6-Apr-10	+
16	12-Apr-10	-	12-Apr-10	-	12-Apr-10	-	12-Apr-10	-
17	19-Apr-10	-	19-Apr-10	+	19-Apr-10	-	19-Apr-10	-
18	26-Apr-10	-	26-Apr-10	-	26-Apr-10	-	26-Apr-10	-
19	3-May-10	-	3-May-10	-	4-May-10	-	3-May-10	-
20	10-May-10	+	10-May-10	+	10-May-10	+	10-May-10	+
21	17-May-10	-	17-May-10	-	17-May-10	-	17-May-10	-
22	24-May-10	+	24-May-10	+	24-May-10	+	24-May-10	+
23	31-May-10	-	31-May-10	+	1-Jun-10	-	31-May-10	-
24	7-Jun-10	+	7-Jun-10	-	7-Jun-10	+	7-Jun-10	+
25	14-Jun-10	+	14-Jun-10	+	14-Jun-10	+	14-Jun-10	+
26	21-Jun-10	-	21-Jun-10	+	21-Jun-10	-	21-Jun-10	-
27	28-Jun-10	-	28-Jun-10	-	28-Jun-10	-	28-Jun-10	-
28	5-Jul-10	+	5-Jul-10	+	5-Jul-10	+	5-Jul-10	+
29	12-Jul-10	-	12-Jul-10	+	12-Jul-10	+	12-Jul-10	-

30	19-Jul-10	+	19-Jul-10	+	19-Jul-10	+	19-Jul-10	+
31	26-Jul-10	+	26-Jul-10	-	26-Jul-10	-	26-Jul-10	+
32	2-Aug-10	+	2-Aug-10	+	2-Aug-10	+	2-Aug-10	+
33	9-Aug-10	-	9-Aug-10	+	9-Aug-10	-	9-Aug-10	-
34	16-Aug-10	+	16-Aug-10	+	16-Aug-10	-	16-Aug-10	-
35	23-Aug-10	-	23-Aug-10	-	23-Aug-10	+	23-Aug-10	-
36	30-Aug-10	+	30-Aug-10	+	31-Aug-10	+	30-Aug-10	+
37	6-Sep-10	+	6-Sep-10	+	6-Sep-10	+	6-Sep-10	+
38	13-Sep-10	+	13-Sep-10	+	13-Sep-10	+	13-Sep-10	-
39	20-Sep-10	+	20-Sep-10	+	20-Sep-10	+	20-Sep-10	+
40	27-Sep-10	+	27-Sep-10	+	27-Sep-10	-	27-Sep-10	-
41	4-Oct-10	+	4-Oct-10	-	4-Oct-10	+	4-Oct-10	+
42	11-Oct-10	+	11-Oct-10	-	11-Oct-10	+	11-Oct-10	+
43	18-Oct-10	-	18-Oct-10	+	18-Oct-10	+	18-Oct-10	+
44	25-Oct-10	+	25-Oct-10	-	25-Oct-10	-	25-Oct-10	-
45	1-Nov-10	+	1-Nov-10	+	1-Nov-10	+	1-Nov-10	+
46	8-Nov-10	-	8-Nov-10	-	8-Nov-10	-	8-Nov-10	-
47	15-Nov-10	+	15-Nov-10	-	15-Nov-10	-	15-Nov-10	+
48	22-Nov-10	-	22-Nov-10	-	22-Nov-10	-	22-Nov-10	-
49	30-Nov-10	+	29-Nov-10	+	29-Nov-10	+	29-Nov-10	+
50	6-Dec-10	-	6-Dec-10	-	6-Dec-10	+	6-Dec-10	+
51	13-Dec-10	+	13-Dec-10	+	13-Dec-10	+	13-Dec-10	+

Source: computed data

Table 1.6 showing the Run test on Weekly index value of stock exchanges of Hong Kong & Singapore from January 2010 to December 2010

HANG SENG INDEX			STRAITS TIME INDEX	
S.N	DATE	SIGN	DATE	SIGN
1	28-Dec-09		28-Dec-09	
2	4-Jan-10	+	4-Jan-10	+
3	11-Jan-10	-	11-Jan-10	-
4	18-Jan-10	-	18-Jan-10	-
5	25-Jan-10	-	25-Jan-10	-
6	1-Feb-10	-	1-Feb-10	-
7	8-Feb-10	+	8-Feb-10	+
8	17-Feb-10	-	15-Feb-10	-
9	22-Feb-10	+	22-Feb-10	-
10	1-Mar-10	+	1-Mar-10	+
11	8-Mar-10	+	8-Mar-10	+
12	15-Mar-10	+	15-Mar-10	+
13	22-Mar-10	-	22-Mar-10	-
14	29-Mar-10	+	29-Mar-10	+
15	5-Apr-10	+	5-Apr-10	+
16	12-Apr-10	-	12-Apr-10	+

17	19-Apr-10	-	19-Apr-10	-
18	26-Apr-10	-	26-Apr-10	-
19	3-May-10	-	3-May-10	-
20	10-May-10	+	10-May-10	+
21	17-May-10	-	17-May-10	-
22	24-May-10	+	24-May-10	+
23	31-May-10	+	31-May-10	+
24	7-Jun-10	+	7-Jun-10	-
25	14-Jun-10	+	14-Jun-10	+
26	21-Jun-10	+	21-Jun-10	+
27	28-Jun-10	-	28-Jun-10	-
28	5-Jul-10	+	5-Jul-10	+
29	12-Jul-10	-	12-Jul-10	+
30	19-Jul-10	+	19-Jul-10	+
31	26-Jul-10	+	26-Jul-10	+
32	2-Aug-10	+	3-Aug-10	+
33	9-Aug-10	-	9-Aug-10	-
34	16-Aug-10	-	16-Aug-10	-
35	23-Aug-10	-	23-Aug-10	+
36	30-Aug-10	+	30-Aug-10	+
37	6-Sep-10	+	6-Sep-10	+
38	13-Sep-10	+	13-Sep-10	+
39	20-Sep-10	+	20-Sep-10	+
40	27-Sep-10	+	27-Sep-10	+
41	4-Oct-10	+	4-Oct-10	+
42	11-Oct-10	+	11-Oct-10	+
43	18-Oct-10	-	18-Oct-10	-
44	25-Oct-10	-	25-Oct-10	-
45	1-Nov-10	+	1-Nov-10	+
46	8-Nov-10	-	8-Nov-10	+
47	15-Nov-10	-	15-Nov-10	-
48	22-Nov-10	-	22-Nov-10	-
49	29-Nov-10	+	29-Nov-10	+
50	6-Dec-10	-	6-Dec-10	+
51	13-Dec-10	-	13-Dec-10	-

Source: computed data

NASDAQ-100 (USA)

- Observed Runs 25
- N1 (Total No. of '+'s in the run) → 32
- N2 (Total No. of '-'s in the run) → 18

$$\mu = ((2 \times N1 \times N2)/(N1+N2) + 1$$

$$\mu = 24.04$$

$$\sigma = ((2 \times N1 \times N2 (2 \times N1 \times N2 - N1 - N2)) / ((N1+N2)^2 (N1+N2 - 1)))^{0.5}$$

$$\sigma = 3.22$$

$$\text{Upper Limit} = \mu + 1.96 \times \sigma \text{ (S.D)}$$

$$\text{Upper Limit} = 30.35$$

$$\text{Lower Limit} = \mu - 1.96 \times \sigma \text{ (S.D)}$$

$$\text{Lower Limit} = 17.73$$

Inference

Since the Observed value lies between the upper and lower limit, H₀: is accepted

NIKKEI 225 (Japan)

- Observed Runs 21
- N1 (Total No. of '+'s in the run) → 29
- N2 (Total No. of '-'s in the run) → 21

$$\mu = 25.36$$

$$\sigma = 3.41$$

$$\text{Upper Limit} = 32.04$$

$$\text{Lower Limit} = 18.68$$

Inference

Since the Observed value lies between the upper and lower limit, H₀: is accepted

SSE Composite Index (China)

- Observed Runs 23
- N1 (Total No. of '+'s in the run) → 27
- N2 (Total No. of '-'s in the run) → 21

$$\mu = 24.63$$

$$\sigma = 3.37$$

Upper Limit = 31.23

Lower Limit = 18.02

Inference

Since the Observed value lies between the upper and lower limit, H0: is accepted

KOSPI Composite Index (South Korea)

- Observed Runs 19
- N1 (Total No. of '+'s in the run) → 38
- N2 (Total No. of '-'s in the run) → 12

$\mu = 19.24$

$\sigma = 2.53$

Upper Limit = 24.21

Lower Limit = 14.27

Inference

Since the Observed value lies between the upper and lower limit, H0: is accepted

DOW JONES BRAZIL INDEX (Brazil)

- Observed Runs 29
- N1 (Total No. of '+'s in the run) → 28
- N2 (Total No. of '-'s in the run) → 22

$\mu = 25.64$

$\sigma = 3.45$

Upper Limit = 32.40

Lower Limit = 18.88

Inference

Since the Observed value lies between the upper and lower limit, H0: is accepted

BSE SENSEX (India)

- Observed Runs 25
- N1 (Total No. of '+'s in the run) → 32
- N2 (Total No. of '-'s in the run) → 18

$$\mu = 24.04$$

$$\sigma = 3.22$$

$$\text{Upper Limit} = 30.35$$

$$\text{Lower Limit} = 17.73$$

Inference

Since the Observed value lies between the upper and lower limit, H0: is accepted

FTSE 100 (UK)

- Observed Runs 23
- N1 (Total No. of '+'s in the run) → 29
- N2 (Total No. of '-'s in the run) → 21

$$\mu = 25.36$$

$$\sigma = 3.41$$

$$\text{Upper Limit} = 32.04$$

$$\text{Lower Limit} = 18.68$$

Inference

Since the Observed value lies between the upper and lower limit, H0: is accepted

CAC 40 (France)

- Observed Runs 30
- N1 (Total No. of '+'s in the run) → 27
- N2 (Total No. of '-'s in the run) → 23

$$\mu = 25.84$$

$$\sigma = 3.48$$

$$\text{Upper Limit} = 32.65$$

$$\text{Lower Limit} = 19.03$$

Inference

Since the Observed value lies between the upper and lower limit, H_0 : is accepted

HANG SENG INDEX (Hong Kong)

- Observed Runs 22
- N_1 (Total No. of '+'s in the run) $\rightarrow 27$
- N_2 (Total No. of '-'s in the run) $\rightarrow 23$

$$\mu = 25.84$$

$$\sigma = 3.48$$

$$\text{Upper Limit} = 32.65$$

$$\text{Lower Limit} = 19.03$$

Inference

Since the Observed value lies between the upper and lower limit, H_0 : is accepted

STRAITS TIME INDEX (Singapore)

- Observed Runs 22
- N_1 (Total No. of '+'s in the run) $\rightarrow 30$
- N_2 (Total No. of '-'s in the run) $\rightarrow 20$

$$\mu = 25$$

$$\sigma = 3.36$$

$$\text{Upper Limit} = 31.58$$

Lower Limit = 18.42

Inference

Since the Observed value lies between the upper and lower limit, H₀: is accepted

Hypothesis

H₀: Index change is random

H_A: Index change is not random

'If the observed numbers of runs are between the upper and lower limit, null hypothesis is accepted otherwise rejected'

Table 1.7 showing the Result of Hypothesis testing

	N1	N2	μ	σ	Upper Limit	Lower Limit	Observed runs	Hypothesis testing at a given level of significance 1.96
NASDAQ	32	18	24.04	3.22	30.35	17.73	26	H ₀ accepted
NIKKEI	29	21	25.36	3.41	32.04	18.68	21	H ₀ accepted
SSE COMPOSITE INDEX	27	21	24.63	3.37	31.23	18.02	23	H ₀ accepted
KOSPI COMPOSITE INDEX	38	12	19.24	2.53	24.21	14.27	19	H ₀ accepted
DOW JONES BRAZIL	28	22	25.64	3.45	32.40	18.88	29	H ₀ accepted
BSE SENSEX	32	18	24.04	3.22	30.35	17.73	25	H ₀ accepted
FTSE 100	29	21	25.36	3.41	32.04	18.68	23	H ₀ accepted
CAC 40	27	23	25.84	3.48	32.65	19.03	30	H ₀ accepted
HANG SENG INDEX	27	23	25.84	3.48	32.65	19.03	22	H ₀ accepted
STRAITS TIMES INDEX	30	20	25	3.36	31.58	18.42	22	H ₀ accepted

Source: computed data

Conclusion

The study comes out to the result that almost all the stock indices move independently without getting influenced from the past indices. In all indices null hypothesis has been accepted which supports the finding that the selective stock market in the global arena has shown efficient in the weak form, I.e. the indices move independently of each other during the successive days. By embarking upon the popular run test the study proves the efficiency of the various stock markets at weak form in the global context.

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