

# Efficiency of South Asian Capital Markets: An Empirical Analysis

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## Abstract

In last few years, the Asian financial crises had grabbed the attentions of researchers towards South Asian capital markets. This paper is an attempt to test the weak form efficiency of select South Asian capital markets; India, Sri Lanka and Pakistan over the sample period spanning from January 2003 to December 2011. The application of dickey-fuller (ADF) and Philip Perran (PP) unit root test provide the evidence that these markets are not weak form efficient which have significant impact on these countries' economies. On the other hand, such inefficiency disturbs the allocation of national resources for development projects. This type of phenomena encourages male practices speculative moves in market place.

**Keywords:** South Asia, weak form efficiency and unit root tests.

## Introduction

The South Asian area obtains strong and continuously economic growth in recent years. The South Asia is a region that has ability to attract international investors for huge interest. In 2008, global financial and economic decline in the region of South Asia have created significant value for companies who have issued new capital. Capital market has vital role in allocation of economic resources in productive activities in economy. By this allocation the securities are accurately priced in the market. The investors invest in capital market of those countries whose securities remain appropriately priced in market. Capital market efficiency is determined by the information and its dissemination among the market players. That is, how correctly and quickly the prices of securities reflect this information that shows the degree of capital market efficiency. Consequently, capital market is an essential institution that makes economic development easy. The capital market efficiency is a particular substance of interest to many stakeholders. Moreover, efficient capital markets provide greater impetus for domestic economic growth. The study conducted to test the weak form efficiency of Pakistan, Sri Lanka and India stock markets. The data for analysis is taken for the period from 2003 to 2011 monthly and weekly observations. Augmented dickey-fuller (ADF) and Philip Perron (PP) unit root test are used to examine the efficiency of capital markets. It is concluded that the Pakistan, Sri Lanka and India capital markets are not weakly efficient. In an efficient capital market, the stock prices reflect all available information. In an efficient market, all investors have equal information at the same time and should not be limited to a few investors only. Free flow of information is required by investors to make their investment decisions. There are three categories of the efficient market hypothesis (EMH) like; strong form, semi strong form and weak form. According to them, the market is efficient regarding to an information event if that information impacts no portfolio changes. Possibility is that people may not be agreeing with the conjecture of a piece of information so some can buy an asset and others may sell in such a way that the market price is not affected. If there is no change due to the information in prices then the market is an efficient capital market (Fama, 1991). According to EMH, every investor's response is in a distinct manner when new information is obtained. The investors do not use the publicly available unbiased information to make high returns. In this study, initiatives are taken to discover the form of markets prevailing in South Asia (Pakistan, Sri Lanka and India) markets. This study is beneficial for stock traders and investors for developing strategies for investments. The purpose of this study is to test the weak-form market efficiency hypothesis in South Asia countries like; Pakistan, Sri Lanka and India. The rest of the manuscript has been divided into four sections further. The section no two and three have covered literature review and methodology respectively while the sections no four and fifth have explained findings and conclusion as well.

## Literature Review

Previous studies on testing weak form efficiency of less developed and developing stock markets like that to

Dhaka stock exchange there are two groups of findings. In-efficiency point out that market has not a very well developed financial system and institutions that ensure and monitor the action of efficiency in the capital market. (Thair, 2011) Pakistan and Indian equity markets return can be forecasted by historical returns therefore these markets are not weak form-efficient (Ur Rehman, Masood, Arshed, & Ali, 2012) South Asia stock markets are not weak form efficient giving scope for profitable trading (Mishra, 2012)

Abraham et al. (2002) studied Middle East markets. They observed that index in thinly traded equity markets may not contain the true fundamental index value. Moreover there is a systematic bias towards rejecting the EMH. The three emerging Gulf equity markets show infrequent trading significantly that has changed the results of market efficiency and random walk tests. No doubt that there are number of studies on the efficient market hypothesis to test the randomness of stock prices of individual companies but still there are enough gaps in the study regarding to test the random walk of equity market indices around the globe in present era. Therefore the Asian-Pacific markets have been selected to test the market efficiency of various emerging and developed markets in the region. Because massive anomalies exists in this regions' capital markets like; days of the week affect Bombay Stock Exchange over a period of 1987-1994. The results conclude that day of the week effect and stock market is not weak form efficient. (POSHAKWALE, 1996) The time period for Mumbai stock exchange (BSE) is from 24<sup>th</sup> May 1991 to 26<sup>th</sup> May 2006 and for National stock exchange (NSE) of India 27<sup>th</sup> May 1991 to 26<sup>th</sup> May 2006. Three test PP, ADF and the KPSS is used. The results find that NSE and BSE are not weak form efficient. (Gupta & Basu, 2007). Autocorrelation, Ljung-Box QStatistic and Variance Ratio tests indicates that Pakistan, India, Korea, Hong Kong, Indonesia, Malaysia, Philippine, Singapore, Thailand, Japan and Australia markets are not weak form efficient. (Hamid, Suleman, Ali Shah, & Akash, 2010). These authors have established various methods to the efficient market hypothesis and concluded different findings. Even though, all the afro mentioned studies are very important in the context of EMH. But the current study also put some light on the efficiency of emerging capital markets of South Asia like; India, Pakistan and Srilanka. The South Asian economies introduced a series of financial sector as well as economic reforms starting in the 1980s and 1990s. So these moves have created the relationship between developed and developing states. So it is being assumed that that the easier access to global financial markets for individuals, corporations, and countries at large will move to efficient disbursement of financial resources which lead to economic growth and prosperity. However, this study intends to examine if the removal geological barriers for free transformation of capital in markets and has improved the pricing efficiency of capital markets in the South Asia region.

### Data and Methodology

The objective of our study is to investigate the efficient market hypothesis in the context of the South Asian capital markets. The sample period considered in the study spans from January, 2003 to December 2011. The data set consists of general stock market Indices for India, Sri Lanka, and Pakistan. The data used in the study are monthly and weekly Indices return for the sample period. The data has been collected from their national stock exchange and concerned web sites. After collection of data different and unique techniques have been applied for checking weak form efficiency hypothesis. Our study uses the most popular Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) unit root tests to examine the weak form of efficiency market. Non-stationary shows weak form inefficiency of the capital market, and stationary shows weak form efficient market hypothesis. The ADF test statistics are calculated for select South Asian stock markets and the results are presented in Table-1. It is cleared that, the null hypothesis of unit root is rejected, as the value of test statistic is more negative than the critical value in each country case. The results indicate that the stock prices in selected countries markets do not follow efficient market hypothesis, markets are not weak-form efficient. The ADF test statistics are calculated for selected countries stock markets and the results are presented in Table-1.

The study has used the most popular Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) unit root tests to verify the efficient market hypothesis for South Asia capital markets like; Pakistan, Indian and Srilanka. The ADF unit root test based on a regression analysis at level, first and second differences of the data series against the series lagged once, lagged difference terms. The test requires estimating the following regression:

$$\Delta R_t = \beta_1 + \beta_2 t + \rho R_{t-1} + \sum_{i=1}^m \alpha_i \Delta R_{t-i} + \varepsilon_t \dots \dots \dots (1)$$

Where,  $R_t$  is the monthly general stock price index based stock market return, i.e.,  $R_t = \log(P_t / P_{t-1})$ ,  $\Delta R_t$  is the first difference of the  $R_t$ ,  $\beta_1$  is the intercept,  $\beta_2, \rho$  are the coefficients,  $t$  is the time or trend variable,  $m$  is the number of lagged terms chosen to ensure that  $\varepsilon_t$  is white noise, i.e.  $\varepsilon_t$  contains no autocorrelation,  $\varepsilon_t$  is the pure white noise error term, and  $\sum_{i=1}^m \alpha_i \Delta R_{t-i}$  is the sum of the lagged values of the dependent variable  $\Delta R_t$ .

Using the equation (1), the null hypothesis (H0) of unit root i.e  $p=0$  is tested against  $H1) p < 0$ . The acceptance of the null hypothesis indicate that there exist a unit root, which implies that that the time series are non- stationary and conclude that market is not weak form efficient

$$\Delta R_t = \alpha R_{t-1} + x_t' \delta + \varepsilon_t \quad \& \quad \alpha = \rho - 1 \dots \dots \dots (2)$$

Phillips and Perron suggested a non-parametric method of testing for a unit root. The PP method estimates the non- augmented DF test equation no 02. Where,  $R_t$  is monthly and weekly stock returns, where as  $x_t$  are optional regressors which may consist of constant, or a trend and parameter estimates.

**Table-1**

Countries	ADF T-Statistic Index Weekly Returns	ADF T-Statistic Monthly Index Returns
Pakistan	-12.33781(0)	-8.409013(0)
Sri Lanka	-8.515317(0)	-8.972323(0)
India	-12.01940(0)	-9.210492(0)

**Table-2**

Countries	PP(Level Form) T-Statistic Index Weekly Returns	PP(Level Form) T-Statistic Monthly Index Returns
Pakistan	-13.04777(0)	-8.359497(0)
Sri Lanka	-9.840231(0)	-9.113024(0)
India	-12.50558(0)	-9.304532(0)

**Weekly Analysis: Table No 03**

	RETURNS WEEKLY	INDIA RETURN WEEKLY	PKISTAN RETURN WEEKLY	SRI LANKA RETURN WEEKLY
Mean	0.001970	0.001492	0.002367	0.002367
Median	0.008157	0.007811	0.003330	0.003330
Maximum	0.166428	0.115355	0.125315	0.125315
Minimum	-1.000000	-1.000000	-1.000000	-1.000000
Std. Dev.	0.058921	0.058602	0.055425	0.055425
Skewness	-10.89670	-11.19714	-12.98798	-12.98798
Kurtosis	185.3221	189.1601	236.5227	236.5227
Jarque-Bera	639204.9	666520.0	1046645.	1046645.
Probability	0.000000	0.000000	0.000000	0.000000
Sum	0.896222	0.679086	1.077169	1.077169
Sum Sq. Dev.	1.576138	1.559126	1.394647	1.394647

**Monthly Analysis**

	RETURN SRI LANKA MONTHLY	RETURN PKISTAN MONTHLY	RETURNS INDIA MONTHLY
Mean	0.022783	0.016803	0.018133
Median	0.020053	0.019629	0.020779
Maximum	0.236693	0.224144	0.299059
Minimum	-0.161508	-0.361604	-0.267662
Std. Dev.	0.079000	0.079690	0.081994
Skewness	0.290454	-1.082143	-0.333612
Kurtosis	3.328061	7.085194	4.650583
Jarque-Bera	1.984302	95.28772	14.13119
Probability	0.370778	0.000000	0.000854
Sum	2.437732	1.797921	1.940194
Sum Sq. Dev.	0.661550	0.673146	0.712644
Observations	107	107	107

In table number 01 and 02 the results of ADF and PP tests have presented which indicate that either at monthly or at weekly levels the data time series are not stationary which indicate that all the concerned market are not efficient even at level means raw data. The results indicate that the markets of Pakistan, India and Srilanka do not follow random walk hypotheses which imply that these markets are efficient and history has complete effect in predicting future. In order to verify the results PP test has also been applied which has also produced the same results. The results are also indicating that in all these concerned markets securities prices are also mispriced and open endeavors arbitraging and malpractices.

In order to further verify the data descriptive statistics have also been applied. The results of table no 03 indicate

the descriptive statistics of returns belongs to different countries. By monthly analysis the value of mean returns countries as; India is **0.018133**, Sri Lanka **0.022783** and Pakistan **0.016803**. The results show that in Sri Lanka the investors have greater chances for making high profits. The median represents the central value of data India has higher median as compare to others which indicate that Indian investors can earn more as compare to the investors of the other countries. Whereas there is the high standard deviation prevails in Indian data which implies that there is high risk in Indian market as compare to others.

### Conclusion

In this study an attempt has been made to examine the efficient market hypothesis South Asia stock markets for the sample period spanning from January 2003 to December 2011. Applying the most popular econometric techniques of ADF and PP Unit Root tests, the study provides the evidence that the South Asian countries stock markets are not weak form efficient giving scope for profitable trading. This thing provides opportunity to the traders for predicting the future prices and earning abnormal profits. Such weak-form market efficiency has a deteriorating effect on the gross savings and investment status of any country thereby disturbing the resource mobilization process for the larger interest of a nation. However, such informational inefficiency of capital markets has an interesting implication. The opportunity of making excessive profits in an efficient market often provides the impetus for successful financial innovation and makes the market move towards efficiency in the long run.

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