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# ANALYSIS OF REGIONAL STOCK MARKETS FOR INVESTMENT & DIVERSIFICATION PERSPECTIVE: EVIDENCE FROM PAKISTAN, CHINA & INDIAN STOCK MARKETS

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**KEYWORDS**

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**ABSTRACT**

The academic ramification of research is that it is one of few that provides a comprehensive analysis of regional market cointegration. One of this study methods is application of pairwise cointegration that is useful for figuring out strength of long-term link amid two variables. In order to reap benefits of diversity, it is better to invest locally rather than traveling to another region, which is why this study investigates new options for academicians to examine long-term interaction between regional stock markets. Study employs most efficient pairwise cointegrated approach to illustrate precise link amid two variables. Daily data of these countries' stock market indices from 2002-2018, used to study stock market co-movement/co-integration. The statistical tests were applied like Dickey Fuller test, regression & co-variance. Pairwise co-integration is examined after confirming combine co integration of three markets. Results show that there is no cointegration amid stock markets of Pakistan China & India. So, Pakistani investors have chance to participate in other two markets at a time when it appears to be lucrative investment portfolio.



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## INTRODUCTION

Based on an empirical analysis of the literature, it has been noted that cointegration affects several regional capital markets, including the stock markets in United States and Africa as well as capital markets in the Asia and Europe. The co-integration effect between regional markets, still, is largely disregarded. The current analysis looks at literature that validates inconsistent outcomes between regionally integrated markets (Isa, Nasrul, Noh & Mohamed, 2018; Kannan & Jesiah, 2019). Thus, analyzing the degree to which stock markets of three major regional economies, China, India, and

Pakistan, move in tandem or in opposition to one another would be intriguing. In the recent research publications, number of academics identified this field of study as possible avenue for investigation (Gangadharan & Yoonus, 2012). In another study Patel (2013) looked into dynamic relationships between the Indian stock market and stock markets of several Asian nations. The study's findings showed that there was an unfavorable relationship between the Indian and Japanese stock markets. The co-movement of the stock market is a phenomenon that changes throughout time, as stated by Ma and Zhu (2019).

The integration of stock markets in United States, Africa, Asia, European Union and other regions have been subject of in-depth research on co-integration of international capital markets. In recent study, the topic of market cointegration was examined in the main stock markets in the South Asian region by two academics Khan and Aslam (2014). The authors gathered and examined monthly data from 2007-2013 for stock market indices of Pakistan, China, India, Japan, Singapore, Malaysia, and Indonesia. The researchers employed the two-step Engle Granger technique, ARDL approach, and Johanson tests for data analysis. The study came to the conclusion that while Pakistan's stock exchange has statistically significant co-integration with Malaysia, Indonesia, Singapore and India, there is no statistically significant co-integration between the PSX and the Chinese and Japanese markets. The findings were little unexpected and at odds with some prior scholarly investigation in this field. Thus, the majority of research publications' conclusions differed from the ones made in this paper, which presented fresh problems regarding required co-movement of the stock exchanges in China and Pakistan.

The author concluded the research by suggesting that high frequency data from various dimensions should be used to further investigate the stock market cointegration of the rational stock markets. In a recent study, Raj and Marcus (2019) suggested that the topic of stock market co integration in different global stock markets should be examined using high frequency data for different time periods. Another study by Chen and Wu (2103) examined the global stock market's co-movement. Goal of study was to determine how much the stock markets of various nations move in tandem, to find out whether some nations could diversify their cross-border risk, and to look at macroeconomic risk that could have an impact on company returns. An extensive dataset comprising around thirty-two developed and developing stock markets was examined. The study came to the conclusion that, before choosing the cross-border investment choice, fund managers should thoroughly the research various market factors. The authors highlighted the importance of assessing the financial risk of various markets in order to achieve appropriate portfolio diversification, a point that was reinforced by Isa et al. (2018).

In addition, Khannan and Jesiah (2019) suggested that in order to gain a deeper understanding of the diversification potential of the various stock markets, there should be more study done on the subject of market co-movement in a variety of geographically divided marketplaces. The purpose of this research is to examine the possibilities for diversification in the three major economies in the area and to look for possible investment opportunities on these stock exchanges. Analyzing regional stock markets for investment and diversification purposes involves evaluating various factors such as economic indicators, market trends, geopolitical risks, and sector performance. This study aids in

examining the segmentation and movement among the three stock markets in question. Investors can also benefit from this study by knowing which of these nations to invest in to maximize portfolio diversification's effects and maximize profits while lowering risk. The co-movement of three major regional markets will be empirically verified, which is crucial from standpoint of future investment and diversification.

## LITERATURE REVIEW

Harry Markowitz first proposed concept of portfolio diversification in 1952, when his well-known paper, portfolio selection was published in journal of finance. Following development of Markowitz portfolio theory, study of diversification opened up new directions for finance scholars. They began analyzing various nations and areas in order to identify prospective diversification chances and to elucidate the advantages of diversification. Herbert (1968) went into great depth about advantages of having a diverse foreign portfolio. He stated that novel way to benefit from countries' economic ties is through portfolio diversification on international scale. The benefit of international portfolio diversification differs from the "gain of trade" and productivity gains resulting from the movement of production elements between nations. Since the United States has the largest economy in world and has considerable influence on both its surrounding countries and other countries to some extent, the literature has extensively studied the impact of US stock market on other stock markets. Using a just created rank test of co integration in conjunction with traditional linear co-integration tests, Li (2006) hired novel approach to analyze co-movement connections & dynamic interactions among various economies.

Using daily data from stock price indexes from May 29, 1992, to April 10, 2001, the study examines the cointegration of the stock markets in Australia, Japan, New Zealand, the United Kingdom, and the United States. Compared to the linear co integration model, the nonlinear co integration model provides stronger evidence for co integration. The results of this study contradict those of previous investigations that only employed the linear cointegration model. A large number of academics studied the mechanisms of transmission in equity markets and the fluctuations in stock prices. The transmission channels are subject to variation over time and among markets, contingent upon the financial system, infrastructure, and cultural factors, among other factors. Before, during, and after Asian financial crisis of 1997–1998, Huyghebaert and Wang (2010) examined, with consideration for integration of these countries with US, interdependence and integration among seven economies of the Asian area stock markets. The daily stock market data in terms of national currencies from July 1, 1992, to June 3, 2003, was used for data analysis. Multivariate VAR models & co-integration tests were done to determine the degree of co-integration and log run equilibrium among various stock exchanges.

The study's conclusions show that the economies of East Asia are strongly correlated and integrated, and that this relationship is a constant, changing phenomenon across time rather than a static one. Majority of the work that has been written on analysis of stock market co movements has focused on the relationships and extent of integration between developed and developing nations. Ali, Butt and Rehman (2011) examined how emerging stock markets moved together for their investigation, they analyzed monthly stock price data from July 1998 to June 2008. They find that Pakistan's stock

market is less linked than other developed stock markets, indicating that there are very attractive opportunities for international investors to take full advantage of portfolio diversification benefits on Pakistan's stock market. It was investigated by Hussain and Muhammad (2011) how Pakistan's stock market is integrated with world market. The study examined the integration of stock markets of Pakistan, India, China, the United States, the United Kingdom, and Germany. To verify Pakistan's stock market cointegration with nations under examination, monthly data on stock market indexes of the countries under study from 2000 to 2010 was examined. The findings showed that Pakistan's stock market had the highest returns, roughly 0.41%, among all the markets considered, albeit at the highest risk.

Moreover, there was little to no co-integration between the European and American stock markets and the Pakistani stock market. It suggests that European and American equities markets, as well as the Pakistani stock market, have a great deal of untapped potential. In order to gain a thorough understanding of the degree and kind of stock market integrations among various nations, various academics have attempted to examine problem of stock market co-integration from various angles over time. Tiwari, Dar, and Bahanja (2013) undertook study to assess the co-integration among the nine selected nations in South Asian region. The study looked on co-integration of stock markets in South Korea, Taiwan, Singapore, Hong Kong, Malaysia, Indonesia, China & India. This study unique feature was its application of Walvete multiple correlation, a novel method for data analysis that was previously put out by (Femandez, 2012). There is an extensive degree of shared integration amid the stock markets in designated Asian region. Besides, at low frequencies, there was comparatively greater integration between Asian stock markets, but not at high frequencies. The authors came to conclusion that while prospective benefits for long-term investment were not general, chosen Asian markets could offer possible returns on short-term investments such as monthly, quarterly, every six months, and annually.

Therefore, investors that invest for short term can gain from diversification; however, for long-term investments, potential for diversification is not as great & long-term diversification cannot provide the desired benefits. The dynamic relationships between the Indian stock market and a particular stock market in region were examined by Patel (2013). Using Johansen co-integration tests, author looked into how stock markets of Sri Lanka Republic of Korea, Malaysia, Pakistan, Singapore, China, and Taiwan were related to the Indian stock market. The Vector Error Correction Model, the Augmented Dickey Fuller Unit Root Test, and analysis of monthly data from these stock markets. By following these steps, you can conduct a comprehensive analysis of the regional stock markets to make informed investment decisions and effectively diversify your portfolio. Remember to consult with financial professionals or conduct thorough research before making any investment decisions. The results of statistical tests show that, save from Japan, all other Asian countries' stock markets have favorable correlations with the Indian stock market. The author added that the excessively high stock market capitalization of Korea, China, and Singapore could be the cause of the Indian stock market causality, while Pakistan's stock market capitalization is relatively low in comparison to India, suggesting that the Indian stock market's causality in Pakistan could also be attributable to this factor.

## RESEARCH METHODOLOGY

The study objective is to analyze Pakistani, Indian & Chinese regional integration from investment and diversification standpoint. These regional stock exchanges' joint movements and possibilities for diversification are examined using the data from these stock market indices. These three nations were chosen for this reason: their stock markets are fastest-growing in the region and have sizable market capitalizations. The judgmental sampling technique served as foundation for samples from three Asian nations.

### Population of Study

The primary goal of research is to examine the three stock exchanges in Pakistan, India, and China from the perspectives of investment and diversification. Therefore, Asian stock markets comprise the study's population. Since goal is to analyze co-movement of three countries' rapidly expanding markets, all of Asia is excluded. The other nations in region were not included in the analysis due to time constraints.

### Type of Study

The quantitative research method is used in this investigation, quantitative research methodology is essentially a data-led methodology. Using statistical analysis techniques, quantitative research applies empirical measures to phenomena. With quantitative research approach, we obtain data and analyze it using various statistical analytic techniques to gain insights about a phenomenon or scenario. In quantitative research, deductive method is employed. The positivist research paradigm is used, in which hypothesis is first developed and then empirically verified using various statistical tests and methods.

### Time Horizon

Regarding the duration of the data, three stock market indexes that were chosen between 2002 and 2014 are ones that are used. For the purpose of data analysis, this study uses daily data from stock market indices for previous thirteen years. The primary goal of employing the high frequency daily index data was to support the approval made by Khan and Aslam (2014) that study should employ high frequency daily data instead of monthly data, which was method most researchers employed in literature. This will allow us to analyze data at very basic level and gain very deep insights about the three markets.

### Data Analysis

One of the most crucial aspects of any research project is data analysis. This part uses statistical and econometrical techniques to examine data that the researchers have obtained from diverse sources or data gathering tools. Data that has been subjected to a variety of statistical tests produces results that highlight any embedded patterns, allowing us to make insightful deductions from the data. Different types of statistical tests are designed to meet unique requirements of a given situation for a variety of analyses. Selecting the right test to utilize for a research project is crucial since wrong test could offer misleading/unsuitable results. Second, as any deviation from suggested technique could provide us with inaccurate findings, it is vital that you adhere to precise steps and procedures during examinations.

## RESULTS OF STUDY

Table 1 Descriptive Statistics

| | PSX--100 | SSEC | BSESN |
|---|---|---|---|
| Mean | -0.00039 | -0.000048 | -0.00028 |
| Median | -0.00059 | -0.00020 | -0.00048 |
| Maximum | 0.0336 | 0.040 | 0.05128 |
| Minimum | -0.037 | -0.0392 | -0.06944 |
| STD DEV | 0.0055 | 0.0069 | 0.006644 |

The essential characteristics of data are described by descriptive statistics. It offers a summary of the chosen data's attributes. Descriptive statistics of data for three stock market indices from January 2002 to 2014 are displayed in Table .1. Over the specified period, average excess returns across all equity markets are negative. The standard deviation, which shows the distribution and variation in the data, is second significant item in table. A measure of risk in and of itself, the standard deviation indicates how uncertain and fluctuating the data set is; the more the fluctuation, the higher the risk and standard deviation. According to standard deviation, Shanghai Stock Market Composite Index (SSEC) has a standard deviation of 0.0069, making it the riskiest and most volatile market in region. The Karachi Stock Market Index (KSE-100) has standard deviation of 0.0055. The value of Skewness for each indicator in this case is within the normalcy range, indicating that data utilized in study is normally distributed.

Table 2 Correlation Analysis

| Correlation t-Statistics Probability | KSE 100 | SSEC | BSESN |
|---|---|---|---|
| KSE 100 | 1.000 | | |
| SSEC | 0.021887 | 1.000 | |
| | 1.227 | | |
| | 0.2199 | | |
| BSESN | 0.01337 | 0.0221 | 1.000 |
| | 0.7493 | 1.2406 | |
| | 0.4537 | 0.0290 | |

Examining stock markets of Pakistan, China, and India for investment potential and diversification is our goal in this study. As is well known, the mean variance theory predicts that there should be a negative correlation between various investment mixes. This correlation table can give us important insights into mean variance theory from standpoint of investing and diversification. The correlation between Shanghai stock market composite index and Karachi stock exchange (KSE 100) is 0.021, indicating a weak positive but statistically insignificant relationship between two. A very weak, positive, and statistically insignificant correlation has been found between two neighboring stock market indexes, as seen by correlation of the Indian stock market index (ISN) and the Karachi stock market (KSE 100).

We will now analyze Pakistani fund managers' relative investing possibilities in the stock markets of three major regional economies, correlation table shows that there is little to no proportional correlation between equity markets of Pakistan and those of China and India. Due to the negligible

correlation, Pakistani businessmen can fully profit from diversification by making savings in China and India. Out of all data set correlations provided, correlation between equity markets of China and Pakistan is strongest.

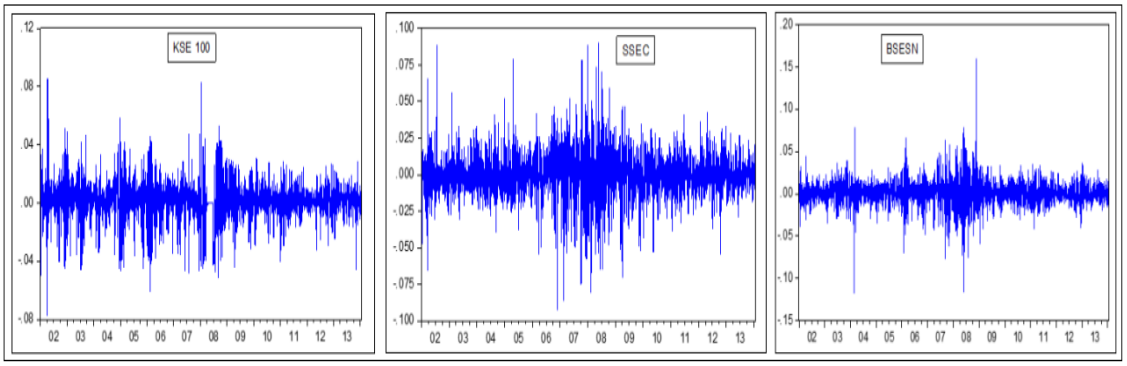
## Data Stationarity Check

A time series data set is referred to as stationary when its mean and variance do not vary across the given time series. Stationarity is statistical feature of time series data. Mean and variance of time series data are always subject to change due to predictable trends and behavior in stationary data. Prior to data analysis, raw data for time series analysis should be converted to stationary form. There are two methods to verify if a time series is stationary utilizing formal statistical tests and informal graphical depiction.

## Checking the Stationarity through graphical representation

The informal graphical method is used before doing a formal statistical test to verify for stationarity. Initially, the stationarity of data was verified at the level, but an upward trend in data was observed on graphs, which is interpreted as an indication of non-stationarity. The graphs for each individual data set are provided below. After stationarity at level is verified, the data's stationarity is verified at first difference. Although data appears to be stationary & lacks any discernible pattern or trend, it provides that no precise information regarding the data's stationarity. The fact that the graphical technique cannot provide precise information regarding the stationarity of the data is a significant drawback. Therefore, statistical tests are frequently utilized for additional statistical confirmation of the stationarity of data. The data's stationarity is statistically verified in following step by using a few stationarity tests.

Figure 1 Self-Explanatory Graphs




## Unit Root Test

One statistical tool for determining whether time series data shows stationarity is the unit root test. There are several tests in this, but the Augmented Dickey-Fuller test is the most popular and well-known. In this study, the Augmented Dickey-Fuller test is also utilized for analysis. There are three alternatives available for the unit root test: level, first difference, and second difference stationarity tests and thus every front variable was level and stationery. In this linking the equation that follows

is utilized. The results of the Augmented Dickey-Fuller test for the stationarity are given in the below table.

$$\Delta Y_t=\alpha_0+\alpha_{t-1}+\delta y_{t-1}+u_t$$

Table 3 Augmented Dickey-Fuller Test

| Indexes | t-Statistics | SIG |
|---|---|---|
| KSE-100 | -49.62 | 0.000 |
| NIKKI-225 | -57.95 | 0.000 |
| SSEC | -55.45 | 0.000 |
| BSESN | -52.27 | 0.000 |

When using Augmented Dickey-Fuller test, each time series data sheet's stationarity is examined separately. For each of three-date series, the stationarity of the data was initially verified on a level, but the results were not stationary at that level. Following that, the data's stationarity is examined at the first difference, and at that point, the data becomes stationary. Table No. 3 displays the actual output of the Augmented Dickey-Fuller for provided data set. The data is stationary, as indicated by t-statistic and significance value. Moreover, the statistical significance of the data's stationarity is notable. This is advantageous because stationarity is vital for time series data analysis; without it, conclusions could be erroneous, non-scientific, and untrustworthy, perhaps missing vital results. As result, there are no trends or cyclic behaviors in data used for analysis, which would otherwise lead to a stationarity issue.

## Test for Co-integration

When examining the relationship between two or more variables, cointegration test is employed. Variable associations are sometimes alleged to be highly significant & might be helpful in making strategic decisions in future. Examining relationships among three main regional equities markets, Pakistan, China, and India, is the aim of this study. in order to gain a deeper understanding of their relationship. This research will provide invaluable insights into the investment and diversification potential of these markets. The first prerequisite for Johanson test of cointegration is that the data utilized for analysis must be non-stationary, which implies that its mean and variance should not change over time.

This further presupposes that the data should not exhibit any cyclical patterns or changes. Second, the order in which data are integrated for analysis must match. The co-integration of these chosen markets is initially looked at so as to acquire information about co movement of the stock markets in China, India, and Pakistan. How many cointegration equations are present in the provided data set is shown by the combined result of Johanson cointegration test. On the data set, cointegration test (Johanson, 1988) is applied concurrently. The outcome of Johanson co integration is displayed in following table.

Table 4 Johanson Co-integration test

| | Unrestricted Co integration Rank test (Trace) | | | Unrestricted Co integration Rank test (MEV) | | |
|---|---|---|---|---|---|---|
| Hypothesized No of CE(s) | Trace Statistics | 0.05 Critical Value | Sig.** | Max-Eigen Statistic | 0.05 Critical value | Prob.** |

| | | | | | | |
|---|---|---|---|---|---|---|
| None | 47.10 | 47.85 | 0.05 | 28.71 | 27.58 | 0.03 |
| At most 1* | 18.39 | 29.79 | 0.53 | 10.80 | 21.13 | 0.66 |
| At most 2* | 7.58 | 15.49 | 0.51 | 4.11 | 14.26 | 0.51 |
| At most 3* | 3.47 | 03.84 | 0.062 | 3.47 | 03.84 | 0.06 |

Trace test indicates no co integrating equations at significance level of 0.05, Max-Eigen value indicates 1 co integrating equations at significance level of 0.05.
Indicates the rejection of null hypothesis at significance level of 0.05, ** Mackinnon-Haugi Michelis (1999) P-value.

Two crucial tables are produced by Johanson test of cointegration: Trace unrestricted cointegration rank test and Maximum Eigen value unrestricted cointegration rank test. Both tests are beneficial for additional reasons. Cheung and Lai (1993), for instance, asserted that the Trace test is preferable than the Maximum Eigen value test. However, other academics believe that the Maximum Eigen value is the superior option; in reality, it can be challenging to determine which option is the best so to gain a thorough understanding of the data in this investigation, we interpreted the Trace and Maximum Eigen value tests. The findings of the Trace test are interpreted first, followed by the results of the Maximum Eigen value test. The null hypothesis for the Trace test is that the three stock market indices do not cointegrate. Table 4. "None" represents the first null hypothesis. Trace test's probability value is 0.05, indicating a significant P-statistic value. This shows that the alternative hypothesis is rejected and the null hypothesis is accepted because the value falls inside significant range at 95%.

The number of co-integrated equations is indicated by at most 1, at most 2, and at most 3. Assume that there is one, two, or three co-integrated equations, correspondingly, at most 1, at most 2, and at most 3. It is statistically insignificant that co integration of the three stock market indices is at most 1, at most 2, and at most 3. This suggests that there is no cointegration equation in chosen data set and that there is no statistically significant integration between stock indexes of China, India, and Pakistan. Results of the second test, Maximum Eigen Value test, are interpreted after the Trace test, absence of cointegration among three stock market indices is null hypothesis, initial null hypothesis is shown in table 4. as "None," and as its value is less than 0.03, the alternative hypothesis is rejected and null hypothesis is accepted, number of co-integrated equations is indicated by at most 1, at most 2, and at most 3.

Assuming that there is one, two, or three co-integrated equations, respectively, at most 1, at most 2, and at most 3, the significant value of the values of at most 1, at most 2, and at most 3 indicate that no equation is the co-integrated and that the variable integration is statistically not significant. The maximum Eigen value indicated a single co integrated relation; this relationship is identified in the following section by checking the pairwise co integration of the many possible pairings. The three stock market indexes of Pakistan, China, and India are not co integrated with one another, and the co-integration between them is the statistically negligible, based on the results of the Johanson co integration test. The pairwise co integration of the market indexes for Pakistan, China, and India is examined in order to have a thorough grasp of the relationship between chosen stock markets and equity markets.

Table 5 Pairwise Co-integration

| Indexes | Unrestricted Co integration Rank test (Trace) | | | Unrestricted Co integration Rank test (MEV) | | |
|---|---|---|---|---|---|---|
| | Trace Statistics | 0.05 Critical value | Prob.** | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
| Pak-China | 2.41 | 3.84 | 0.12 | 2.41 | 3.84 | 0.12 |
| Pak-India | 3.11 | 3.84 | 0.07 | 3.11 | 3.84 | 0.07 |
| China-India | 1.58 | 3.84 | 0.20 | 1.58 | 3.84 | 0.20 |

Table 5 displays the pairwise correlation between three major stock market indexes and Pakistan Stock Exchange (PSX100) index, one by one. The statistics from Maximum Eigen value and Trace test values are analyzed, and approximate same findings are obtained for both tests. The findings demonstrate that there is no statistically significant co-integration amid Pakistan Stock Exchange (PSX100) and stock market indices of China and India. This is supported by pertinent probability values, which reveal that Trace and Max-Eigen values are not statistically significant. The Pakistan stock exchange (PSX100) pairwise co-integration links with all other nations are negligible, shown in table 5 above.

## DISCUSSION

This paper's primary goal is to analyze, look into, and perhaps diversify the stock markets of China, India, and Pakistan. The goal of choosing the research topic is to ascertain the potential for regional diversification for managers of local, regional, and global portfolios and funds. A strong foundation for investment, portfolio diversification is provided by mean variance theory. The best diversified portfolio, according to mean variance theory, should be made up of stocks that have a negative association, which indicates that investment mix shouldn't be integrated with itself (Isa, Nasrul, Noh & Mohamed, 2018). The co-integration among three chosen countries is examined in this study to determine the potential for international diversification using the mean variance theory. A very structured and methodical approach is used in this investigation. First, unit root test is used to verify the stationarity of data obtained from the stock market (Kannan & Jesiah, 2019). The data is not stationary at level, according to findings of stationarity at level check. During unit root test, data became stagnant at the first difference. The cointegration of the three data series is examined after stationarity of data has been verified. In this linking, the integration of three stock market indices is studied using Johanson test of the cointegration. Two distinct test results are provided by Johanson cointegration test, each of which indicates whether the hypothesis is accepted or rejected at the particular degree of the confidence interval. The combined cointegration of all three-time series is examined in first stage.

The Trace test's combined results of three time series show that the co-integration among the three stock market indexes is not statistically significant, despite Maximum Eigen value test indicating one co-integrated equities. The Johanson co integration test is used step-by-step to investigate the relationship and determine co integration pairs. The pairwise, step-by-step co integration analysis allows us to obtain incredibly deep insights into interrelation and co-movement of the stock market indexes (Gangadharan & Yoonus, 2012). The purpose of examining pairwise co-integration is to ascertain correlation and movement of various stock market indices. Analysis of co-integration is done first. Consequently, findings demonstrate that Pakistan's equity market behaves and moves

very differently from the stock markets of China and India, demonstrating that the stock market movement is not cointegrated with these markets (Khannan and Jesiah (2019). This demonstrates that Pakistani investors can make money over the long term by making investments in Chinese and Indian stock markets because fluctuations of these markets do not coincide with the movement of Pakistan's equity market. Pairwise cointegration suggests that investors from Pakistan can diversify their portfolios by purchasing Chinese stocks, and that the Chinese investors can reap the same benefits. there is no statistically significant cointegration between Chinese & Indian markets. Only these relations in the total pairwise relations have the 95% confidence interval where no one is statistically significant.

## CONCLUSION

The conclusion is the most essential section of any research paper. This displays the real findings and outcomes of the investigation. The study's result is particularly significant since it provides us with critical details regarding the cointegration of the equities markets in China, India, and Pakistan. The Johanson Co-Integration Test is used to examine the co movement of stock market indices. The findings indicate that there are potential prospects for investment and portfolio management for both Chinese and Indian investors as well as Pakistani investors should be aware that the country's stock market index is not co-integrated with the indices of China and India. The data indicates that Pakistan's equities market behaves and moves very differently from the stock markets of China and India, demonstrating a lack of co-integration between the two markets. This demonstrates that Pakistani investors can make money over time by making investments in the Chinese and Indian stock markets, because the movements of these markets do not coincide with the movement of the Pakistan's equity market. Pairwise cointegration suggests that investors from Pakistan can diversify their portfolios by purchasing Chinese stocks, and that the Chinese investors can reap the same benefits. Additionally, there is no statistically significant cointegration between the markets of the China and India. There is no statistically significant association with a 95% confidence interval in the total pairwise relations. Thus, the study's findings are in line with those of Patel (2013) and Khan and Aslam (2014).

### Implications

The study's "policy implications" are the least significant. The article goes into great detail about the long-term relationship between Indian and Chinese stock markets. The government's authorities are able to anticipate probable consequences of any financial crisis, take the appropriate action, and reduce its effects by taking preventive steps. The absence of co-integration in the stock market suggests that distinct policies govern each of three fore markets independently. This suggests that other nations' policy makers should also concentrate on developing global standards for regulation of stock markets.

### Limitations

There are certain limits to this study as well. To start, analysis of market data for certain companies is not taken into consideration. This study uses data from stock market indexes, which provides information on the market index as a whole rather than focusing on a single firm or set of companies. The examination of the various nations in various stock markets provides insightful knowledge on

investment and portfolio diversification prospects for fund managers. The study's second restriction stems from its exclusive focus on the analyzing three stock markets. The stock markets of the other significant regional economies are not taken into account. Additionally, this analysis ignores the various global regional economies, which could yield crucial information about interdependence of international stock markets. This study only examines the stock markets of the three nations in the concerned area.

### Future Research Recommendations

This study explores deeply into the topic of the regional stock market co-integration. Based on this, examining long-term relationships between the stock markets of various geographic regions could be topic for future research. Investors will receive wealth of useful and diversified information from this for portfolio diversification. These kinds of studies be highly beneficial in providing investors worldwide with comprehensive information that would not only allow them to invest, but also to understand the dynamic relationships and associations between different markets. To make the best choices when it comes to investing in these nations, foreign fund managers need to be well-versed in the various markets and how they relate to one another. It is crucial that future studies examine the dynamic relationship between various stock markets in diverse parts of world. Examining dynamic relationships among the regional stock markets with inclusion of other nations presents a potential second research area. Current study examines long-term relationship among just three nations, but it might be worthwhile to include other growing regional economies and reexamine this association. When investing in these markets, investors can benefit greatly from the in-depth insights that such studies can offer on various regional stock markets. The investors would be able to learn about the local marketplaces.

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