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Driven by Fundamentals or Exploded by Sentiments: Testing for Speculative Bubbles in Emerging Stock Markets

Asra Shaikh* Muhammad Kashif** Mobeen Ur Rehman*** Shafiq Ur Rehman****

Abstract

This study investigates the existence of speculative bubbles in diverse nine emerging markets, which may lead to terrible financial disasters. Therefore, a novel approach of Rtadf (Recursive, Right-tailed Augmented Dickey-Fuller) tests, monthly time-series data (January 2000–July 2021), and Monte-Carlo simulation under Gaussian assumptions is used. Our findings imply that massive growth in China, Indonesia, Malaysia, Pakistan, Taiwan, and Thailand is driven by credit or speculative bubbles rather than fundamentals whereas no bubbles are found in South Korea, India, and the Philippines - (as per Generalized Supreme ADF - GSADF test). Furthermore, in each stock market, these bubbles primarily exist prior to any local and global financial crisis. These findings add to the existing knowledge of the relationship between bubbles and financial crises. Hence, this study suggests the GSADF test could detect an impending financial crisis in any economy, allowing authorities to control or maintain economic and financial stability.

Keywords: Speculative bubbles; emerging markets; Rtadf approach; economic and financial stability.

JEL Classification: C58, G01, G41

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1. Introduction

According to behavioral finance theory, typically a stock market bubble, also known as an asset bubble or speculative bubble, is an unobservable phenomenon caused by a surge in asset prices as a result of an "investor's cognitive-emotional biases" or "exuberant market behavior," as a result of group thinking or herding behavior (Gali, 2014; Liaqat et al., 2019; Kashif et al., 2021). These financial bubbles have been the most important academic topic throughout history because they are used to predict financial crises since the longevity of speculative bubbles often leads to terrible financial disasters. However, quantifying such bubbles is difficult yet critical since public funds are more frequently trapped in these types of financial hurricanes (Ghosh, 2016b). Therefore, upfront bubble detection is one of the holy grails in financial markets as it manifests serious implicative effects on an economy, and may distort or cause a misrepresentation of a real economy affecting the output growth, investment prospects, anticipated inflation, and collective expenditure (Joarder et al., 2014). In such a case, these deviations in asset prices from their true intrinsic value indicate the existence of bubbles and that market has lost its effectiveness (Çağlı & Mandacı, 2017). However, a subsequent increase in stock prices is not the only reason for the bubble, other factors may also cause this phenomenon.

These bubbles may manifest in three folds: Firstly, it could be natural that appear on fiat money because the overconfidence of financial investors often stems from financial brokers or agents. Secondly, it may arise due to informational monopolies in which some people or firms have inside information and they take benefit of this information by manipulating other investors and artificially increasing the prices of desired stock so they can beat the market. Lastly, political alliances along with some running elites provoke major economic events which in turn leads to an economic bubble (Shleifer, 2000; Bansal & Yaron, 2004; Jimenez, 2011). Therefore, a vast amount of research has been devoted to investigating the presence of asset pricing bubbles in different stock markets (Yu & Hassan, 2010b; Chang et al., 2016; Lee & Phillips, 2016; Caspi & Graham, 2018; Zeren & Yilanci, 2019; Nazir et al., 2020).

Shortly, the incredible progress of emerging markets grabbed the attention of academic researchers and financial investors all around the world. According to the Wall Street article, emerging markets have become modern-day gold rush as their share has recently surpassed the developed market share in just the past 12 months (Weil, 2021). However, this incredible progress is somewhat inexplicable. No doubt, the financial asset prices of these emerging markets are booming but when we look at the public financing of these markets, it is turning from bad to worst (Bulwark, 2021). Given this fact, these markets are fueled by unprecedented global liquidity which occurred in response to the pandemic. The Federal Reserve and European Central Bank started printing more and more money, have pushed the world interest rates to the lowest possible level which in turn persuaded financial investors from around the world to stretch for the yield by taking more risk, especially through

investing in emerging markets (Bulwark, 2021).

Hence, the financial asset prices of emerging markets are not truly reflecting their deteriorating fundamentals or performance. Therefore, it is important to investigate whether the sharp increase in the emerging stock market indexes and market performance over the last decade is merely a speculative bubble or actual performance based on stock market fundamentals. In this regard, few studies have been conducted to document the single or multiple episodes of speculative bubbles in emerging markets (Ghosh, 2016b; Liu et al., 2016; Mitra & Chaudary, 2016; Almudhaf, 2018; Tran, 2017; Nazir et al., 2020; Korkmaz et al., 2021). However, no one has conducted research on testing speculative bubbles in (nine) emerging markets altogether to provide a comprehensive view to answer the main research questions of this study. 1. Are these emerging markets safe or riskier for financial investors' investments? 2. Are there any speculative or asset pricing bubbles in (nine) emerging stock markets? 3. Are these (Rtadf) able to predict the financial crisis led by speculative bubbles in these emerging stock markets?

To the best of our knowledge, the present study is unique as it contributes to scarce literature about date stamping single or multiple episodes of speculative bubbles in (nine) emerging markets (Including China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan, Thailand – MSCI Emerging market index) in addition to Pakistan (which recently reclassified as a frontier market but shares the most characteristics of the emerging market) to provide a comprehensive picture. Secondly, this study has considered the most recent time-series (monthly) secondary data from Jan 2000 to July 2021. Since 2000, 80% of the data has been available. As a result, this sample time period is chosen. Furthermore, this study compares various Recursive - Rtadf tests, such as Supreme ADF -SADF (Phillip et al., 2011) and Generalized SADF -GSADF, (Phillip et al., 2015), to see which test can better predict the financial crisis led by speculative bubbles in emerging stock markets. Lastly, Monte Carlo simulation is used for the p-values estimation (potentially more robust even in the presence of nonstationary volatility in the market) under the assumption of Gaussian innovations in emerging stock markets.

2. Literature Review

`The first bubble ever recorded in economic history was skyrocketing price of Tulip bulbs in the 1630s known as Tulip Mania or Tulip bubble, followed by the Mississippi bubble (1927); Asian Country's estate and stock market bubble (1992-1997); Dot-Com or Tech bubble (2000), Real-estate or Sub-Prime Mortgage Housing bubble (2008-2012); Greek Government Debt bubble (2011) and Bitcoin bubble (2015) are among the most important bubble examples in history (Zeren & Yilanci, 2019) These asset pricing bubbles are divided into two categories. For instance, rational bubbles and irrational bubbles. The irrational bubble is well explained by behavioral finance using the perspective of game theory by

combining the concepts of investors' psychology and factors of the environment. This includes the Noise trader model, Herding behavior model, Fashion trend model, etc. Conversely, rational bubble theory states, that a rational bubble occurs whenever the true price of an asset deviates progressively more quickly from its economic fundamentals. The growth of a rational bubble reflects the presence of rational expectations of an investor regarding the future increase in asset prices.

This idea of identification of a rational bubble was first proposed by Blanchard (1979a) using an overlapping generation model followed by various subsequent models based on rational expectation theory. According to this theory, past outcomes influence future outcomes, and it also laid down a theoretical foundation to measure the rational bubble. For instance, if the current price elasticity is compared to the next period's expected price elasticity and if the resulted value is smaller than 1 then there must be a forward solution that considers the condition of stationarity and therefore rational expectation is conditional on the relationship of current and future expected prices (Blanchard, 1979b). According to Chan et al. (1998), rational expectation also reveals the 'rational bubble law'. Rational bubbles mean that the long-run relationship between stock prices and dividends disappears or that an increase in stock prices moves over long periods, whereas the bubbles resulting from an increase in asset prices unexpectedly explode due to some specific events. As many individuals or firms involved in profit speculation grow, rational behavior devolves into what is known as a bubble. A bubble subsequently rises in price for a certain period before its collapse, while a prolonged negative bubble is referred to as a collapse. Therefore, Blanchard and Watson (1982) claimed this fact, speculative rational bubbles are not led by investors' rational behavior due to which it is more difficult to find such a potentially high-power procedure that can accurately detect rational bubbles in stock markets.

In retrospect, earlier rational bubble tests assume that rational bubbles are linear illustrating the fact that if a bubble exists in any market it will always exist and would not collapse or reoccur but in reality, this assumption does not hold. Thus, empirical identification of the rational stock market bubble in real-time has practically been a big challenge. Many researchers have proposed various statistical testing methods such as the Variance bound test (Shiller, 1981b); Co-integration test (Diba & Grossman, 1988a); Specification test (West, 1988) followed by Non-Linear testing models (Evans, 1991a); Generalized dickey fuller test (Hall et al., 1999) to test the presence of stock market bubbles over the period but due to severe criticism, loopholes and biases, these methods are not substantially supported by economists in general (Diba & Grossman, 1988b; Evans, 1991a; & Caspi, 2017).

More recently, a new advanced testing method based on the Recursive- right tail augmented dickey fuller (Rtadf) unit root test has been developed by Phillip et al. (2011) & Phillip et al. (2015) which enables us to not only identify the bubble but to also date stamp its occurrence. The significant advantage of this test is that it allows for accounting for nonlinear

patterns and multiple breaks during investigating multiple bubbles in the market. These tests consider changes in the generalized dickey-fuller test by considering the null hypothesis of unit root and alternative as mild explosive behavior with the use of the Monte-Carlo simulation technique to estimate the p-values. Due to this, these rolling and recursive tests are also found more robust and potentially more powerful than standard test methods.

Since the global financial crisis of 2008 triggered by the U.S sub-prime mortgage crisis, there has been a growing literature in more developed and emerging markets exploring the existence of financial bubbles and their potential consequences with the help of using above-mentioned strategies. In this regard, a couple of studies have documented date stamping of single or multiple episodes of bubbles (Yao & Luo, 2009; Yu & Hassan, 2010b; Caspi, 2014; Chang et al., 2016; Liu et al., 2016b; Rasekhi et al., 2017; Madjumerd et al., 2017; Caspi & Graham, 2018; Zeren & Yilanci, 2019; Liaqat et al., 2019). However, the recent shift of financial investors towards emerging markets over developed ones has attracted the interest of academic researchers everywhere to investigate whether or not the emerging market's sudden rise is consistent with its actual performance as measured by stock market fundamentals.

Hence, the present study contributes to the literature as follows: Firstly, this study aims to investigate the date stamping of single or multiple episodes of speculative bubbles in various emerging markets. Secondly, China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan, and Thailand stock emerging markets are considered in addition to Pakistan, using monthly time series secondary data from the period of (Jan 2000 – July 2021). Moreover, this study considers advanced Recursive – (Rtadf) models: Supreme ADF (SADF, Phillip et al., 2011) and Generalized SADF -GSADF (Phillip et al., 2015) with Monte Carlo simulation, under the assumption of Gaussian innovations to detect asset pricing bubbles.

2.1 Theoretical Background

The current equilibrium price (under the conditions of no-arbitrage and risk neutrality assumption) is equal to a future discounted expected outcome.

$$P_t = 1 / R_{t+1} E_t (P_{t+1} + D_{t+1}) \tag{1}$$

In which, Pt is the actual stock's price (t), Dt+1 is the dividends received for the maintenance of stocks from t-1 to t, Rt+1 is the gross discount rate and Et represents expectations at time t. later, a log-linear approximation of equation (1) is considered (Campbell & Shiller, 1988; Cochrane, 2001).

$$P_t = k + \rho p_{t+1} + (1+\rho) d_{t+1} - r_{t+1} \tag{2}$$

In which, log price to dividend obtained is as follows:

$$k = -\log \rho - (1-p)\log(\frac{1}{1-\rho})$$

This equation (2) represents the first-order difference which can be rewritten as:

$$p_t = p_t^f + b_t \tag{3}$$

In which, expectations and log-linear approximation lead to equation (4) using forward iterations.

$$p_t - d_t = \frac{k}{1-\rho} + \sum_{i=0}^{\infty} \rho E_t(\Delta d_{t+1+i} - r_{t+1+i}) + \underline{\lim}_{\infty} \rho^i E_t(\mathrm{p}_{t+i} - d_{t+i}) \tag{4}$$

Equation (4) can be further broken down into two equations:

$$p_t - r_t = f_t + b_t \tag{5}$$

$$f_t = \frac{k}{1-\rho} + \sum_{i=0}^{\infty} \rho E_t(\Delta d_{t+1+i} - r_{t+1+i}) \tag{6}$$

This equation (5) shows the most important component i.e. rational bubble in terms of the growth rate of expected profits. Where,

$$b_t = \underline{\lim}_{\infty} \rho^i E_t(\mathrm{p}_{t+i} - d_{t+i}) \tag{7}$$

In a situation, where a strictly positive rational bubble occurs, investors will pay an additional price i.e. more than the base price of the stock because they have a firm belief that their expectations will be compensated in future expected prices. This behavior of investors is aligned with the hypothesis of rational expectation theory (Caspi, 2014). Here one thing should be noted, in equation (4) variables (Pt - dt) can be computed through (ft and bt) as discussed above. Ft can be determined through . The explosive evidence of (Pt - dt) can exhibit strong evidence of an asset pricing bubble i.e. (bt = 0) only if dt and rt both are of maximum co-integration at the first order of difference.

This mild explosive behavior process was introduced by Philip and Mangdalinos (2007) which can be helpful in financial boom modeling. However, co-integration in dividends and stock prices fails to examine the periodic fading of stock bubbles because of certain biases and kurtosis (Evans, 1991a). Therefore, Philip et al. (2011) and Phillip et al. (2015) suggested the framework of advanced recursive (Rtadf) tests to detect single or multiple bubbles in a more sophisticated econometric way because these co-integration techniques or normal unit root tests cannot identify periodical fading of bubbles.

3. Research Methodology and Data Collection

This empirical study is based on the framework suggested by Philip et al. (2011) and Phillip et al. (2015), also regarded as an advanced recursive approach (Rtadf tests) to detect single or multiple bubbles in emerging stock markets. The sample size of this study includes the MSCI-Emerging stock markets such as China (Shanghai Stock Exchange– CSI-SSE-50 index); India (Nifty 50 index); Indonesia (KOMPAS 100 index); Korea (KOSPI 100 index); Malaysia (FTSE BURSA Malaysia 30 index); Philippines (PSEI 30 index); Taiwan (Taiwan Stock Exchange 100 index); Thailand (Thailand 100 index) in addition to Pakistan (KSE 100 index) – (Pakistan recently classified as Frontier Market but shares major characteristics of the emerging market).

In this regard, Philip et al. (2011) proposed a model known as the Sup ADF (SADF) test, which comprises a recursive right-tail unit root ADF that can date-stamp (detect the exuberance, duration, and collapse date) single asset pricing bubble. For this purpose, we also have the Chow test and Cumulative Sum test but the SADF test is found to be more efficient and fits best in structural failures while discovering bubbles. The random step process of this test is as follows:

$$y_t = dT^{-\eta} + \theta y_{t-1} + e_t, e_t \sim N(0, \delta^2), \theta = 1 \tag{8}$$

Where yt is the main variable (price-to-dividend ratio), d is constant, n is the coefficient where the sample size (T) extends to infinity and e is the error term. This right-tailed test by considering subsequent autoregressive properties can be written as:

$$y_t = \mu + \delta y_{t-1} + \sum_{i=1}^{p} \phi_i y_{t-i} + e_t \tag{9}$$

Where y_t is the main variable (price-to-dividend ratio), μ is constant, $\delta_{\mathbf{r_1, r_2}}$ sign is the approximate coefficient of ADF statistics, p means the maximum number of intervals, is the coefficient of differenced term and e is the error term. It should be noted that this test calculates the ADF statistic with $ADF_{r1, r2}$. In this regard, the normal range is from 0 to 1. The size of the window in regression is represented by r_w i.e. $r_w = r_2 - r_1$ (Caspi, 2014). The right-tailed test calculates the ADF statistic recursively and regression samples involve rolling windows to test rational bubbles based on the following hypothesis:

- H0 = $\delta_{\mathbf{r1, r2}} = \mathbf{0}$, Series has no rational bubble along with the unit root.
- H1 = $\delta_{\mathbf{r1, r2}} > \mathbf{0}$, Series have mildly explosive behavior or rational bubbles along with the unit root.

Unlike the normal left-tailed unit root tests where these r_1 and r_2 statistics are fixed and are placed as the first and last observation in the sample where $r_w = r_0 = 1$. Hence, the divergence in alternative Rtadf tests is about the replacement of ADF statistics of r_1 and r_2. This can better be understood with the following versions of the tests:

In the standard ADF unit root test, these r_1 and r_2 statistics are fixed and are placed as the first and last observations in the sample where $r_w = r_0 = 1$. This can be seen from the below-given figure (1). Therefore, this test fails to identify the periodic collapse of bubbles in any market.

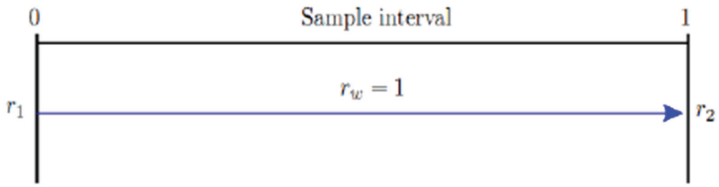

Figure 1: The process of ADF (Source: Caspi, 2014)

The Supreme ADF test is based on the computation of ADF statistics where the initial point is constant i.e. $r_1 = 0$ in all windows, but eventually, the size of the window increases at each stage at a specific rate. Accordingly, $ADFr_2$ represents the ADF value at each level of estimation, also found to be significant in detecting a single bubble such as:

$$SADF(r_0) = \sup\{ADF_{r2}\}, r_2 \in [r_0, 1] \tag{10}$$

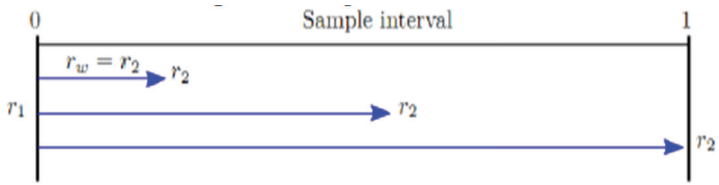

Figure 2: The process of Supreme ADF (Source: Caspi, 2014)

The Generalization of SADF statistics emerges through the GSADF strategy. In this test, the computation of ADF statistic of the initial point of estimation can be both fixed and variable [see Figure 4]. In case of multiple booms and collapse failures, the Generalized Sup ADF (GSADF) test is more appropriate and powerful. Moreover, among all the $ADFr_2$ statistics GSADF statistics are supremely related to each window such as:

$$GSADF(r_0) = \sup\{ADF_{r1}^{r2}\}, r_2 \in [r_0, 1] \,\&\, \mathrm{r}_1 \in [0, r_2 - \mathrm{r}_1] \tag{11}$$

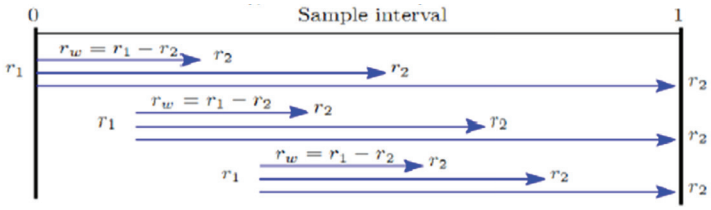

Figure 3: The process of Generalized ADF (Source: Caspi, 2014)

Hence, for the empirical testing, these regression models were used to derive Supreme ADF (SADF) and Generalized SADF (GSADF) statistics with the inclusion of a constant. On the other hand, Phillips et al. (2015) propose a backward sup ADF (BSADF) test to detect the origin and termination date of a bubble. The direction of the tests is reversed in the tests. The origination and termination date of a bubble can be determined based on the BSADF statistic. Additionally, secondary data is obtained from the official database of the Refinitiv Eikon Database. The minimum window size considered is 32 as per the general rule of $\lambda 0 = 0.01 + 1.8 / \sqrt{T}$ (Phillips et al., 2015). The p–values of the statistics are computed using Monte Carlo simulations under the assumption of the Gaussian method which is expected to be found robust even in the presence of nonstationary volatility in the market. Moreover, it should also be noted all simulations are executed using Rtadf (E-views) Add-in (Caspi, 2015) rested on 1000 replications with a sample size of 259 observations.

3.1 Data Collection

In our implementation for the illustrative analysis, the empirical data employed is monthly time series including Price per share (P) and Dividend per share (DPS) of selected listed companies of the following MSCI emerging stock markets along with Pakistan. The sample includes the following stock market indexes: China – (Shanghai Stock Exchange–CSI-SSE-50 index), India – (Nifty 50 index), Indonesia – (KOMPAS 100 index), Korea – (KOSPI 100 index), Malaysia – (FTSE BURSA Malaysia 30 index), Pakistan - (KSE 100 index), Philippines – (PSEI 30 index), Taiwan – (Taiwan Stock Exchange 100 index) and Thailand – (Thailand 100 index). The secondary data is gathered from the official database of Refinitiv Eikon Database from the period of (Jan 2000 to July 2021) of the major (most commonly used) stock indexes of emerging stock markets, as well as according to the availability of required data. However, to reflect the relationship between stock prices with its market fundamentals, the Price to dividend ratio is considered and computed by taking the cross averages of listed companies' data (Caspi, 2017).

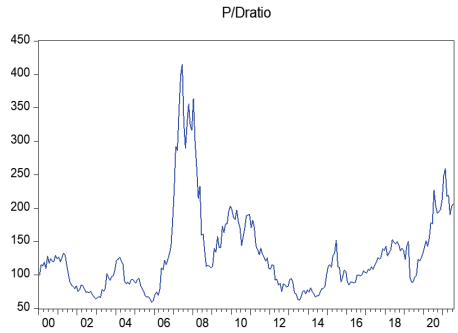

Figure 4: P/D ratio (China)

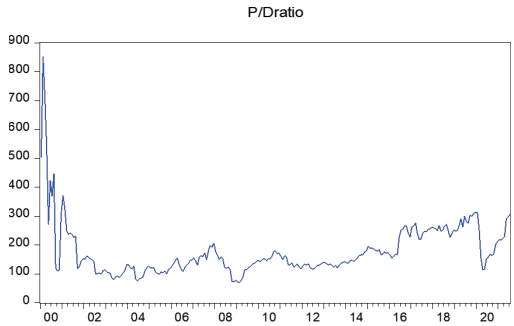

Figure 5: P/D ratio (India)

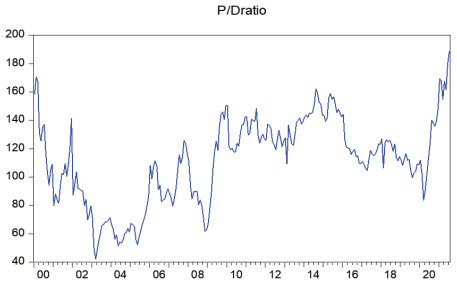

Figure 6: P/D ratio (Indonesia)

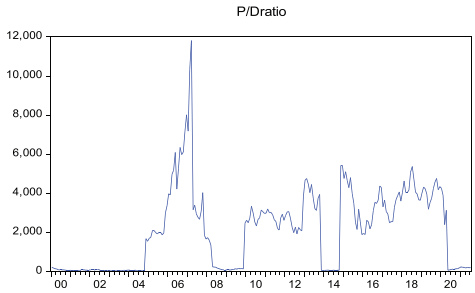

Figure 7: P/D ratio (Korea)

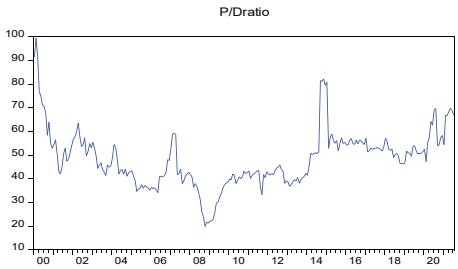

Figure 8: P/D ratio (Malaysia)

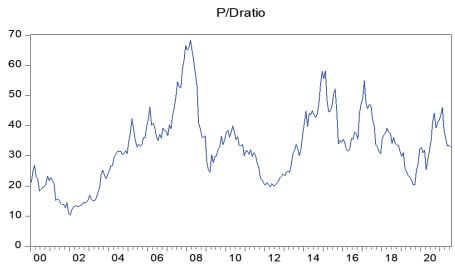

Figure 9: P/D ratio (Pakistan)

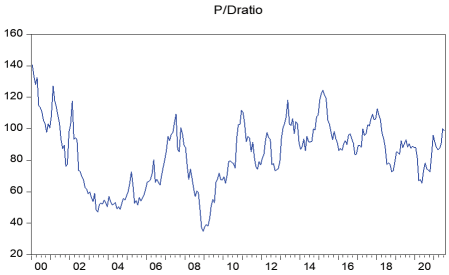

Figure 10: P/D ratio (Philippines)

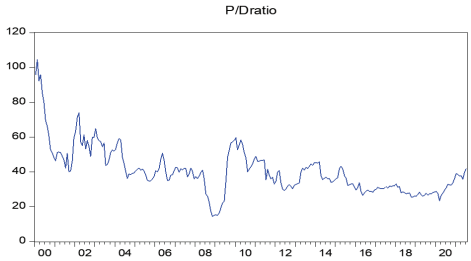

Figure 11: P/D ratio (Taiwan)

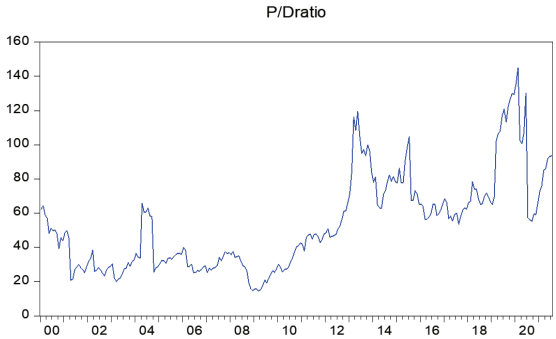

Figure 12: P/D ratio (Thailand)

Following the studies of Philips et al. (2011) and Phillip et al. (2015), the above figures (4-12) show the testing data of the Price to a Dividend ratio of all the listed companies in emerging markets. During the sample period of (Jan 2000 – July 2021), dramatic abrupt fluctuations can be detected easily in all the index's price-to-dividend ratios with the illustrational evidence of multiple shocks or bubbles in these markets.

4. Results and Discussion

This empirical study has considered bubble discovery tests based on the volatility of right-tailed ADF tests (Rtadf) in which the null hypothesis is a unit root (no bubbles) and the alternate hypothesis exhibits the existence of bubbles in the stock market.

Table 1
Recursive Right-Tailed- ADF Tests Results

STOCK MARKETS	SADF	GSADF
Shanghai SE 50 (China)	5.96 (0.00)***	6.65 (0.00)*
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.11
CV - 90 % Level	1.18	1.92
NIFTY 50 (India)	-2.03 (0.99)	1.73 (0.14)
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.11
CV - 90 % Level	1.18	1.92
KOMPAS 100 (Indonesia)	4.22 (0.00)***	4.22 (0.00)***
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.11
CV - 90 % Level	1.18	1.92
KOSPI 100 (Korea)	-1.64 (0.98)	1.79 (0.12)
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.11
CV - 90 % Level	1.18	1.92
FTSE BURSA (Malaysia)	-1.52 (0.93)	1.02 (0.10)*
CV - 99 % Level	0.99	1.77
CV - 95 % Level	0.51	1.28
CV - 90 % Level	0.29	1.02
KSE 100 (Pakistan)	1.73 (0.01)***	2.09 (0.06)*
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.11
CV - 90 % Level	1.18	1.92
PSEI 30 (Philippines)	-1.23 (0.96)	0.84 (0.65)
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.11
CV - 90 % Level	1.18	1.92
TAIWAN 100 (Taiwan)	-1.48 (0.93)	1.20 (0.05)**
CV - 99 % Level	0.99	1.77
CV - 95 % Level	0.51	1.28
CV - 90 % Level	0.29	1.02
Thailand 100 (Thailand)	0.26 (0.44)	4.91 (0.00)***
CV - 99 % Level	1.96	2.75
CV - 95 % Level	1.46	2.1
CV - 90 % Level	1.18	1.92

This table reports the results of Emerging (nine) markets from the period of Jan 2000- July 2021 of two right-tailed (ADF) regression models with the P-values computed through Monte Carlo simulations based on 1000 replications considering an initial window size of 32 (sample size 259 observations) through E-views (Rtadf) Add-ins. (***) represents 1%, (**) represents 5% and (*) represents a 10% level of significance respectively.
(Source: Author's Calculations)

Table (1) suggests strong evidence of the existence of rational bubbles in China, Indonesia, Malaysia, Pakistan, Taiwan, and Thailand stock markets from (Jan 2000 to July 2021). The null hypothesis (unit root or no bubbles) is rejected as the GSADF statistics values are found statistically significant at 1%, 5%, or 10% levels also greater than its critical values as computed through Monte-Carlo simulation. However, South Korea, India, and the Philippines exhibit no evidence of significant rational bubbles. The results, in other words, suggest the GSADF test is found to be a better model than the SADF test in detecting past multiple bubbles in diverse emerging markets. Moreover, for the date stamping Backward (SADF) statistics sequence with 95%, the critical value sequence is used from the Monte Carlo simulation of 1000 replications.

4.1 Pakistan

Regarding Pakistan, strong evidence of multiple bubbles is found in (KSE -100 index) from the period of Jan 2000- July 2021 as SADF and GSADF t-statistics are found greater than all critical values and are also found statistically significant at 1% under the Monte Carlo simulations.

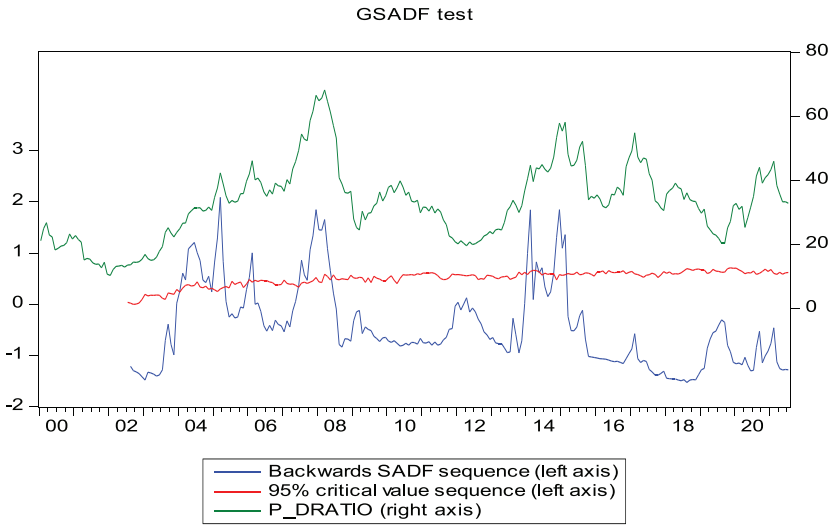

Figure 13: GSADF (Pakistan)

The visual inspection of the date stamping procedure can be seen from the above graphical illustration of the GSADF test. In which, the blue line represents BSADF (Backward SADF) sequence and the red line shows the threshold sequence at 95% critical value sequence. Figure 13 shows the BSADF sequence does cross the threshold rejection line at different times stating the existence of three multiple bubbles. Firstly, the BSADF sequence stays above the threshold from 2003 to 2005. This bubble indicates the bullish trend which continued in terms of market capitalization, turnover, and shares traded as a result of privatization moves and liberalization measures after a decade. Secondly, the run-up phase of another big bubble can be seen for about months in and around 2007-2008 mainly caused due to the assassination of Prime Minister - Mohtarma Benazir Bhutto followed by the global financial crisis of (2008), political upheaval, and local crisis. Lastly, another big bubble can be seen during June 2013, this happened due to the excitement created ahead of Pakistan's reclassification into the MSCI emerging market and panic selling of (heavy-weighted by our local investors as a result of disappointment (Dawn, 2017 & Liaqat et al., 2019).

4.2 China

Regarding China, again strong evidence of multiple bubbles is found in (Shanghai SE 50 index) from the period of Jan 2000- to July 2021 as SADF and GSADF t-statistics are found greater than all critical values and are also found statistically significant at 1% under the Monte Carlo simulations.

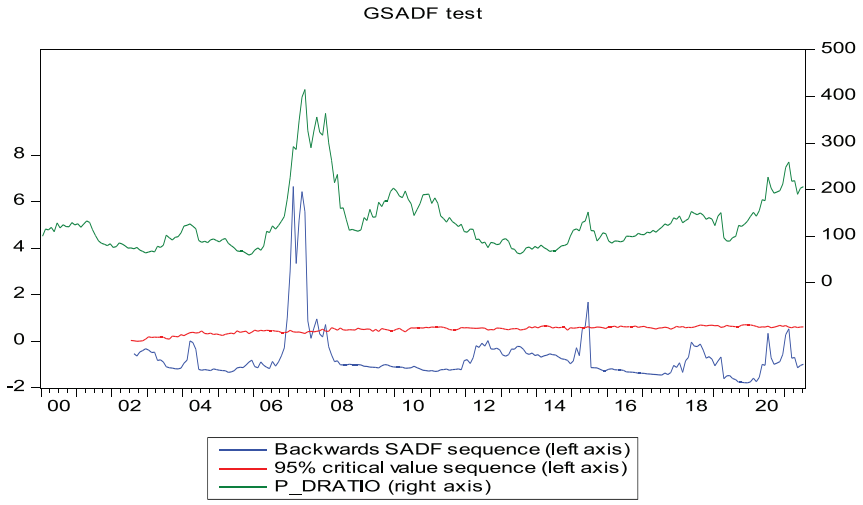

Figure 14: GSADF (China)

Figure 14 shows that the BSADF sequence does cross the threshold rejection line at different times stating the existence of two multiple bubbles in the market of China. Firstly, the BSADF sequence stays above the threshold from 2007 to 2008 during the period of the subprime crisis. Moreover, the situation got worst when the Chinese stock market bubble in 2007 also hit the economy when the SSE Composite index of the Shanghai stock exchange collapsed by 9% due to an unpredicted selloff. This was unfortunately one of the largest dips in the history of 10 years, which triggered a major drop in worldwide stock markets (Chang et al., 2016). Another bubble occurred around the period of 2015, when inexperienced people started investing in the Chinese stock market especially in leveraged instruments due to the changes in Government policy to solve its debt issue, this was followed by the market collapse.

4.3 Indonesia

Indonesia also exhibits strong evidence of multiple bubbles in the Kompas 100 index from Jan 2000 to July 2021) as SADF and GSADF t-statistics are found greater than all its critical values, and are also found statistically significant at 5% and 1% respectively under the Monte Carlo simulations.

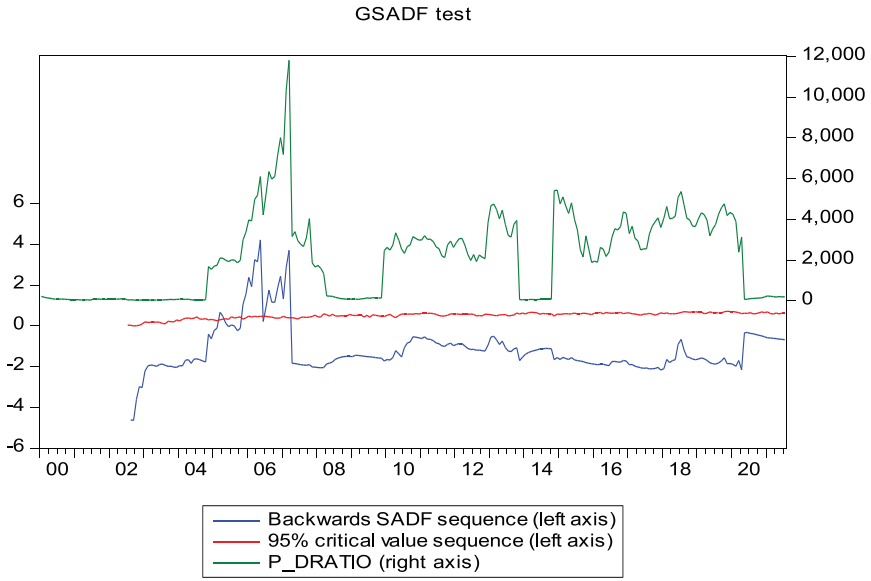

Figure 15: GSADF (Indonesia)

Figure 15 shows that the BSADF sequence does cross the threshold rejection line at different times stating the existence of two multiple bubbles in the market of Indonesia. Firstly, the BSADF sequence stays above the threshold from 2005 to 2006 and 2006 to 2007 respectively. These multiple phases of bubbles occurred due to the significant events which

happened in the Indonesian stock market. This includes the stock options which were launched in October 2004. Moreover, the Surabaya stock exchange also merged with the Jakarta stock exchange in 2007 to increase the operational efficiency of the stock market. These events were then followed by the subprime Global financial crisis (Chan & Woo, 2008; Chen & Xie, 2017;Almudhaf, 2018).

4.4 Korea

Korea exhibits no evidence of the rational bubble in the Kospi 100 index from Jan 2000 to July 2021as SADF &GSADF t-statistics are found smaller than all its critical values, and is also found statistically insignificant even at 10% under the Monte Carlo simulations.

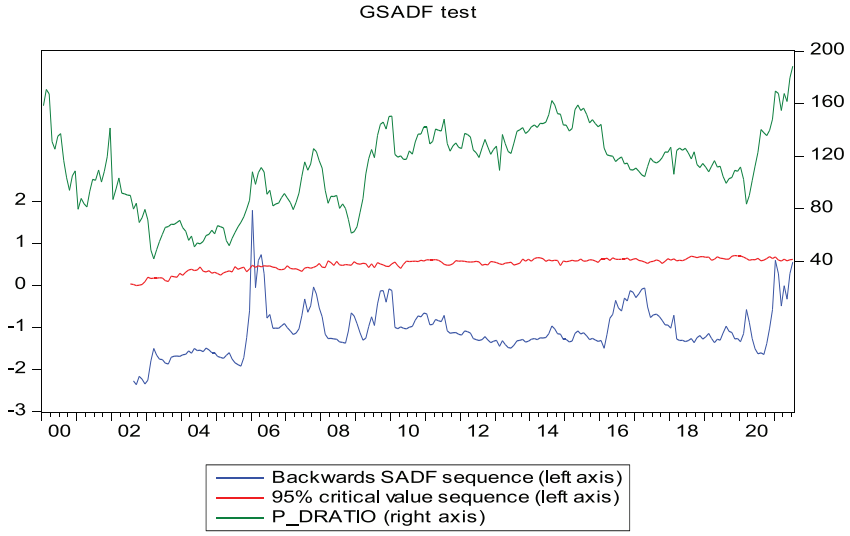

Figure 16: GSADF (Korea)

Figure 16 shows that the BSADF sequence does cross the threshold rejection line once but this bubble is found to be insignificant as the GSADF statistic value is found to be smaller than its critical value [See Table1]. Our findings suggest that the market seems to be efficient and the results are aligned with Hu (2011).

4.5 Malaysia

Malaysia also shows some empirical evidence of multiple bubbles in the FTSE BURSA index from Jan 2000 to July 2021 as only GSADF t-statistics are found greater than its critical value, and is also found statistically significant at 10% respectively under the Monte Carlo simulations.

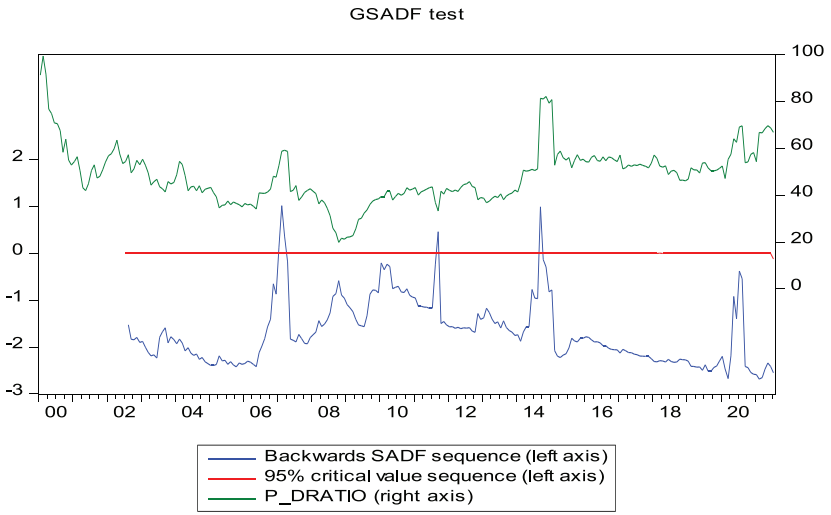

Figure 17: GSADF (Malaysia)

Figure 17 shows, the BSADF sequence does cross the threshold rejection line multiple times stating the existence of three bubbles in the market of Malaysia. The first bubble of Dec 2006 occurred due to the stock overreaction behavior in the pre-crisis period followed by the subprime mortgage crisis of 2007-2008. Similarly, the second bubble appeared in the time period of 2011-2012 whereas the third bubble in 2015-2016, indicating that Malaysia's market is also less efficient followed by a certain behavioral bias (Hu, 2011;Chen & Xie, 2017; Szulczyk et al., 2018).

4.6 Philippines

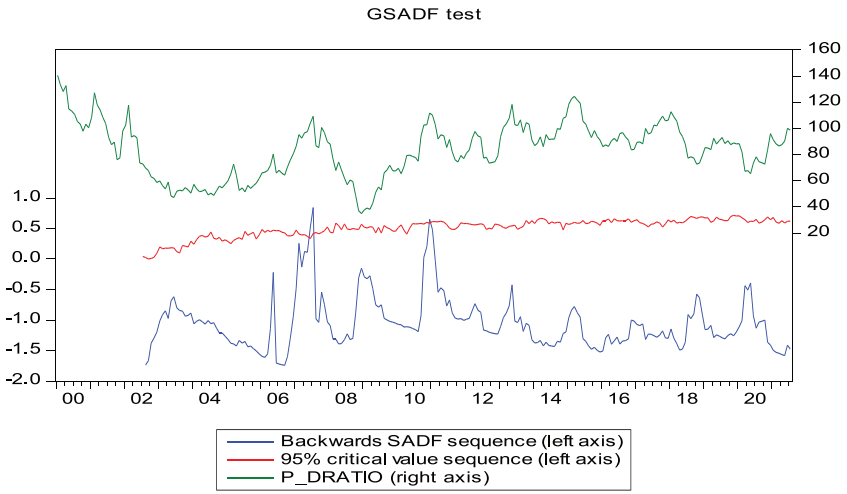

Figure 18: GSADF (Philippines)

Figure 18 shows that the BSADF sequence does cross the threshold rejection line once as one can see a small blip also found to be insignificant. As a result, no reasonable bubbles can be discovered in the Philippines (PSEI 30 index) because this market is still underdeveloped. Overall our results regarding the Philippines market are consistent with Glindro and Delloro (2010) and Hu (2011).

4.7 Taiwan

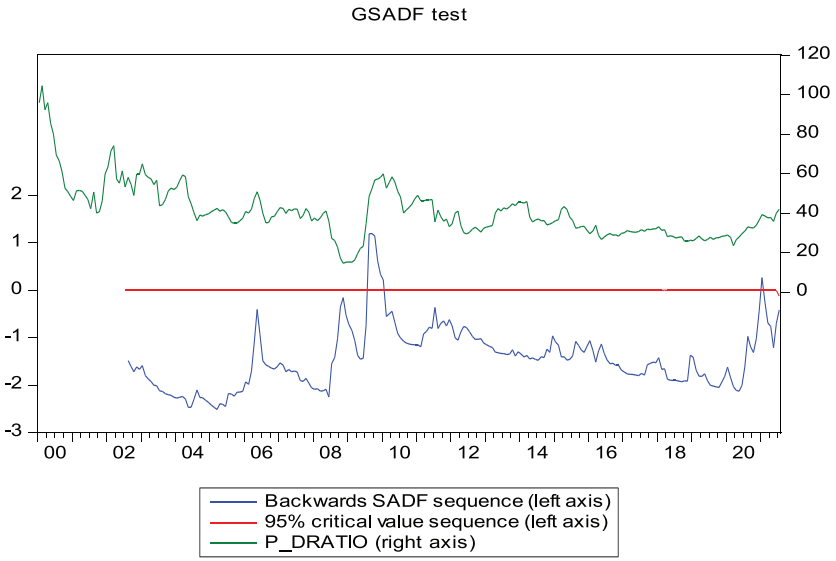

Figure 19: GSADF (Taiwan)

Figure 19 shows the results of Taiwan, which suggest strong evidence of a single bubble due to the subprime mortgage crisis in the Kospi 100 index) as GSADF t-statistics are found greater than all its critical values, and is also found statistically significant at 5% respectively under the Monte Carlo simulations.

4.8 Thailand

Thailand also suggests strong evidence of the single giant bubble in the Thailand 100 index from Jan 2000 to July 2021 as GSADF t-statistics are found greater than all its critical values, and is also found statistically significant at 1% respectively under the Monte Carlo simulations.

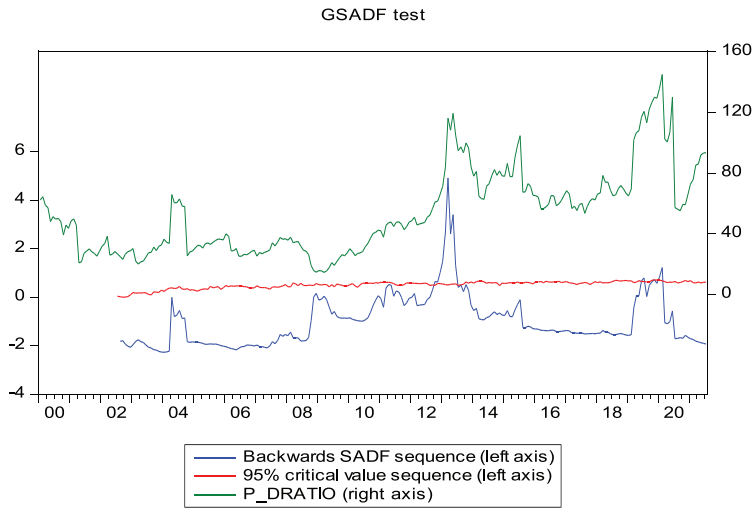

Figure 20: GSADF (Thailand)

Figure 20 shows that the BSADF sequence does cross the threshold rejection line once as one can see a big spike that is also found to be significant. This bubble (2012-13) occurred because of ultra-low interest rates in the US, Europe, and Japan which surged 'hot money' flow in emerging markets including Thailand. Moreover, abnormally cheap credit conditions caused property (Condo Houses) prices to inflate which together created the perfect conditions for the construction of bubbles in this market (Colombo, 2014; Szulczyk et al., 2018).

4.9 India

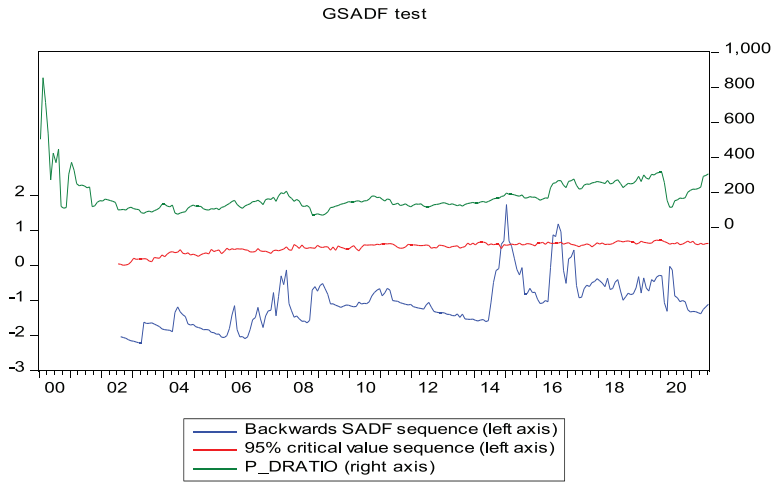

Figure 21: GSADF (India)

Whereas, Figure 21 shows the BSADF sequence does cross the threshold rejection line twice in the Nifty – 50, Indian stock market, indicating these spikes as bubbles but these bubbles are found to be insignificant. Moreover, the GSADF statistic value is found to be smaller than its GSADF critical value, which ensures that this market is efficient and stable as behavioral bias is declining in this market (Mitra & Chaudhuri, 2016; Singh et al., 2018).

5. Conclusion

For the past 20 years, the central banks have been happily causing bubbles in stock markets by printing more and more money at ever-lower interest rates to attract more investments. Since the global financial crisis of 2008, emerging markets have been the scene of a modern-day gold rush for investment returns but these markets are also fueled by unprecedented global liquidity in response to the pandemic, making them far riskier. Therefore, the presence of speculative bubbles in (nine) emerging economies including Pakistan is explored in this study using (advanced) recursive right-tailed tests such as SADF (Phillip et al., 2011) and GSADF (Phillip et al., 2015). The obtained results confirmed that incredible growth in China, Indonesia, Malaysia, Pakistan, Taiwan, and Thailand is driven by ballooning credit and speculative pricing bubbles; both herding and cognitive error is negligibly present in these markets as a result of investor sentiments (Hu, 2011; Colombo, 2014; Chang et al., 2016; Chen & Xie, 2017; Almudhaf, 2018;Szulczyk et al., 2018; Liaqat et al., 2019; Kashif et al., 2021). The findings support the rational bubble law. Hence this study confirms, investing in these emerging markets including Pakistan nowadays is far riskier than investing in any other market. As a result, global financial investors should exercise greater caution before making any investment decisions, as these emerging markets' financial asset prices do not accurately reflect their deteriorating fundamentals or performance.

Moreover, the presence of such (multiple) speculative bubbles in these emerging stock markets may lead to disastrous financial crises such as recession or even in some cases depression. Therefore, financial bubbles are often used to predict financial crises since the longevity of speculative bubbles leads to terrible financial disasters. In this regard, the findings of date stamping of these bubbles through (BSADF) statistics also indicate both local and global financial crises, with bubbles appearing in several emerging markets, particularly before the global financial crisis of 2008. Similarly, the effect of the local crisis can be observed through multiple bubbles that are found in the stock market China-driven by leverage and loose credit cycle before the Chinese crisis period (2015) and in Thailand before the Thailand Property Crisis (2013). Hence, the findings revealed many financial crises are followed by various speculative bubbles in these markets. On the other hand, the stock markets of Korea and India seem to be more efficient and more stable as behavioral bias is declining to a great extent in these markets, thus no significant bubbles are found in these stock markets (Hu, 2011; Mitra & Chaudhuri, 2016 & Singh et al., 2018). Besides this, no speculative bubbles are found in the market of the Philippines too because this market is still underdeveloped

(Glindro & Delloro, 2010; Hu, 2011).

Overall our findings suggest that bubbles are an important estimator of a financial crisis because the presence of bubbles seeds financial and macro-economic instability in any economy. It is also evident from our analysis; that many financial crises are followed by speculative bubbles in emerging markets. Thus, an advanced (GSADF) test that can accurately detect multiple bubbles can be used as the earliest cautionary measure of a forthcoming financial crisis in any stock market.

5.1 Practical implications

The formal analysis of the emerging stock market behavior and patterns may aid domestic and international investors in their investment management decisions. They should exercise greater caution before making any investment decisions, as the financial asset prices in these emerging markets do not accurately reflect their deteriorating fundamentals or performance. Similarly, this study's identification of bubbles can aid the regulators to enhance the operation of the business cycle. Since multiple bubbles also exist in the Pakistan stock exchange, regulators should take preventive measures by using an advanced (GSADF) test that can accurately detect multiple bubbles because whenever prices deviate more from their fundamental values, there is always a financial crunch when bubbles burst. Furthermore, policymakers should consider improving the transparency of investor information, which would reduce uncertainty about the economic environment and strengthen the market by reducing misleading stock price movements.

5.2 Limitations

Hence, these results can help to understand only the evolution of past bubbles which may be considered one of the major limitations of this study through which various upcoming financial crises can be avoided by regulators rather than predicting the financial bubbles. Second, the unavailability of most listed companies' price and dividend data was a major issue, so the time period for the analysis was set to begin in 2000 because 80% of the data was only available since that year. Lastly, continuous data of price-to-dividend variable is used to investigate mild explosive behavior (that is not always available when it comes to individual stocks) along with its exact origination and termination dates through BSADF statistics.

5.3 Future area of research

For the future area of research, other innovative techniques like artificial neural networks or fuzzy neural networks can be employed to predict future bubbles which can help regulators and financial investors mitigate their losses. Moreover, if any economy lacks data regarding the dividend variable, book-to-market ratio can be used to test the existence of a speculative rational bubble (Caspi, 2017).

Data Availability Statement
Data can be available based on the request at asra.shaikh@szabist.edu.pk

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Conflicts of Interest
The authors declare no conflict of interest.

Notes

1. Data availability – Monthly data of 'Price per share' and 'Dividend per share has been taken from Refinitiv Eikon data stream of companies listed in Pakistan and emerging markets (MSCI index) for the computation of the Price to Dividend ratio.
2. Pakistan is considered for the analysis besides the eight emerging markets (MSCI index) because Pakistan was reclassified as a frontier market just recently in September 2021 but shares the major characteristics of emerging markets.
3. Software - E-views -10 software is used for testing various right-tailed tests, this may take a while since it involves Monte Carlo simulations with 1000 replications.
4. Indian Stock market: Regarding this market, analysis has been performed in both the Bombay stock exchange (BSE) and Nifty (50) index to cross-check the results. Our findings suggest bubbles are insignificant in both BSE and Nifty stock markets.
5. Rationale for using Price to Dividend Ratio: Some researchers also use prices to detect the bubbles but this may cause biases in the results. If the dividends are set aside by considering only the investment of a firm and also ignoring all the income factors, then this may create biases in the results. For example: if a firm's stock price increases accompanied by an increase in dividends then this shows there is performance support in a firm. Thus, one cannot conclude a bubble from the price (Li et al., 2021).
   Therefore, this study has considered the Price to Dividend ratio for anal-ysis purpose.
6. Monte Carlo simulation: This method is commonly used in statistical modeling or analysis to estimate p-values without relying on asymptotic distribution theory or complicated /exhaustive enumerations.

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A PLS-SEM Study to Test the Role of Social Media in Influencing Purchase Intention

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Abstract

In light of the growing importance of social networking marketing (SMM) to the profitability of tiny and medium-sized businesses (SMEs) and the relatively modest adoption rate of SMM among SMEs, this study seeks to determine which factors influence SMEs' adoption of SMM. This study, unlike the majority of others, proposed a two-stage analysis combining the partial least squares (PLS) method with an artificial intelligence technique called an artificial neural network (ANN). Using a deep ANN architecture, the proposed model can make predictions with a 91% success rate. The marketing rate of social networking site adoption was found to be significantly affected by the strength of the relationship between perceived efficiency, user approval of use, perceived expenses, encouragement from upper management, beneficial conditions, and vendor pressure. The findings of this study contribute to the expanding body of literature on online advertising by shedding light on the role played by technological, corporate, and ecological (TOE) variables in consumers' adoption of social media promotional activities. Investment choices in digital marketing in comparable and non-competitive industries can benefit from the study's findings, which can be used by policymakers as well as managers of SMM and consumer behavior.

Keywords: Social media marketing; digital marketing; mobile marketing; TOE factors; buying behavior; technology adoption and determinants.

JEL Classification: M310

1. Introduction

Social media marketing, one of the fastest-growing areas of digital advertising, provides tremendous advantages and can help you reach billions of customers around the world (Miao et al., 2022). To promote one's business and boost earnings, this is an excellent strategy. There are a lot of positives to using social media for advertising (Khan et al., 2022c). For one, it raises brand recognition; 91% of marketers believe social media ads enhance the online experience for their target audience. By engaging in two-way conversations with

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followers, users of social media platforms can learn invaluable information about their target demographic (Jiang et al., 2018). Users have not universally reaped the advantages of social media's growth into new arenas of information sharing, communication, and interaction (Zaman et al., 2018). This is adding fuel to the fire of social media's unequal distribution (Khan et al., 2022b). For instance, the elderly and those with lower levels of education gain less from mainstream social media than their younger and more advantaged peers (Khan et al., 2022a).

The use of social media platforms as revealed, is politicized and commercialized, and is highly individual. In 2008, researchers polled college students across the United States and found that 85.5% of them were active on at least one social networking site (Miao et al., 2020). People today provide themselves in various ways across a variety of channels, and they may change their identities and images while having a conversation about their highest priorities, values, and perspectives on the world (Khan et al., 2022d). Even though interaction and linking were the goals of social tools in the first place, individual actions triggered by compromising aspects of social life are fostering solitary behavior in these cutting-edge social spaces (Mubarik et al., 2021).

New motivations for being and strategies for success have emerged in response to the profound shifts in the online social space; these have not supplanted but rather are realized through interpersonal contact (Khan et al., 2021b). When we don't feel confident in our own ideas and skills, we often compare ourselves to the thoughts and actions of those around us. Social comparison sufferers typically have low self-esteem and look to comparisons with others as a means of boosting their own sense of worth (Khan et al., 2023a). Inadequacy in the classroom, low self-esteem, a negative sense of self, and anxiety disorders may be more prevalent among people who make lots of comparisons to others (Islm et al., 2021). However, people who don't compare themselves to others tend to be more receptive to new ideas, information, and opinions from others and spend more time concentrating on and developing their own internal mental models (Akbar et al., 2017). Those with low self-worth, depression, or self-doubt are more likely to spend money on Facebook in an effort to engage in social comparison or other comparison-based activities (Agha et al., 2021). The impact of social comparison can lead to a rise in feelings of inadequacy about one's own value (Khan et al., 2021a).

When we say that someone has low self-esteem, what we really mean is that they have a negative opinion of themselves (Mubarik et al., 2021). People who lack confidence spend a lot of time on social media because it allows them to avoid talking to real people (Mubarik et al., 2021). The rise of influencers in the social media sphere has been associated with a dramatic shift in consumers' priorities toward ephemeral qualities (Khan et al., 2022c). Individuals who are materialistic are preoccupied with their physical and financial well-being (Jamil et al., 2022). There is a widespread negative perception of materialistic ways of

thinking because they are associated with callous, exploitative, and antagonistic approaches to other people (Jiang et al., 2018). Research shows that people who spend a lot of time glued to the screen of the TV are more likely to value material possessions (Khan et al., 2021b). Reasons for this could include the widespread message conveyed by media outlets that monetary success and luxury are prerequisites for a fulfilled existence (Khan et al., 2023b).

1.1 Objectives of the Study

1. The focus of this research is how material and social comparisons are related.
2. There is an emphasis on how gender, age, and nationality affect business outcomes.
3. This study explores the characteristics of influencers on social media and how they sway their followers' intentions to make purchases.
4. This study will help researchers learn more about the effects of self-selection bias.
5. This research aims to examine how people use the advancement of technology in social media, as well as the impact of verbal relationships on peer pressure.

1.2 Research Problems

Some people in the community are more than happy to participate in the identity surveys since they think doing so will give them more influence. This is an example of self-selection bias, which causes people to put themselves first. In addition, it undermines confidence in the results. The research needs to uncover the varying motivations for social media use across cultural groups. Furthermore, research should incorporate cultural and socioeconomic factors as facilitators of the utilization of social media platforms to enhance performance. Finally, SMM fosters luxury brands and encourages rivalry among followers, both of which are associated with materialism, a mindset in which people place an inordinate value on material possessions and excessive spending. Finally, the cross-sectional nature of the study limits the potential benefits of implementing social media marketing by making it necessary to account for the positive effects of technological, organizational, or environmental factors in nature.

1. Why do people with different cultural backgrounds engage in different social media platforms?
2. Why must social media marketing research need to include demographic and cultural variables as moderating use?
3. What kind of measures can we take to stop social comparison among followers?

2. Literature review

2.1 Social Media Marketing Activities

In order to boost their brand awareness, most businesses today use promotional strategies like blogger endorsements, social media ads, and user-generated content management (Miao et al., 2020)The term "social media" is used to describe the network of websites and applications that were developed using the principles of the Web 2.0 movement in order to promote the sharing of user-generated content (Zafar et al., 2022). In comparison to more static mediums such as radio, television, and print, social media's interactive nature makes it the most important communication channel for spreading brand information (Maduku et al., 2016). A few instances of what we now refer to as "social media" include blogs, communities on the internet, user reviews, networks of human beings (Twitter, Blogger, LinkedIn, and Facebook), and encyclopedias (Wikis).

Information, collaboration, and interpersonal connections all benefit from the widespread use of social media (Mujahid et al., 2019). There is a wide variety of social networking sites and applications available for use with each one (Mujahid et al., 2019). Some examples include bookmarking, evaluation, pictures, videos, webcasts, wikis, writing blogs, social blogs, and weblogs (Nesi & Prinstein, 2015). There has been a significant uptick in the past few years in the use of social media as a means to communicate among social networkers, government agencies, and businesses (Näsi et al., 2012) . All levels of government and private industry use social media for marketing (Parsons & Lepkowska-White, 2018). When consumer partners, events, media, internet items, and retailers are all connected and interacting with one another in a seamless manner, as they are in social networks, integrated marketing activities are not only more effective but also less expensive to implement (Podsakoff et al., 2003).

Luxury advertising campaigns heavily rely on individualization, image, fashionability, communication, and amusement to sway consumers' propensity to buy and their opinion of a brand's value (Rana et al., 2019). Unlike products, which are beyond the purview of the consumer, community marketing takes place when an experience has an effect on the consumer's feelings or thoughts (Selwyn et al., 2003). In spite of this, users and consumers can expect varying outcomes from the same event and service exposure due to individual differences in perception (Siren & Knudsen, 2017). Promotions should focus on themes and sensations that will impress and please consumers in light of the likelihood that future marketing competition will center on advertising for brand initiatives (Sullivan & Koh, 2019). Nowadays, consumers expect nothing less than top-notch quality from the brands they support.

2.2 Perceived Cost and SMM

What Do People Think it's Worth? There is a strong correlation between how people perceive the value of a product or service and their likelihood of adopting and using new technology, as shown by previous research (Tafesse & Wien, 2018).The cost of implementing a social media marketing strategy may be a deciding factor for small and medium-sized businesses (SMEs) (Miao et al., 2022). Malaysia is a good example of a country where the cost of IT hasn't been a major stumbling block to widespread adoption (Tan et al., 2009).

There will be significant up-front costs for any enterprise that decides to implement cutting-edge technology. On the other hand, some small and medium-sized enterprises (SMEs) prioritize using social media over other forms of IT adoption due to its low cost, low barrier to entry, and quick use. For the right price, many businesses would prefer to advertise via social media rather than any other channel due to the two-way interaction it enables with customers. Social networking sites usually have a low barrier to entry when compared to other advances in technology (Khan et al., 2022a). It's a cheap way for small businesses to connect with their customers. Small and medium-sized businesses (SMBs) are more likely to use social media marketing if the associated costs are manageable (Khan et al., 2022d). The following conjecture is warranted in light of the preceding discussion:

H1: The perceived cost has a negative influence on social media marketing adoption.

2.3 Perceived Usefulness and purchase intention

The connection between social media marketing's popularity and perceived usefulness has been studied at length (SMM) (Zaman et al., 2018). (Wang & Kim, 2017)researched the link between PEU and tech adoption and found a positive correlation. The use of mobile devices is associated favorably with PEU. The PEU of technology is its perceived performance, efficiency, risk, and trustworthiness (Cheung et al., 2021). Perceived usefulness considers benefits, risks, privacy, and security. Multiple arguments support a link between FCO and intent to purchase (Elbanna et al., 2019). First, according to the Unified Theory of Acceptance and Use of Technology (UTAUT), the Four Contextual Outcomes (FCO) construct is one of four key characteristics that determine user acceptance and technology use behavior (Derham et al., 2011). When facilitating conditions such as convenience, accessibility, and system suitability are met, the propensity of a user to make a purchase in the context of electronic commerce or social media purchasing is increased (Duffett, 2015). Second, according to ECT, a customer's satisfaction and subsequent repurchase propensity can be increased if the supporting conditions meet or exceed their initial expectations (Fatima & Bilal, 2020). The quality of an online purchasing platform may influence a customer's propensity to make a purchase, for instance (Festinger, 1954).

Lastly, from a pragmatic standpoint, enabling situations may impact the user's perception of the effort required to complete a transaction. The consumer is more likely to have a purchase intent if they perceive the process to be straightforward and uncomplicated due to predetermined enabling factors. Alternatively, if the purchasing process is too complicated, it may deter consumers from making a purchase. In conclusion, there is a plausible explanation for the relationship between favorable conditions and the intention to purchase. When consumers are presented with favorable conditions, they are more likely to complete their intended purchase. Applying SMM for purchasing intention will gain many of these challenges that can be resolved. From these data, we can infer the following hypothesis:

H2: Perceived usefulness positively affects the use of SMM for purchase intention.

2.4 Facilitating conditions (FCO) purchase intention

When we talk about "facility conditions," we're referring to things like the staff's confidence that this is the right technical facility and the approval of higher-ups to roll out the new system (Venkatesh, 2012). Evidence from the past indicates that the tendency of individuals to adopt new innovations is significantly influenced by enabling conditions. (Chatterjee & Kar, 2020) According to the results of this study, the following theory has some merit:

H3: Facilitating conditions (FCO) positively impact the use of SMM for purchase intention.

2.5 Perceived Ease-of-Use (PEOU) purchase intention

Using technology or system contradicts the widely held belief that technology is increasingly user-friendly (Mubarik et al., 2021). Among these are the notions of self-sufficiency and ease. These are also considered to play a role in convincing SMEs to join the social media sphere (Khan et al., 2023c). Users are more likely to adopt new technology if it is perceived to be user-friendly (Ware, 2018). This proves that PEOU interacts favorably with technological progress. Chatterjee and Kar (2020) research demonstrates a causal link between PEOU and SMM uptake. As a result of these findings, the following conjecture is made:

H4: Perceived ease-of-use (PEOU) has a positive impact on the use of SMM for purchase intention.

2.6 Social Media Marketing (SMM) and purchase intention

Internet-based social media serve as a virtual meeting place where people can connect, share, and seek out new ideas and as a platform for individual growth and group endeavors (Ghobakhloo et al., 2012). An estimated number of Indonesians spend 3 hours and

26 minutes online across all social media platforms (We are Social, 2020). This demonstrates that the business potential for social media is high and that this Framework has become a simple instrument for instantaneous global online communication between customers and businesses (Jamil et al., 2023). This platform is excellent if a buyer has few options due to a lack of money, expertise, etc (Keipi et al., 2018). Trust in a company and its products is bolstered by its use of social media marketing, and simplifying product research for consumers (Mubarik et al., 2021). Trust, closeness and customer loyalty positively correlate with social media marketing strategies. Business brand development and expansion are simplified by the organization's use of social media (Khoa, 2020). Through the use of SMM, they can enhance their purchasing decisions (Lin & Ho, 2011). The following hypotheses are proposed in light of these results.

H5: Social media marketing has a positive effect on purchase intention.

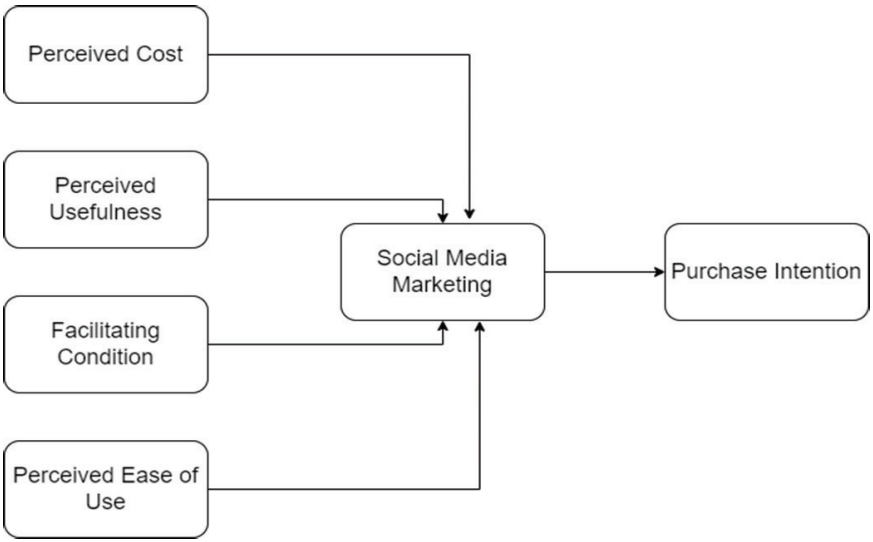

Figure 1: Conceptual Framework

3. Research Methodology

3.1 Measure of Constructs

It's worth noting that a questionnaire was used to compile data for this cross-sectional analysis. All of the items in the study came straight from existing literature. Two technological considerations are value and expense. Organizing Considerations Management support, user-friendliness, and employee knowledge were all evaluated with scales. Items pertaining to external variables like perceived simplicity of use, enabling conditions, and supplier support are adapted from Oliveira et al. (2014), Wu and Lee (2005), and

Ghobakhloo et al. (2011). All items were graded on a 5-point Likert scale, with "strongly disagree" and "strongly agree" serving as the two poles. Common method bias was also addressed by employing the Harman factor test, which was suggested by (Podsakoff et al., 2023) The one-factor variability produced by this test is less than 50%.

3.2 Data Collection and the Sample

Students at various educational institutions were included in this analysis. Today, most college students use social networking sites for academic and professional purposes, such as Facebook and Instagram. The investigators selected SMM as the subject population because it accounts for 98.5% of local businesses in purchase intention, which accounts for 37.5% of the domestic product purchase. A qualitative methodology was used to substantiate the assumption suggested in the research. Notably, data were obtained via self-administered & online surveys. The survey was comprised of two sections. The first section was devoted to demographics. Chapter 2 assessed perceived cost, value, and ease regarding ease of use, purchase intent and advertising on social media on Likert scales. The questionnaire's first page doubled as a cover sheet that explained the research's goals. Participants were assured that their responses would remain confidential. Users of social media platforms were the focus of this analysis. The students themselves served as the sampling frame in this case. Purposive sampling was used to select participants, and those participants were chosen according to two factors. To begin with, they needed to be an Insta user, and secondly, they needed to follow at least one Instagram influencer who regularly posts products or brand endorsements.

Using a technique commonly used in previous studies, respondents were then asked to provide the name of the Influencer they followed, which would be an anchor regard for the remaining questions in the questionnaire. These two conditions guaranteed that most of the Respondents had appropriate background knowledge for this study. We gave the respondents a 5-point Likert scale to rate how much they agreed with statements about whether or not they were likely to buy products or services supported by (Instafamous). The partial least squares ordinary least square method (PLS-SEM), was performed with the help of Smart PLS software and was used to examine the data used in this study. We used PLS-SEM because it was appropriate for this exploratory study to determine whether or not there was a correlation between SMM and consumer intent to make a purchase.

3.3 Research Design

In order to identify the relationship between the explanatory and explanatory variables, the study adopted a quantitative strategy and a cross-sectional design. The primary source of information came from Google Docs surveys disseminated via social media platforms like Twitter, Instagram, and WhatsApp. Non-probability sampling was used with (closed) structural questions on the questionnaires. In non-probability sampling, selecting

sample data from the target population is not random. Furthermore, (Lian et al., 2014) hypothesized that a small sample size could limit the applicability of research findings. This study's sample size is sufficient.

3.4 Statistical approach

In contrast to prior studies that solely relied on Structural Equation Modeling (SEM) for data analysis, the current study's authors employed a deep learning-based, double PLS-SEM and ANN technique. Using a hybrid method based on deep learning, we tested whether or not the predicted relationships exist between the constructs. Based on the PLS results, this would also prioritize the factors. Researchers analyzed the research model during the initial phase of PLS-SEM analyses by assessing assumptions using (Puspaningrum, 2020) 2 different operations (outer model as well as inner model). In the following stage, sensitivity analysis was employed alongside ANN to determine the variables' relative positions.

(Ainin et al., 2015) added that SEM is preferable to the PROCESS macro for assessing models with latent constructs. Due to this fact, the PROCESS preprocessor was not utilized during this study. We performed a comprehensive collinearity test by generating a random-number dummy variable and then going backwards on all factors (perceived price, perceived value, enabling conditions, regarded ease of use, acquisition intent). Discriminant validity was the last test of the measurement model. The (Alam & Noor, 2009)criterion requires that the square of the AVE of each construct be greater than the correlation for every other conceptual Framework to verify that the PLS model is free from the problem of discriminant validity (Fornell & Larcker, 1981)Furthermore, if the value of the heterograft monotrait (HTMT) is more significant than 0.9, discriminant validity may be compromised (known as the HTMT criterion). When evaluating the impact of explanatory variables on a dependent variable, the total effect is used, while the mean score depicts the effectiveness of a variable.

3.5 Why use SEM via SMART PLS 4 and complement it with ANN

Artificial Neural Networks (ANN) and Smart PLS 4 (Partial Least Squares Structural Equation Modeling) have numerous applications and are effective instruments for researchers examining the influence of social media on consumer behavior and purchasing decisions. The adoption of an ANN is primarily motivated by its unparalleled ability to identify and model nonlinear correlations within the data. There is a multitude of interdependent factors and nonlinear forces at play in the dynamics of social media and its effect on purchase intent. Compared to more conventional statistical techniques, an ANN's inherent ability to learn from data makes it a potent instrument for identifying enigmatic patterns and intricate correlations. Smart PLS 4, which provides a robust variance-based SEM (Structural Equation Modeling) method, is a valuable complement to ANN. It is especially valuable for

conceptualizing and assessing complex relationships between latent variables. The effect of social media on purchase intent is moderated or modified by variables such as perceived utility, trust, company attitude, etc. PLS-SEM is an ideal method for evaluating such models when the data distribution assumptions are not satisfied. Smart PLS 4 is well-suited to the complexity of a concept like social media influence because it can accommodate both reflective and formative assessment approaches.

The dataset can be extensively analysed using a combination of ANN and PLS-SEM. PLS-SEM is beneficial for validating theoretical models underlying the data, whereas ANN excels at identifying intricate patterns and providing predictive ability. Together, they provide a comprehensive picture of how social media influences the propensity of consumers to make a purchase decision.

3.6 Demographic Characteristics

Table 1
Respondent's Profile (N=420)

Demographic items	**Frequency**	**Percentile**
Gender		
Male	177	42..15%
Female	243	57.85%
Age		
18 – 25	308	73.3%
25- 35	64	15.3%
35-45	48	11.4%
Education level		
Post Graduate	255	60.8
Graduate	117	27.8
M-Phil	23	5.5
PhD	25	5.9
Marital status		
Single	315	75%
Married	95	22.7%
Divorced	10	2.3%

3.7 Explanation

Table 1 displays the results of the demographic analysis that was performed. The table shows that when the respondents were broken down by gender, 42.15% were males and females 57.85% seemed female. Most respondents (73.3%), were under the age of 25, while 15.3% were among the ages of 25 and 35 and 11.4% were over the age of 45. 68% of those who filled out the survey had advanced degrees, while 27.8% held a bachelor's, 5.5% a master's in the study of philosophy, and 5.9%a doctorate. 75% of the participants were single, 22.7% were living with a partner but not married, and 2.3% were divorced.

4. Result

This study measured the constructs competency of the model by reliability, validity, discriminate validity and convergent validity.

4.1 Data Analysis

Table 2
Measurement Model Assessment

Variables	Items	Outer Loadings	Cronbach's alpha	Average Variance extracted
Perceived Usefulness	PU1	0.903	0.915	0.856
	PU2	0.918		
	PU3	0.954		
Facilitating Conditions	FC1	0.925	0.902	0.836
	FC2	0.896		
	FC3	0.921		
Perceived Ease of Use	PEOU1	0.915	0.9110	0.849
	PEOU2	0.902		
	PEOU3	0.948		
Perceived Cost	PC1	0.935	0.921	0.864
	PC2	0.920		
	PC3	0.932		
Social Media Marketing	SMM1	0.923	0.925	0.870
	SMM2	0.938		
	SMM3	0.937		
Purchase intension	PI1	0.561	0.882	0.894
	PI2	0.496		

4.2 Explanation

Table 2 displays that Cronbach's alpha for all variables is greater than 0.7, indicating that the evaluation model meets the proposed standard for Composite reliability requirements. Convergent validity was assessed by ensuring that the AVE for each variable was greater than 0.5, as suggested by (Fornell & Larcker, 1981). As shown in Table 2, AVE values for all constructs are greater than 0.5, demonstrating the convergence reliability of the evaluation model.

4.3 Ethical Considerations

In order to make participants feel at ease during data collection, researchers established their credibility and trustworthiness beforehand. Second, we safeguard the privacy of members of marginalized populations because we value their specific needs. Moreover, privacy is maintained for all individuals involved in the initiatives and research. As a final step, we cited the work of our predecessors.

Table 3
Discriminant validity (Fornell-Larcker Criterion)

	Facilitating conditions	**Perceiv ed cost**	**Perceived ease of use**	**Perceived usefulness**	**Purchase Intention**	**Social Media Marketing (SMM)**
Facilitating conditions	0.914					
Perceived cost	0.882	0.929				
Perceived ease of use	0.908	0.850	0.922			
Perceived usefulness	0.869	0.780	0.846	0.925		
Purchase Intention	0.891	0.821	0.830	0.825	0.946	
Social Media Marketing (SMM)	0.890	0.846	0.841	0.866	0.854	0.933

4.4 Explanation

Discriminate validity of AVEs and cross loadings are shown in Table 3. (average Variance extracted). AVE values should be greater than construct correlation(Fornell & Larcker, 1981) Evidence from FLC demonstrates that the diagonal values meet. Given these considerations, the research presented here is trustworthy and sound. The results of these analyses demonstrate the validity and trustworthiness of this study.

4.5 Structure Model

Model analysis of the structure was carried out by using a standardized approach. Moreover, the hypothesis being tested is reflected in each possible route. Table 4 displays the outcomes of a path analysis.

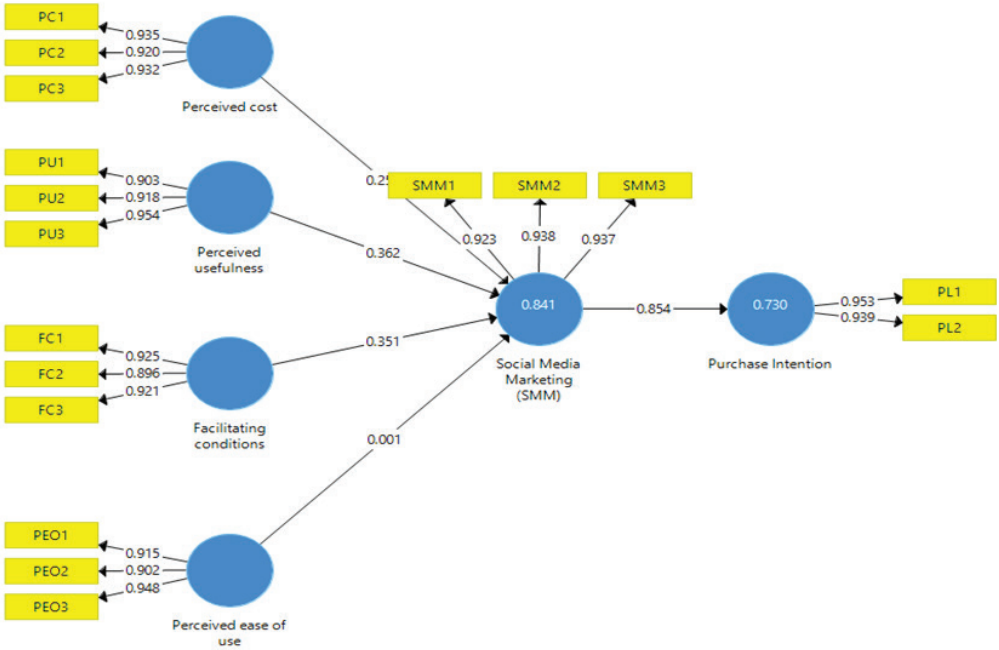

Figure 2: A Path Analysis

Table 4
Mean, STDEV, T-Values, P-Values

Regression path	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Decision
Perceived cost -> Social Media Marketing_(SMM)	0.250	0.152	1.664	0.097	Not Supported
Perceived usefulness -> Social Media Marketing_(SMM)	0.353	0.083	4.372	0.000	Supported
Facilitating conditions -> Social Media Marketing_(SMM)	0.348	0.114	3.071	0.002	Supported
Perceived ease of use -> Social Media Marketing_(SMM)	0.016	0.130	0.009	0.993	Not Supported
Social Media Marketing_(SMM) -> Purchase Intention	0.856	0.025	34.140	0.000	Supported

4.6 Regression

Table 5
Model Summary for Regression Analysis

Variables	R Square
Purchase Intention	0.730
Social Media Marketing_(SMM)	0.841

4.7 Explanation

Path analysis yields five hypotheses, with three confirmed and two disproved. Given that the Sig value of 0.097 (P>0.097) is greater than 5% or 0.05, the null hypothesis H1 Perceived cost -> Social Media Marketing (SMM), is rejected. Since the Sig value for H= (Perceived Usefulness -> Social Media Marketing) is 0.000 (P0.000), which is less than 5% (0.05), we accept this hypothesis. The Sig value of 0.002 (P0.002) for the H3 Facilitating conditions -> Social Media Marketing (SMM) hypothesis indicates a significant relationship between Facilitating Condition and SMM; thus, the hypothesis is accepted. Since the Sig value of the H4 Perceived ease of use -> Social Media Marketing (SMM) is 0.993 (P>0.993), which is greater than 5% or 0.05, the hypothesis is rejected. Given that the Sig value for H5 Social Media Marketing (SMM) -> Purchase Intention is 0.000 (P0.000), which is less than 5% or 0.05, it is accepted.

5. Discussion

Some of the many factors that affect social media advertising are accessibility, affordability, appropriateness, scientific relevance, and simplicity. Social media can be an effective means of advertising for UMKM products, but only with a significant investment in the necessary supporting facilities and knowledge. From the results of this study, we can conclude that the condition of the physical location has minimal impact on the outcomes of social media advertisements. This is due to several factors, including a lack of resources (both financial and human) for social media structures, a lack of social media experts' assets, a lack of training for staff members on social networking sites, and a lack of in-house training centers owned by SMEs to analyze social networks. The results agree with those reported by Venkatesh (2012) and (Chatterjee & Kar, 2020)

Spending money on social media marketing, especially on paid advertisements, can add up quickly. The company places a premium on its employees by providing ample opportunities for growth in both skill and experience. This study demonstrates that the cost of social media advertising is irrelevant. This is because brands that care deeply about purchase

intent aren't yet using all of the channels at their disposal to their full potential. Most businesses have a tiny chance of success because they rely on the media to spread information about their products. Studies by (Wang & Kim, 2017),(Chatterjee & Kar, 2020), (Tan et al., 2009)and (Wang & Kim, 2017)contradict these results.

Whether or not a company uses social media as a promotional tool depends greatly on the nature of the company and the products it offers. Each product receives its own unique social media marketing campaign designed to increase customer interest in that product. Study results demonstrate a positive and statistically significant correlation between compatibility and ad performance on social media. According to the findings, companies and products are more likely to resonate with consumers when they employ digital marketing strategies aimed at influencing their purchasing decisions. Businesses will have an easier time connecting with their ideal customers via social media, and consumers will have access to an expanding selection of goods optimized for use on these sites. Today's students can choose from a variety of social media systems, each with its own set of benefits and drawbacks, to meet their individual requirements for using these tools. Social media marketing is more successful when the analyst's interpretation of user behavior is taken into account. Clearly, the more benefits there are to use social media for business reasons, the more individuals will use them, as evidenced by this effect. The majority of respondents also saw social media as a means to increase efficiency and a powerful promotional instrument. It has been hypothesized that using social media can help businesses manage their operations and increase customer satisfaction. Supporting previous research by(Wang & Kim, 2017) and (Chatterjee & Kar, 2020), the results of this study demonstrate that (2019). (2020), social media marketing is only effective if it can be easily implemented.

Today's students, even if they are not particularly tech-savvy, must be able to make effective use of social media and the internet. The analysis of this study's data lends credence to the theory that users are more likely to engage with social media marketing campaigns that they perceive as being easy to implement. This shows that the easier it is to use promotional tools on social media, the more people will use them. A user-friendly social media platform has a low learning curve, that makes it simple to find new customers, and allows current customers to quickly and easily request more of the same. In addition, the provided customer information makes social media advertising simple. The results of this study agree with those of several other recent studies (Henderson & Divett, 2003); (Chatterjee & Kar, 2020) The spread of an illness can be slowed down by limiting people's opportunities for physical and social interaction, but these have been removed as a result of digitalization. Marketers who employ social media to spread the word about their products report higher sales as a result. Among the many options for increasing revenue is expanding your business's online presence through Facebook and Instagram sales. It is expected that increased sales will result from using social media as a promotional tool. A higher level of consumer intent to purchase was observed after participants engaged with firms on social media. Increased use of digital

technologies for product purchases can have positive effects on many aspects of businesses, including revenue, client satisfaction, efficiency, and creativity. Entrepreneurs rely on it for a wide range of tasks, including advertising their wares, communicating with customers, and researching the market.

5.1 Conclusion

According to the strategy used by(Arrigo, 2018), this study provides a range of perspectives on social media and digital marketing from invited experts. Experts' views cover both broad overviews of the field and analysis of narrower topics like the impact of digital marketing on consumers' sense of ethics and morality, as well as their vulnerability to the perils of social anxiety and feelings of academic inferiority. The many themes and central topics are discussed, along with the challenges, opportunities, and future studies agenda from multiple perspectives. The expert opinions within the overarching themes of environment, marketing strategies, company and outcomes explain many critical elements and current debates within the broader social and digital marketing literature. Many ongoing debates in academic and practitioner-focused research are reflected in the areas of expertise covered by these different points of view. On the other hand, those who do not engage in social comparison are often more open to new information, ideas, and perspectives from others but spend more time focusing on and building their mental models. Anjala S. Krishen's article referenced eWOM in our capability to comprehend and interact with numerous cultural contexts, addressing several human-centered concerns and cultural facets of digital marketing. In this view, credible knowledge can be built through new mechanisms, facilitating informed data-driven decisions. Jenny Rowley looks at the research side of social media marketing. This point of view outlines the most critical factors related to consumer and user behavior studies within businesses.

Research findings allowed for several different inferences to be drawn. One example is the significant positive impact that social media and influencers had on perceived usefulness and ease of use, subjective standards, and enabling conditions. In contrast to the impact on consumers' sense of identity, another finding showed that social media advertising (SMM) positively and significantly affected consumers' propensity to make a purchase. Further studies found that influencers did not directly impact consumers' intent to buy, but did have an indirect, positive effect on consumers' perception of price. Ultimately, the optimal positioning was for high-end goods that came in various options, were packaged attractively, and did not break the bank.

5.2 Implication

By shedding light on the technological, managerial, and social and economic variables that influence adoption, this study adds theoretical depth to the expanding body of

literature on SMM. Many technological factors were found to be influential, but the perceived benefit and enabling situations stood out. Support from management is the only organizational variable influencing the adoption of social media marketing. Any additional considerations, such as the price tag or how simple it seems to implement, are negligible. Results for intent to purchase can be explained by the low cost and low difficulty of social media advertising. It is expected that the results of the research will be useful to policymakers in practice. Policymakers are able to promote social media marketing among purchases if they have access to data on the factors and findings that motivate consumers' intent to make purchases via social media.

The economy of the country will grow as a direct result of implementing this winning strategy. The findings will also inform executives on how to implement social media marketing effectively. Last but not the least, this study contributes to the literature because it can identify nonlinear links between the constructs, something no previous studies have been able to do because they all used structural equation modeling (SEM). This study improves upon prior efforts by employing a deep network, a tool of artificial intelligence, to discover linear and nonlinear associations between the variables. When combined with PLS-SEM, the results from ANN are more robust, and the exceptional precision of ANN is displayed.

6. Limitations and Future Studies

Future studies that are similar to this one might benefit from taking into account a few limitations. As a cross-sectional study, it is limited in its ability to capture the dynamic shifts in internet marketing's acceptance as the scope of impacting technological, managerial, and environmental factors continues to expand. Therefore, the proposed relationships need to be investigated over a longer period of time to yield credible results. Second, the data was compiled using a relatively small number of citizens of Karachi. Potential scientists may need more samples in order to extrapolate the results. However, there may be regional or national differences in the factors that drive the expansion of social media advertising. In addition to the nine criteria explored in this study-the bandwagon effect, political ties, social ties, conversational abilities, diverse knowledge, customer intent to purchase, and trust-there may be other precursors. Using only a handful of variables could be seen as limiting. When future studies take into account more variables, the same theory can be examined and verified in different countries.

Additional study is needed to examine the impact of technological, managerial, and environmental variables on social media marketing for large businesses. The factors that impact the use of SMM were the focus of this research, rather than its adoption and impact on shoppers' intentions to buy. Researchers will now be able to more thoroughly examine how social media advertising influences consumers' intentions to make a purchase. This may lead to unexpected findings. Finally, it is possible that the differences between concept and

empirical findings can be explained by the sample's distinctiveness, which is not confined to the Karachiites' setting. As a result, researchers in the future will need a more representative cross-section of the population to effectively apply theory and generate conclusions. This will help researchers in the future generalize their findings.

6.1 Recommendations

The findings suggested several directions for future studies. The initial goal was to put a name with a face to gain insight into the personalities of influencer marketing who might impact the product's sales. Research could be expanded to include more studies of social bloggers with perceived value and facilitating conditions, as purchase intent is a part of social media marketing. In order to improve the quality of the findings, it was also suggested that additional studies be conducted. Future research should investigate the requirements and motivations that may account for the preferences of social media users from different cultural backgrounds or countries. On top of that, modern social networking sites like Facebook and Twitter have distinct features that set them apart from older networks. There needs to be more attention paid to this change in the future. The impact of SMMAs on user habits and expectations was the primary focus of this research. More than physical storefronts are needed for product promotion in the modern era. When AR becomes more widespread, it will serve a similar purpose. Marketers and other stakeholders will continuously introduce new forms of virtual content into consumers' daily lives. Businesses must change to keep up with the times, and Augmented Reality (AR) will likely become as important in most sectors as online channels are today. Differentiating between the three factors that can affect the persuasiveness and influence of communication—the sender, the recipient, the text, the medium, and the context-is necessary if we provide some guidance for a compelling study (Wathen & Burkell, 2019).

According to studies, consumers care more about the reliability of the message than the reliability of the origin (Filieri, 2016), which is especially true for more complex choices. To better understand whenever the text and source are much more crucial in evaluating review trustworthiness, researchers in the future must consider the quality of the information as a partial moderator or facilitator of the impacts of reference group dimensions in eWOM circumstances also with high versus low review to assess. This study's findings suggest that digital marketing is a powerful tool for enhancing the efficiency of MSMEs. How different entrepreneurs' cultural preferences affect their adoption practices needs to be clarified. The extent to which this would change the outcome is unknown. The onus is now on researchers of the future to investigate this concern. Seven experts were consulted for their opinions on the readability of the questions in this study. However, a more expert opinion could bring in even more factors relevant to this context, particularly to investigate the nature of the impact. Nonetheless, that is not the case with the current investigation. Future researchers might pick this up to build on the previous work.

Additionally, more research is required to evaluate the effects of technological, organizational, and environmental factors on social media advertising at large corporations. Furthermore, the adaptation of digital marketing and its effect on the performance of SMEs were not evaluated in this study; only the factors that led to its use were studied. Future researchers will be able to examine how social media marketing affects the success of small and medium-sized enterprises (SMEs). Those results could lead to surprising discoveries. In order to generalize the results, potential researchers may need a larger sample size. However, the factors that influence the spread of digital marketing may vary from one nation to the next. Furthermore, there may be extra forerunners apart from the nine criteria investigated in this research, including group mentality, political ties, social connections, various studying, and customer trust. For this reason, using only a few variables is a restriction. The same theory can be tested and validated in different countries if future studies include additional factors.

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Survey Questionnaire

Dear Respondent,

This survey is conducted for writing a report on our subject named "Business Research" as part of our PhD. This survey aims to identify the Framework indicating the significance of Demographic and Cultural Variables. Please complete the following table. Any information obtained with this study that can be identified with you will remain confidential.

1) Gender
- Male
- Female

2) Age
- 18-25 years
- 25-35 years
- 35-45 years

3) Qualification
- Post Graduate
- Graduate
- M-Phil
- PhD

4) Marital Status
- Single
- Married
- Divorced

5) Perceived Usefulness.
- The online system makes it easy to find the content required.
- Using E-learning improves my performance.
- The online system provides valuable content.

6) Facilitating Conditions
- Central support is available to help with technical problems
- The device is not compatible with another device I use.
- I know necessary to use the device.

7) Perceived Ease of Use
- My interaction with E-learning requires little effort.
- Using online shopping would make it easier for me to conduct a transaction.
- Using online shopping would improve the speed with which I could conduct myself.

8) Perceived Cost

- The money invested in training employees to use social media marketing would be high.
- The cost of maintaining social media marketing would be very high for our enterprises.
- The costs of adopting social media marketing would be greater than the expected benefits.

9) Social Media Marketing

- Our social content aligns with the interest and needs of our target audience.
- It is beneficial for businesses to use social media as a communication channel.
- Social media usage impacts the consumer behavior of respondents.

10) Purchase intention

- I recommend others to use online stores.
- I am happy to use my credit card to purchase from an online vendor through Facebook.
- References

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Conventional and Islamic Banks' Performance An Analysis of During and Post-Economic Crisis

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Abstract

The current study looks at the factors that affected conventional and Islamic banks' profitability between 2007 and 2013. This period is further classified into two periods, i.e.2007-2009 and 2010-2013, the tenure during and the tenure after the financial crisis. Descriptive research design and logical reasoning are employed in this study to analyze fourteen conventional and Five Islamic banks. We used Return on Assets to measure the profitability, whereas two macro-economic variables, i.e. Inflation and GDP (gross domestic product), and three industry-specific constructs, i.e. Size, Leverage and Liquidity as independent constructs. According to panel regression results, the profitability of both banking sectors during both tenures was unaffected by macroeconomic factors. In the case of financial or variables that are specific to an industry, both types of banking sectors had a negative impact on profitability under pre-economic crisis tenure. However, the profitability of traditional banks is considerably enhanced by liquidity. The scale of both banking sectors greatly boosts profitability while the financial crisis is ongoing. Conventional banks' leverage had a significant negative and liquidity had a significant positive impact on profitability during the financial crunch. In the years following the crisis, once again Islamic banks increased in profitability despite being inefficient, providing them with a tax shelter, with an increase in leverage significantly. On the other hand, conventional banks had the inverse impact of leverage on their profitability but they managed their liquidity much better than the previous two tenures and generated more profit. The outcomes will be useful for the banking institutions to develop their strategies consequently.

Keywords: Islamic; conventional banks; determinants of profitability; regression analysis.

JEL Classification: B26, B55

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1. Introduction

In each country's economic development, the financial system is always a key component to be taken into consideration. Because the operations of the financial system help to boost the efficiency of economic activities, if the financial system is not robust, the economy will never expand and may even experience a severe reduction. It promotes confidence among investors, borrowers, and creditors on both a national and international scale, as well as among individuals. If the financial system or a certain industry is stable, the investment will definitely expand, which will result in increases in employment, per capita income, and the Gross Domestic Product. In order to stabilize their financial systems and expand their economies, the governments of all countries are preoccupied with developing policies that will aid in the stabilization and expansion of their respective economies first and foremost. In the financial industry, there are institutions like banks, Modaraba firms, leasing companies, and insurance companies, to name a few examples (Hassan et al., 2018).

For most of us, banks are a necessary part of our daily lives, and it is impossible to imagine a period when we did not have access to banking services (Khan et al., 2018). To put it another way, banks are supposed to be the lifeblood of a country's economic system. The use of "Monetary Tools," which are made available through the financial system, by the government of any country can help to improve the economy of that country. Additionally, financial institutions that are under government regulation handle all of the business and financial activities in which we are involved. Although conventional banking provides several advantages, it has also been associated with several negative aspects, as we have already mentioned, the conventional banking system was primarily responsible for the financial and economic catastrophe that occurred in the twenty-first century.

Due to the advent of Capitalism, in which interest rates are permitted, the frequency of such financial crises has increased significantly. If any person is not able to make a gain on a debt, it will have an impact on the entire financial system. We have seen that financial institutions, such as commercial banks, are the principal victims of the current economic crisis, which we attribute to the possibility of the economic system collapsing. Financial institutions that provide traditional ways of financing and investment are known as commercial banks. It is for this reason that academics, business leaders, and policymakers were eager to put policies in place that would prevent the country from going bankrupt. Among the methods that will help to eliminate "interest" and the ramifications of non-payment of interest are Islamic banking models. Every one of the instruments employed by Islamic banks conforms to the Shariah method of investing, which is free of interest.

Islamic finance has been in operation in Pakistan for thirty years, but the State Bank of Pakistan (SBP) only began to make serious efforts in January 2000, when it established the Central Trust Fund of Pakistan (CTFS), and again on September 15, 20 years ago, when it

established an Islamic banking section at its headquarters in Islamabad, according to the State Bank of Pakistan website. It was created by the SBP to advance Islamic banking and investment methods. When Meezan Bank Limited was granted a license to operate as Pakistan's first Islamic bank, it did so after receiving certification from the State Bank of Pakistan that it was capable of performing the functions of a fully-fledged Islamic bank.

It is widely acknowledged that the global financial crisis has had a considerable influence on the majority of countries' economies, notably in the banking sector (Asadullah et al., 2021). A component of the financial sector, in particular, the banking sector, is accountable for an economy's immune and repair systems. The effective operation of this business may provide a source of energy for the development of other industries as well as the expansion of the economy. According to research by Sadaqat et al. (2011), Pakistan's financial market is one of the most unstable in the world. Consequently, it is anticipated that the banking sector should be financially sound and powerful, as well as operating at a profit. To effectively address the issue, it is vital to have a complete understanding of the factors that influence financial performance in the industry before, during, and after an economic downturn.

1.1 Significance of the study

The significance of studying the performance of Islamic and conventional banks during and after an economic crisis lies in understanding the dynamics and resilience of different banking systems in challenging times (Le , 2022). Economic crises often lead to systemic risks that can jeopardize the stability of the entire banking sector. By studying Islamic and conventional banks, policymakers and regulators can assess the extent to which each system contributes to systemic risks and identify measures to enhance financial stability. Islamic banking operates based on the principles of risk-sharing and asset-backed financing, which can affect the banks' performance during a crisis. Understanding how Islamic banks fare during economic downturns helps in evaluating the resilience of their risk-sharing mechanisms and assessing their potential as an alternative to conventional banking (Wahyuni & Aidah ,2022).

Islamic finance adheres to ethical principles, such as avoiding interest-based transactions (riba) and investing in socially responsible activities. Investigating the performance of Islamic banks during and after an economic crisis allows for a study of how ethical considerations impact their decision-making, risk management, and contribution to the broader economy. The findings from studying Islamic and conventional banks' performance during and after an economic crisis can inform policymakers in formulating appropriate regulatory frameworks and policies (El-Chaarani et al., 2022). It can shed light on the need for tailored regulatory measures specific to each banking system, promoting financial stability and sustainable growth.

Moreover, a crisis can significantly impact investor confidence and market perception of different banking systems. Analyzing the performance of Islamic and conventional banks helps to understand how investors react to each system during turbulent times. This insight can influence market participants' decisions and potentially shape the future development of the banking industry (Mirzaei, 2022). Islamic banking has experienced substantial growth and global expansion over the past few decades. Studying the performance of Islamic banks during and after an economic crisis has broader implications for countries with significant Islamic finance sectors, as well as for those considering the adoption of Islamic banking principles. It can provide valuable lessons for policymakers worldwide. Overall, examining the performance of Islamic and conventional banks during economic crises allows for a comprehensive evaluation of their strengths, weaknesses, and overall contribution to financial stability. It provides policymakers, regulators, and market participants with valuable insights to enhance risk management, strengthen resilience, and shape future banking practices.

2. Literature Review

Whether directly or indirectly, the financial catastrophe had a physical and intangible effect on the insurance business all over the world, both directly and intangibly. The incident has been confirmed by several well-known specialists and industry analysts. As Sebastian Schich (2009) points out, "the financial crisis has nevertheless had an increasingly visible impact on the insurance industry as the crisis has progressed and the prognosis for real activity has deteriorated considerably." According to representatives from the banking industry, a financial crisis appears to be primarily a banking tragedy, and the sector's long-term viability does not appear to be jeopardized as a result of the crisis. According to Gul et al. (2011), the only factor that positively and insignificantly correlates with the firm size is ROA. As reported by Pasiouras and Kosmidou (2007), the size of a bank and its profitability have a positive relationship. Based on his research, Bashir (2003) discovered that the size of an institution hurts its profitability. According to Wasiuzzaman and Tarmizi (2010), there is no statistically significant correlation between bank profitability and size.

(Le, 2022) used a sample of 24 nations from the fourth quarters of 2013 and 2020 to examine the relationship between diversification and the performance of Islamic banking systems under the influence of the COVID-19 upheaval. His results show that sectoral diversification of financing that complies with Shari'ah and income diversification are both favorably correlated with the success of Islamic banking systems. Income diversification is observed to lessen the detrimental impact of this health issue on the functioning of the Islamic banking systems, even if this analysis reveals a negative impact of the COVID-19 shock. It was discovered by Scott and Arias (2011) that the profitability of banks is positively correlated with the gross domestic product (GDP). It was discovered by Sufian and Habibullah (2009) that the GDP has a mixed impact on return on assets (ROA). We noticed that the GDP coefficient was negative during times of crisis, but when we are in charge of both crises

and peaceful periods, the GDP coefficient changes to a more favorable value. (Le, 2022) (Mirzaei,2022) Concluded that the size of the company, the board of directors, the sharia supervisory board, and third-party funds are all factors that affect financial success. This result shows that the research model fits the data effectively. Results of the individual sample test (t-test) indicate that firm size and the size of the board of directors have a negative impact on financial performance, whereas the size of the sharia supervisory board has no effect on financial performance.

Return on assets and return on equity were found to be negatively related by Khrawish (2011), who revealed that GDP and inflation had a negative relationship with each other (Mirzaei ,2022). According to Bourke (1989), Eichengreen and Gibson (2001), and Bashir (2000), one of the major elements impacting bank profitability is liquidity. We may expect higher profits if we invest less of our cash in liquid investments, according to Eichengreen and Gibson (2001). The individuals listed as Scott (2014), according to their empirical analysis, Nigeria's inflation and bank size had a negligible effect on bank profitability over the study period (Wahyuni & Aidah, 2022). (Alabbad, 2022) concluded that the two types of banks react to income support programmers differently. When governments implement income support initiatives, Islamic banks' finance income and net income shift much more than those of their favorably conventional peers. Additionally, the stock values of Islamic banks react favorably to income support initiatives more than those of regular banks.

H0: Macroeconomic and bank-specific indicators haven't had any impact on Conventional and Islamic Banks' profitability both during and after the economic crisis.

3. Methodology

According to the authors, descriptive research design and logical reasoning are employed in this study. Panel data covering a period of six years, from 2007 to 2013, has been collected and analyzed to determine the impact of industry-specific and macroeconomic variables on the profitability of both pillars of the banking sector. The authors have selected fourteen conventional and Five Islamic banks and used Return on Assets to measure the profitability, whereas two macro-economic variables, i.e. Inflation and GDP (gross domestic product), and three industry-specific constructs, i.e. Size, Leverage and Liquidity as independent constructs have been used. There are three years labeled as post-crisis years, ranging from 2010 to 2013, and a period defined as the global financial crisis period, spanning from 2007 to 2009. In his research, the author has made use of descriptive statistics as well as Panel Regression approaches, among other techniques. The author has selected nineteen financial institutions, five of which are Islamic and fourteen of which are conventional. The equations which have been developed for all models are as below. In this model, we have shown the impact of macroeconomic financial values like GDP and Inflation on the performance of Islamic and conventional banks. The performance is analyzed through the return on assets,

which translates the financial performance. Moreover, the impact of the liquidity of that bank as well as the size is also considered to analyze the performance of categories of these banks.

3.1 Model: Macroeconomic and Financial values' effects on Islamic and conventional banks' viability

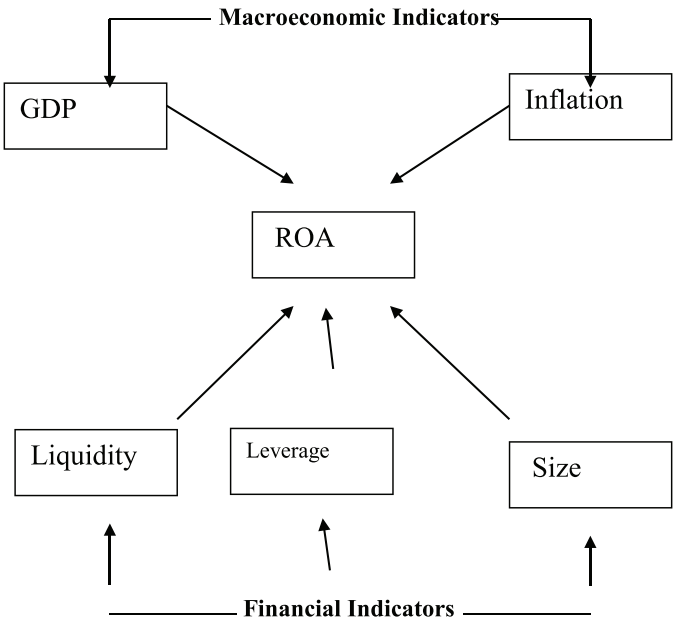

Figure 1: Financial Indicators

Equation –ROA = Bo + B1GDP + B2INF + B3L + B4LQ + B5SZ + σ

Where, ROA = Return On Asset (Conventional and Islamic Banks)

GDP: Gross Domestic Product

INF : Inflation

L: Leverage (Conventional and Islamic Banks)

SZ: Size of the firm (Conventional and Islamic Banks)

4. Empirical Results & Discussion

4.1 Regression Results (During Economic Crisis Tenure):

Table 1
Panel Regression Results (During Economic Crisis Tenure)

Constructs	(Fixed Impact Model) Conventional Banks	(Fixed Impact Model) Islamic Banks
Constant	0.519	0.023
	(0.000)	(0.001)
Gross Domestic Product	-0.313	0.612
	(0.930)	(0.409)
Inflation	-0.720	-0.813
	(0.517)	(0.237)
Size	0.229***	0.206***
	(0.000)	(0.0006)
Leverage	-3.011***	0.61
	(0.000)	(0.361)
Liquidity	0.922***	0.90
	(0.003)	(0.25)
F-Statistic (P-Value)	26.18	34.978
	(0.0000)	(0.0008)
R-Squared	0.373	0.318
Hausman Test	Prob>chi2 = 0.0007	Prob>chi2 = 0.0000

The table 1 shows the results of panel regression of both banking sectors throughout during the economic crisis. In both models, the fixed-effect model was selected as the more appropriate model than Random Effect Model (REM) and it was endorsed by significant values of the Hausman Test. In conventional banks, leverage was found to have a significant negative association with conventional banks' profitability, whereas size had a meaningful helpful impact on it. 1 per cent growth in size and leverage will lead to a growth of 0.22 per cent of size and 3.01 per cent of leverage respectively. However, liquidity and traditional banks' profitability were highly positively correlated. 1 per cent increase in liquidity will tend to increase 0.9 per cent of the profitability of insurance companies. Other variables were having insignificant relationships throughout the tenure. The R-Squared i.e. 0.373 indicates that 37.3% of variation has been discussed by this model. Moreover, the F-Value i.e. 26.18, and F-P value i.e. 0.000 revealed that the model is fit to analyze the data.

The only factor that significantly influenced profitability in Islamic banks was size. A 1 per cent increase in size will lead to an increase of 0.206 per cent of the profitability of the Islamic banks. However, other variables have an insignificant relationship with profitability. The R-Squared i.e. 0.318 indicates that 31.8% of variation has been discussed by this model. Moreover, the F-Value i.e. 34.97, and the F-P value i.e. 0.0008 revealed that the model is fit to analyze the data.

4.2 Diagnostic Tests (During Economic Crisis Tenure)

Table 2
Diagnostic Tests

Tests	(Fixed Impact Model) Life Insurance Companies	(Fixed Effect Model) Non-Life Insurance Companies
Breusch-Pagan LM independence test	0.591	0.81
Group Wise Heteroscedasticity Wald Test	0.631	0.514
Autocorrelation in panel data - Wooldridge test	0.4996	0.725

The table 2 summarizes the diagnostic tests that were carried out to verify the findings and uphold the panel regression method's presumptions. In both fixed-effect styles, the Breusch-Pagan LM analysis of individuality value leads to insignificant i.e. 0.591 and 0.81 which is evident that in both models there is no issue of independence. Group-wise heteroscedasticity - Wald Tests were also insignificant i.e. 0.631 and 0.514 which proved that all data sets have no problem of heteroscedasticity. Wooldridge's check for autocorrelation in panel number values i.e. 0.4996 and 0.7225 for conventional and Islamic banks indicates that there is not an issue of autocorrelation among data sets of both models.

4.3 Panel Regression Results -Post Economic Crisis Tenure (2010-2013)

Table 3
Panel Regression Results (Post Economic Crisis Tenure)

Constructs	(Fixed Effect Model) Conventional Banks	(Random Effect Model) Islamic Banks
Constant	0.473	0.572
	(0.004)	(0.000)
Gross Domestic Product	0.766	0.632
	(0.323)	(0.229)
Inflation	0.212	-0.900
	(0.111)	(0.717)
Size	-0.662	-0.474***
	(0.990)	(0.000)
Leverage	-1.400***	0.961***
	(0.003)	(0.000)
Liquidity	2.433***	0.777
	(0.000)	(0.428)
F-Statistic (P-Value)	12.21	8.161
	(0.0000)	(0.0000)
R-Squared	0.293	0.288
Hausman Test	Prob>chi2 = 0.0007	Prob>chi2 = 0.2124
Breusch-Pagan(LM) Testing for Random Serial Correlation:	-	Prob>chibar2 = 0.0000

Table 3 shows the results of panel regression of data taken post-economic crisis. The author has taken post-economic crisis data from 2010 to2013. The Hausman Test's substantial value in the conventional banking model demonstrated that the fixed effect model is preferable over the random effect model. The author found that leverage had a significantly negative relationship with the profitability of the conventional banks in Pakistan. One per cent increase in leverage tends to decrease 1.4 per cent of profitability of Life Insurance companies. Profitability is considerably boosted by liquidity. The profitability of Pakistan's traditional banks will drop by 2.433 per cent for every per cent rise in liquidity. However, other variables remain insignificant. The R-Squared value i.e. 0.293 shows that a 29.3% variation of profitability has been described by the prescribed variables. The F-Value i.e. 12.21 and the F-P value i.e. 0.000 revealed that the model is fit to analyze the data.

In Islamic banks, the insignificant value of the Hausman Test leads to running Breusch-Pagan (LM) assessment for random Serial Correlation. The random effect model is preferred over the ordinary least squares model, according to the LM test's significant value. Panel regression results showed that size has a significantly negative impact on the profitability of Islamic banks. The profitability of Islamic banks typically declines by 0.47 per cent for every one per cent rise in the size. The profitability of Islamic banks in Pakistan will rise by 0.96 per cent for every percentage point increase in leverage. Moreover, other variables were

found to be insignificant. The R-squared value i.e. 0.288 indicates that 28.8% of the variation of the dependent and independent variables has been described by the given model. Rests of the variations are because of unknown variables. The F- value i.e. 8.161 and the F- P-value i.e. 0.0000 signified that the model is fit to run.

4.4 Diagnostic Tests (Post Economic Crisis Tenure)

Table 4
Diagnostic Assessments

Assessments	(Fixed Effect Model) Conventional Banks	(Random Effect Model) Islamic Banks
Independence Breusch-Pagan LM	0.2323	0.6959
Group Wise Heteroscedasticity - Wald Test	0.317	Robust Command Error
Autocorrelation in panel data - Wooldridge test	0.555	0.1247

The overview of the diagnostic assessments that were performed to confirm the findings and uphold the panel regression technique's presumptions is presented in Table 4. The p-values of the Breusch-Pagan LM test of independence i.e. 0.2323 and 0.6959 of conventional and Islamic banks revealed that there is no issue of independence among the panel data. In both the models, the Wooldridge test for autocorrelation yielded non-significant results, indicating the absence of autocorrelation in the panel data. The Wald Test returned an insignificant value i.e. 0.317 for heteroscedasticity. It means the problem of heteroscedasticity is not the issue in the given data whereas in the second model, where the random effect model was selected, the test for heteroscedasticity is not available in STATA. In order to resolve the problem of heteroscedasticity from the supplied data, the researcher has therefore used the Robust error command.

5. Conclusion

This study aims to investigate or evaluate the factors that influence conventional and Islamic banks' profitability before, during, and after financial crises. The lack of research on this subject inspired our study. The author has taken Return on Assets to measure the profitability, whereas two macroeconomic variables, i.e. Inflation and GDP (gross domestic product), and three industry-specific constructs, i.e. Size, Leverage, and Liquidity were treated as independent variables. According to the panel regression findings, macroeconomic factors have little bearing on the profitability of interest-based and Islamic banks. The reason for the insignificant effect is the developing economic system of Pakistan. Both sorts of banking

sectors have a negative impact on profitability when it comes to financial or sector-specific variables because they are ineffective at turning a profit off of their assets. However, the liquidity management of conventional banks was better than Islamic banks which faced an inverse impact on profitability which is inconsistent with the findings of Khokhar et al. (2020).

Conventional and Islamic banks, two subsectors of the insurance industry, were both productive and made more money thanks to the growth of their assets throughout the financial crisis. Although conventional banks experienced a fall in profitability along with a rise in borrowing, they managed their liquidity better throughout the financial crises. During a post-crises period, once again Islamic banks were inefficient, nevertheless, they had tax protection through an increase in profitability with an increase in leverage. On the other hand, conventional banks had an inverse impact of leverage on their profitability but, they managed their liquidity much better than the previous two tenures and generated more profit.

Examining the performance of Islamic and conventional banks side by side during an economic crisis allows for a comparative analysis of their strengths, weaknesses, and overall stability. This analysis can provide insights into the effectiveness of each system in responding to financial shocks and mitigating risk. The author concludes that both banking sectors should concentrate on their internal, sector-specific, or financial metrics as suggested by Mehboob-Ul-Hasan et al. (2020) for the GCC financial institutions. They need to create and put into place the kinds of policies that will allow them to boost their profits through efficient liquidity management, benefit from leverage, make use of tax shelters or tax evasion, and cut expenses by building up their assets, which is the idea behind economies of scales. The banking sector should manipulate its policies which enable the sector to build more strength and stabilize because if the banking sector is stable then the economy of any country will be in shield protection. It will create trust among investors, traders, businessmen, and other important personnel.

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Stability, Funding Risk and Bank Performance: Evidence from Pakistan

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Abstract

This study analyzes how banks' stability and funding risk affect their profitability in the case of Pakistan. For this purpose, data from 19 Banks were used from 2000 to 2016. The independent variable was Bank Performance for which Return on Assets was used. The dependent variables were first, Bank Stability, which was calculated as the Z-Score of RoA and Equity to Assets, and second, Funding Risk, which was calculated as the Z-Score of Deposits to Assets Ratio and Equity to Assets. Our control variables were Bank Size, Credit Risk, Liquidity Risk, Diversification, and Capital to Asset Ratio. Our results indicated that Funding Risk, Liquidity Risk, Credit Risk, and Bank Size are negatively affecting bank performance whereas bank stability is positively affecting bank performance. From the result of size, we may conclude that in the case of Pakistan, Larger Banks are not getting the benefits of economies of scale. Our findings suggest that policymakers and banking institutions in Pakistan should prioritize efforts to enhance bank stability and mitigate funding risk in order to improve bank profitability.

Keywords: Bank Performance; banking sector; bank stability; funding risk.

JEL Classification: E44, G21, G24

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1. Introduction

1.1 Bank Profitability

The flow of funds' support is the leading and primary role of a financial system. A competent financial system should not only demonstrate better quality services for consumers but, profitability improvements and collect the bulk of funds from savers for debtors.

To any economy, as a whole, it's very critical to have a fit and healthy banking sector (Gazi et al., 2022). This demands the study of banking sector performance in developing economies of greater significance. Although a sufficient literature background is available on developing economies, our primary motive is to bring this convergingly to the Pakistani context.

As we initiate, discussion about the origin of banking is inevitable. The origin of modern banking was marked by financial historians in Italy in the thirteenth century with the rise of financial houses (Schefold, 2022). Whereas, 33 A.D is considered as the earliest cries recorded, where the convergence of factors like foreign debt defaults, frauds, government policy for liquidity draining, and some ships sinking loaded with uninsured commodities forced some Roman banking houses to shut down. Reliable bankers were then provided with funds by Tiberius Caesar and some debtors for recovery. Caesar had to suspend government policies and forgive some interest but as a payoff to it, some institutions recovered.

Bank performance evaluation is not simple but rather a complex process as it encompasses assessing environmental elements interaction, external factors and internal operations. A generally accepted pattern used to narrate bank performance is assessing performance through a number of empirical financial ratios from which financial intermediaries' performance is normally gauged. Ratios provide a broader view of the bank's performance as ratios are calculated from accounting data i.e. extraction from financial statements and banks' balance sheets. As considered by many studies, operating efficiency is another key element for management to assess performance. While measuring efficiency, cost control information is depicted by the spread. The difference between rates paid on deposits and the rates charged on loans provides cost efficiency in numeric terms. Whereas for Islamic banks, participation in many non-interest-based investments can be used to attain spread (Al-Harbi, 2019).

Ratios and spread both provide a macro view of the performance. Other measures of performance are Return on Equity (ROE) and Return on Assets (ROA). ROE and ROA both are tightly attached to net revenue derived from the income statements; not income. Both measures of performance are used previously in many performance-related studies to estimate bank performance. In a simple manner, ROE represents shareholder funds' effective usage by the management. On the other hand, ROA is dependent upon policy decisions and

many economic and other external factors including government interferences. Regulators believe that ROA represents bank performance more than any other measure. ROA reflects the earned profit per rupee of assets, this means the assets utilization through management ability; mainly financial assets.

With significantly higher returns than other parts of the world, commercial banks in Pakistan appear very profitable too, similar to few other emerging economies of the globe. Malamud et al. (2022) described standard asset pricing models signify that riskier assets be compensated with greater returns and this must be ensured through an arbitrage. Performance reflected in many commercial banks of Pakistan, along with regulatory, supervisory and structural reforms, for promoting financial development parallelly reducing the concerned risks. However, some institutions still operate in a risky financial environment which compels them to charge higher returns to compensate for high risks. An increase in loan defaults and deterioration in loan quality as a consequence of low economic growth too can severely impact banking sector performance as weak economic performance exposes banks to more risks. Bank performance is not only impacted by internal factors but it has relations with external factors/determinants, as supported by literature, the factors include but are not limited to variables representing market characteristics, taxation, GDP per capita, GDP development and last but not least, inflation rate. A very trivial impact is of the tax burden on bank performance as banks easily transfer the tax burden's large part onto its associates such as borrowers, depositors and fee-generating purchasers (Barrdear & Kumhof, 2022).

`Deregulation and financial stabilization made important implications on the banks' income statements (Al-Harbi, 2019). It's about from traditional financial income by making a shift to non-interest income from a complete interest base. Interest margin's decline changes the role traditionally played by the banks and a thrust of new avenues for revenue is felt, such as service, trading and other operations (Kumar et al., 2022). Furthermore, fee income increased its importance as a new revenue avenue such as financial innovation, new information technology and industry deregulation sort of structural changes are taking place, and due to this phenomenon, gross income and non-interest income ratio have increased sharply in every country (Ghorbani et al., 2019). Albertazzi and Gambacorta (2009) stated that this ratio of non-interest income to gross income increased in Western countries consequently demonstrates a sharp increase in banking performance. But apart from the UK which leads in this ratio, the rest of the banks in the region like Portuguese, Spanish, German, and Italian lag behind in this ratio.

This lower ratio denotes the stock market's lower development in the country and a strong lending-borrowing relationship which often characterizes these countries. The banking sector in Pakistan is a lucrative area of study for researchers as due to its heterogeneity, research studies can focus on any part of this multi-branched tree. Public sector banks, fully privatized banks, and partially privatized banks may and can have the same sort of operations

and financial structure and are operating in a comparable environment but on the contrary, the environment of Islamic, SME, and Microfinance is holistically different in regulatory ambit as well as the operations and performance are concerned.

The pivotal role played by the banking sector forces both i.e. academia and professionals to raise a relevant fundamental question about the efficacy of operational performance mechanisms (Akther & Rahman, 2022). Precisely stating, how should the banking sector operate either Market-based or state-controlled? Further, a concern is raised pertaining to the transition phase from state-owned to private-owned or vice versa. The answer to such scrutiny itself is evidence that the sector under consideration is progressing up the liking table of professionals and academia alike. Pakistan too, in alignment with changing environment of the economic world, underwent phases of banking sector reforms. Imperative to mention some studies connected to the regulatory regime and banking performance relationship. Ahmad and Burki (2016) studied deregulation's impact on banking sector performance by analyzing market perception. Results indicated that key banking reforms proved to be helpful in fixing glitches and an improvement in the banking sector of Pakistan's cost inefficiency score. Khan and Hanif (2017) adopted a microeconomic approach to analyze the competition among banks in Pakistan which is linked to the performance of the banking sector itself. Khan and Hanif (2017) used financial capital cost, physical capital and cost of labor as input while taking earning assets as an output. Ali (2020) while assessing the impact of financial sector reforms on the Pakistani economy discussed and debated on the success of the banking sector denationalization scenario which again links towards banking sector's performance.

The operating environment for banks in Pakistan has observed substantial changes since the implementation of financial sector reforms in the early 1990s. Specifically, the privatization of state-owned commercial banks was commenced, and the private sector was encouraged to open new banks; directed-credit schemes were gradually stopped; the cap on lending rate was abolished; licensing of branch policy was liberalized; and the use of information technology for the provision of financial services was facilitated. Moreover, the State Bank of Pakistan (SBP) has been actively facilitating Islamic banking, branchless operations, and microfinancing, to promote access to financial services. All these changes were planned to implant healthy competition, create a sound, effective and efficient banking system capable of supporting the growing economic activity. Understating of the degree and evolution of bank competition is also important as it has strong implications for the way changes in monetary policy stance impact the ultimate underlying objectives.

Khan and Hanif (2017) narrated that in an emergent economy like Pakistan, the role of the banking system can be barely over-emphasized. While the acknowledgment of the impact of sectors' reforms on the banking structure of Pakistan is there, both the management and academics question the level of efficiency of the banking sector. The Competition Commission of Pakistan (CCP) has also been critical of competition in the banking sector. The

reforms of the financial sector, including the most material one made the banking sector in Pakistan competitive. Exploring empirical bank performance precisely, researchers viewed the banking sector altogether such an important area of research they even explored the angle of regulatory regimes of the banking sector in detail. A few contributions from around the world are included for reference and emphasis purposes. Studies such as Berger et al. (1995) revealed that even in the US, liberalization of deposit rates has little or no effect on bank deposit rates which are linked with bank performance. Few contrary studies supporting the phenomenon are also found (Kumar et al., 2022; Phan et al., 2020). Despite its importance seen through the binoculars of existing literature, very less work is conducted in the context of Pakistan. Abbas and Malik (2008) conducted a study to capture market perception about the performance of the Pakistani banks observed from spectacles of the central bank's deregulation and liberalization measures.

Banking performance is generally taken as inversely proportional to insolvency. The higher a bank's performance would be the lower it has risks of insolvency. When banks go insolvent many adverse effects encompass it. The primary factor considered in the literature regarding the transparency of reporting both sectors is that the non-financial sector is more transparent as compared to the financial sector. Some reasons specified are that banks have less transparent operational processes than operations/production processes of the non-financial sector, banks' products, in general, are payable in future (banks' inability to pay will be exposed at a later stage) whereas non-financial deals on the day-to-day basis and all weaknesses are very much identified to market. Financial firms can roll over with loans or even increase deposits for the same purpose too. High return promises can attract new clients when inevitable situations are to be faced coming from old clients. In this manner, the financial sector is at a high risk of insolvency; banking performance in general term reduces this risk.

The distinct features of a very high spread compared to other countries of the world and a day-by-day stiffer regulatory environment make the sound foundation to empirically investigate the banking sector and its performance (Phan et al., 2020; Wang & Luo, 2022). The current research's focal point is the same. A similar sort of work done on bank profitability is acknowledged which was previously done by Adusei (2015) which examines Bank profitability in Rural and Community Banks (RCB) of only Ghana. However, the current research differs from (Adusei, 2015). Firstly, Adusei focused on RCBs of Ghana having restrictions of operations for certain geography and not allowed to open branches (single branch banks) whereas this paper focuses on the complete banking sector of Pakistan which consists of 22 numbers of banks operating in Pakistan and having branches across the country with no significant territorial restrictions. Secondly, the sampling framework for the paper constitutes of only 112 RCBs whereas this research has access to a secondary database through Thomson Reuters of all banks operating in the country. For which, results extracted from this paper will provide deep insights into the banking performance as compared to the base paper.

1.2 Research Problem

Although a variety of factors affecting bank performance was researched with different fusions in order to find the most prominent ones which influence bank performance, it is an interesting and inducing research topic to find out the results for more influential factors to affect bank performance.

"This research study will examine which factors of Bank performance are more dominant/influential among factors of prevailing literature i.e. Bank Size, Liquidity Risk, Credit Risk, Bank Stability, Diversification, Funding Risk, and Capitalization in the case of Pakistan"

1.2.1 Research Question

This study will be investigating the following Research Questions:

- What is the most influential factor among the factors in determining bank performance?
- Are the effects of the prominent factors consistent across the entire banking sector or do they vary from bank to bank?

1.3 Study Objectives

The experimental and theoretical evidence proposed that many financial crises, troubling a lot of underdeveloped and even developed economies in the world (Caprio & Klingebiel, 1996), resulted in designing indicators for monitoring financial vulnerability (Kanas et al., 2012). When a prudent list of macroeconomic indicators is to be made for the purpose of banking performance, its future outlook ascends the list in debate. The principle focus of the study is to drill down the variables which in numeric terms stimulate the bank performance in Pakistan's financial market scenario. The essential motive to commit research is the sector's own importance in providing funding from the micro to macro economical level while pooling idle funds from the scratch of the economy for this purpose. Furthermore, the goal is to investigate the different variants/ i.e. Bank Size, Liquidity Risk, Funding Risk, Bank Stability, Credit Risk, Diversification, and Capitalization in the Pakistani scenario.

1.4 Limitations

The study may be specific to the context of Pakistan's banking sector. Extrapolating these results to other countries or regions should be done cautiously, as banking systems and market conditions can differ significantly. The reason for differentiation is that they can have different capital structures. In addition, there can be one more contrast, the legislative requirement of banking from nonbanking financial firms. This maybe as a shutdown of a nonbanking financial firm affects somewhat a limited stakeholder but a shutdown of a large bank affects

larger related parties from stakeholders in contrast. Also, this study analyzed data from 2000 to 2016, which may not reflect the current banking landscape and dynamics. Changes in the regulatory environment, market conditions, and banking practices over time could influence the validity and relevance of the findings. Also, this study includes control variables such as credit risk, liquidity risk, diversification, and capital-to-asset ratio. However, there may be other relevant factors that were not considered, potentially influencing the relationship between bank stability, funding risk, and bank profitability.

2. Literature Review

2.1 Why Banking? Why Banking Performance?

In every economy, a pivotal part is played by the banking sector. Banking allocates funds to the most productive uses as this sector mobilizes savings and supports in the payment system. The role of the banking sector is central, for utmost value use, the bank allocates funds, to limit costs and risks, and generate economic activities (Jaffee & Levonian, 2001). Likewise, the study by Porter (1965) revealed that an efficient financial system does provide growth and financial development. Because of banking's fluid significance in any economy, policy devising, and everlasting efforts are made to keep the playing field leveled and opportunities are to be provided on an equal basis, this enables them to operate efficiently, and play competitively.

2.2 Global Perspective

2.2.1 Developed Countries Banking Sector

A great deal of literature now exists, that consents that bank performance at large is pertinent to management/manipulation of resources, and financial resources to be exact. Many studies focused on the US banking system and the banking systems in the developed world have agreed that the main factor backing the bank's performance is the efficient allocation of available funds and other resources.

China was a centrally controlled economy. It went through a comprehensive reform in the banking sector, initialized in 1997, and the aim was to make the banking sector a profitable contributing sector. The focus of the reforms was state-owned four commercial banks which lend to the state's own enterprises. Mainly two restructurings were undertaken in two ways, to carve out non-performing loans and more importantly, capital injection. Besides this, the government took other steps and regulatory reforms like lifting the restrictions on deposit and lending rates, also gradual capital account opening (Tan & Floros, 2012). The results suggest that foreign participation increases and a reduction in state ownership can lead to banking efficiency in China (Yao et al., 2008). Moreover, there exists relevant literature

studying banking sector profitability and their determinants employing ROA, ROE and interest margin. In this regard, the study of Adelopo et al. (2022) found a positive relationship between liquidity and the performance of banks in Europe while a negative relationship between asset quality and performance.

Changes in the factors of the macroeconomic environment influenced the profitability of banking in EU countries. A relatively weak relationship was investigated in size and profitability. Albertazzi and Gambacorta (2009) while using 5 indicators for banking profitability analyzed the volatility of stock market impact on banking profitability in industrialized main developed countries. Results revealed that apart from profit before tax and provisions other determinants are positively related. Further, provision has no relationship and profit before tax has a negative relationship. A similar study by Albertazzi reveals that net interest income has a negative relationship and other variables have a positive relationship.

For an international sample of banks, Demirgüç-Kunt and Huizinga (2010) revealed that there is a positive relationship between non-deposit funding and non-interest income share with absolute bank size. But bank activity and funding patterns may not be potential factors of bank performance.

2.2.2 Developing Countries Banking Sector

Unlike studies available for developed countries rarer material investigated the same topic in developing and/or under developing economies. Out of this vast topic few may be discussed for reference i.e. Bank performance determinants of seventeen (17) commercial banks of Malaysia (Guru et al.,2002), Thailand's local domestic and foreign banks' performance (Chantapong, 2005), the impact of macroeconomic situation and bank financial structure on the bank performance (Ben Naceur & Goaied, 2008).By contrast, fewer studies have looked at bank performance in developing and/or underdeveloped economies. Guru et al. (2002) inspect the determinants of bank performance in seventeen (17) Malaysian commercial banks, the impact of Middle East and North Africa (MENA) countries' commercial banks' performance under the influence of concentration, institutional and financial development, and bank regulation.

2.2.3 Diverse Perspective

Quotable cross-border and diverged explorations on the topic are discussed which added value and helped discover new relationships. First, an exploration of factors of bank performance in a set of countries is offered (Molyneux & Thornton, 1992). While using bank-level data of eighty (80) countries to determine bases of bank performance Demirgüç-Kunt and Huizinga (2010) contributed a comprehensive study. Further, taking a larger number of developed and developing countries in the sample Demirgüç-Kunt and Huizinga (2010)

contributed effects of structure and financial development on the bank performance (Wang & Luo, 2022; Yakubu & Musah, 2022).

2.3 Pakistani Banking Perspective

2.3.1 Historical Reforms

A crucial part is played by the banking sector in the development of the nation of Pakistan. Snapshot of important occurrences is conferred. In the mid of 1,970s significant changes occurred in the financial scenery of the country. Not only banks' nationalization and afterwards control of interest rates but an intricate system of credit ceiling introduction and subsidized credit schemes and many digressive decisions were also taken. Then a series of disruptions followed. The government started interrupting the business affairs of banks. A much-tilted behavior was observed, especially the nationalized banks were given primary importance to cater borrowing needs of the government. While the needs of the private sector were either met hardly or even ignored. The efficiency of banks was severely affected as a repercussion of the policy alterations. By the 1980s, the banking sector of Pakistan could merely contribute to cope with the ever-growing needs of the nation. At that point in time, deregulation and financial liberalization in the banking sector were predominantly important in order to have constructive far-reaching implications for the sector.

2.3.2 Current Issues and Arguments

Between the two-phased reforms designed to let the banking sector play its real role in the economy, the initial phase of reforms was subsequently implemented whereas the implementation of the later phase of the long-waited reforms is about to reach its resultant conclusion. Two of the stakeholders, the central bank and the government, claimed that said reform program provided positive outcomes. Even despite large claims on many fronts by policymakers of banking reforms, uneven distribution of credit, low return, non-performing loans of high level, risky investments/exposures etc. keep affecting banks' balance sheets from liability and assets sides as well. Policymakers' keen interest and attention were required to make as the overall economy can have negative implications because of the ineffective and incompetent banking sector. The incorporation of deregulation of controls and liberalization of banking practices helped improve the efficiency and performance of banks.

The improvement observed in the privatized banks' profitability is a contribution of the privatization process, though intermediation spread was enhanced not reduced (Akhtar, 2006). The banking sector's financial health still continues to improve . This reform process improved the overall health of the banking sector and further strengthens it. A study was published in 2006 on the topic of "Getting Finance in South Asia" by the World Bank. Evaluation shown in the study reflects that our country has, after India, higher capital adequacy rates,

stable liquidity position and non-performing loans are low among the South Asian Countries.

To curb non-performing loans, the adoption of a multi-track strategy was planned, including but not restricted to a genuine case incentive package, a new law was enacted for the recovery of bad loans created by an institution. "The Financial Institutions (Recovery of Finance) Ordinance 2001" was promulgated for the same purpose. Stuck-up loans' expeditious recovery was made possible as this law provided a mechanism for it. Transfer of cases from other courts to banking court and mortgage properties' sale and foreclosure was possible through this enacted law.

Furthermore, Banking Companies Ordinance 1962 was amended for recovery expeditions of loans. The Committee on Revival of Sick Industrial Units (CRSIU) and Corporate and Industrial Restructuring Corporation (CIRC) were set up for resolving stuck-up loans' portfolios on banks. CIRC was incorporated for banks to partly transfer their loan burden, which stuck up in the past, and CIRC could pursue it independently. CRSIU's task was to examine the viability of closed sick units otherwise viable for continuing operations but had to curtain them due to unsustainable debts. Cases of willful defaulters were referred to NAB and customers who were keen to regularize themselves were offered incentives. Pakistan's banking sector, within South Asia, is well ahead on all indicators. The financial sector's performance improved with advances in high growth but in a disproportionate manner that raised financial institutions' risk exposure too. Still, the risk is mitigated with fresh loans, better quality and capital adequacy ratio improvement simultaneously.

3 Research Methodology and Econometric Modeling

3.1 Research Design

The nature of this study is quantitative and was carried out by incorporating financial figures of total equity, capitalization, total deposits, total revenue, total assets, loan to other financial institutions, net profit, and current assets of banks listed on the Pakistan Stock Exchange (PSX). The time period was from 2000 to 2016.The above financial figures were converted into financial variables of return on equity, liquidity risk, credit risk, bank size, bank stability, funding risk, return on assets and diversification and Capitalization. Return on assets and return on equity as performance indicators of banks were regressed as Dependent Variables and Independent Variables were Bank Stability and Funding Risk. Our Control Variables were Bank Size, Liquidity Risk, Credit Risk, Diversification, and Capitalization.

3.2 Sampling Framework

Convenient sampling was done on banks listed in PSX. Convenient sampling was employed in this research due to practical constraints and the availability of data. Given the

limited resources and time, the researchers chose to select the banks listed in the Pakistan Stock Exchange (PSX) for their analysis. The convenience sampling technique allowed them to access the necessary data from Thompson Reuters, which was readily available and accessible. While this method may introduce some bias and limit the generalizability of the findings, it was a pragmatic approach given the research constraints.

3.3 Source of Data

Secondary data is available with Thomson Reuters Data Stream which was used for the extraction of relevant data. The extensive filtration process for financial variables of ROA, ROE, Bank Size, Funding Risk, Bank Stability, Liquidity Risk, Credit Risk, Diversification, and Capitalization was required for banks listed in PSX for the period from 2000 to 2016.

3.4 Hypothesis

3.4.1 Factors of profitability (Regression)

HA1: Bank Stability has a statistically significant impact on the performance of banks in the case of Pakistan.
HA2: Funding Risk has a statistically significant impact on the performance of banks in the case of Pakistan.
HA3: Bank Size has a statistically significant impact on the performance of banks in the case of Pakistan.
HA4: Liquidity has a statistically significant impact on the performance of banks in the case of Pakistan.
HA5: Credit Risk has a statistically significant impact on the performance of banks in the case of Pakistan.
HA6: Diversification has a statistically significant impact on the performance of banks in the case of Pakistan.
HA7: Capitalization has a statistically significant impact on the performance of banks in the case of Pakistan.

3.5 Econometric Modeling

Following were the econometric models utilized for hypothesis testing.

$$ROA_{it} = a + b_1SIZE_{i,t-1} + b_2LRISK_{i,t-1} + b_3CRISK_{i,t-1} + b_4FUNDRISK_{i,t-1} + b_5DBSTAB_{i,t-1} + b_5DIV_{i,t-1} + b_5CAP_{i,t-1} + Uit \quad (1)$$

$$ROE_{i,t} = a + b_1SIZE_{i,t-1} + b_2LRISK_{i,t-1} + b_3CRISK_{i,t-1} + b_4FUNDRISK_{i,t-1} + b_5DBSTAB_{i,t-1} + b_5DIV_{i,t-1} + Uit \quad (2)$$

where ROA is the return on assets; ROE is the return on equity; SIZE is the bank size; LRISK is the liquidity risk; CRISK is the credit risk; FUNDRISK is the funding risk; DIV is the diversification (diversification in the business model); BSTAB is the bank stability; CAP is the capitalization); a, b and u are the parameter and stochastic error term, respectively; i, t are the individual bank and time effect, respectively.

The following table explains the above econometric terms and definitions of same:

Table 1
Variable Description and Definition

Definition	Variables	Notation
Profit before interest and tax divided by total assets (%)	Return on Assets	ROA
Profit before interest and tax divided by Shareholder's Equity (%)	Return on Equity	ROE
Natural logarithm of total assets	Bank Size	BSIZE
Cash to total deposits	Liquidity risk	LRISK
Total loans divided by total assets	Credit risk	CRISK
Z-score = Total deposits to asset ratio + Equity to assets ratio divided by the standard deviation of total deposits to assets ratio	Funding risk	FUNDRISK
Profit before interest and tax to assets ratio plus equity to assets ratio divided by the standard deviation of profit before interest and tax to assets ratio	Bank Stability	BSTAB
Total investment in financial securities (short and long-term) divided by total assets	Diversification	DIV
Equity capital divided by total assets	Capitalization	CAP

3.6 Plan of Analysis

The Plan of Analysis for this research is as follows:

- Descriptives and Correlation of all the variables have been calculated and analyzed.
- Hypothesis of HA1 to HA7 regarding Factors of profitability has been tested by Multiple Regression Analysis.
- Model Selection Criteria of the Hausman Test (in case of Panel Regression) has been applied to discover whether the Fixed Effect Model or Random Effect Model is better.

4. Results and Analysis

In this Section, Results and Analysis are shown.

Table 2
Descriptive Result

Variable	Obs	Mean	Std. Dev.	Min	Max
Roa	201	.0134205	.0234506	-.0975125	.0585539
Roe	201	.0723923	1.621123	-21.58582	3.191828
Bsize	291	18.83105	1.775736	8.061487	21.64243
Lrisk	287	58.92645	17.72301	19.05	127.48
crisk	253	.5154361	.1245081	.0817651	.8662684
friskz	291	15.9582	6.716912	.4315158	29.88914
bstabz	200	12.99349	10.85402	-5.140077	42.79041
div	290	.3422855	.1332096	.0262728	.8531384
capital	291	.0873878	.0673196	-.0418613	.5431475

Table 2 shows the summary statistics of all the variables used in this study. We can see that on average, the return on assets for our banks is 1.34% whereas the return on equity is 7.2%. High standard deviation along with the minimum and maximum value of ROE indicates the diversity of our sample banks. It also shows that our banks are not homogenous as we have included available data of all the possible banks working in Pakistan which includes small banks as well as large banks. Funding Risk and Bank Stability are Z-Score Values defined in Table 1 so this is a relative number and there is no need to explain this due to its unitless nature.

Table 3
Correlations Analysis

	Roa	Bsize	Lrisk	Crisk	Friskz	Bstabz	Div	Capital
Roa	1.0000							
Bsize	0.4002	1.0000						
Lrisk	0.2869	0.2535	1.0000					
Crisk	-0.2833	-0.2837	-0.9343	1.0000				
Frisk	0.4155	0.2582	0.1650	-0.1575	1.0000			
bstabz	0.4428	0.4228	0.3750	-0.3863	0.5050	1.0000		
Div	0.1927	0.2890	0.9036	-0.8808	0.1233	0.3352	1.0000	
Capital	0.2223	-0.1948	0.2408	-0.2509	0.2884	0.2515	0.0466	1.0000

Table 3 shows the correlation of all the variables used in this study. Most of the values are less than 0.5 which shows that our data is not affected due to multicollinearity issues and we can use panel multiple regression. However, the highest correlation is between credit risk and liquidity risk at -0.93 and the lowest relation is between diversification and capitalization.

4.1 Fixed Effect Model versus Random Effect Model

After checking the correlation among the used variables, we decided to go for the fixed effect model, as our sample banks are not homogenous and if cross sections of panel data are heterogenous, we should go for Fixed effect model while applying multiple regression. In Table 4, We also applied Hausman test which shows whether fixed effect model or random effect model is better. Our results indicate that we should go for Fixed Effect Model due to systematic difference in our coefficients.

Table 4
Hausman Test Coefficients

	(b) fixed	(B) random	(b-B) Difference	Sqrt (diag (V_b-V_B) S.E.
bsize	-0.0053625	0.0002213	-0.0055838	0.0011107
lrisk	-0.0009822	0.0001702	-0.0011524	0.0002795
crisk	-0.1758911	-0.0795359	-0.0963552	0.0232175
friskz	-0.0052412	0.0005254	-0.0057667	0.0018591
bstabz	0.0027852	0.0009436	0.0018416	0.0006076
div	-0.0070537	-0.0719117	0.0648581	0.0205974
capital	0.0026952	0.0698501	-0.0671549	0.0556297

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

Chi2 (7) = (b-B)` [(V_b-V_B)^(-1)](b-B)

= 42.17

Prob>chi2 = 0.0000

(V_b-V_B is not positive definite)

4.2 Regression Analysis

Table 5 shows different versions of our model 1. Model (M1) shows the effects of funding risk and bank stability on bank performance. Both funding risk and Bank Stability are the main variables of this study and have not been studied in the case of Pakistan to the best of our knowledge. Funding Risk has negative signs and is also significant which shows that the higher the funding risk, the lower the profitability or performance of a bank. Also, Bank stability is positively significant which means the more stable the bank is, the higher the performance is. In our Model (M2) to Model (M6) we start including our control variables to see whether the sign or coefficient of our Model is changing or not. In model two we

only include Bank Size, which appears to be negatively significant. Literature has shown its significance but mixed results of positive and negatives are there. In Model M3, we include the liquidity of banks along with the bank size and both Bank size and liquidity risk remain significant. However, in the presence of Liquidity Risk, the significance of our main variable of credit risk disappears. It shows that as liquidity risk and funding risk are correlated, it is liquidity risk which is more significantly affecting bank performance as compared to funding risk. In model M4 when we include all three risks of our study, liquidity risk, credit risk and funding risk, all three appear to be negatively significant. Model 4 shows that Bank performance is severely affected by how they manage their risk. As all three types of risk of our study, liquidity, credit and funding are negatively significant, so, higher the Risk in the banks of Pakistan, the lower will be the profitability.

Although it is a well-known phenomenon in banking literature as funding risk has not been studied in the case of Pakistan earlier and the way we calculated funding risk (as Z-Score of Funding fluctuations), shows the importance of including this variable. In model M5 and M6 we also control for diversification and equity capital. The results of M5 show that although diversification matters for bank performance, I it may be qualitatively affecting the bank's performance as regression results are not significant in the case of diversification and equity to assets. Also, diversification in the case of Pakistan is negatively affecting bank performance but is not significant. It may also be concluded from M5 and M6 that higher diversification may lead to lower profitability.

Table 5
Stepwise regression of our Model (ROA)

Variables	M1	M2	M3	M4	M5	M6
	ROA	ROA	ROA	ROA	ROA	ROA
Bsize		-0.00328*	-0.00554***	-0.00553***	-0.00536**	-0.00536**
		(0.00185)	(0.00212)	(0.00207)	(0.00225)	(0.00226)
Lrisk			0.000232**	-0.00102***	-0.000981**	-0.000982**
			(0.000109)	(0.000342)	(0.000393)	(0.000395)
Crisk				-0.174***	-0.176***	-0.176***
				(0.0449)	(0.0468)	(0.0475)
Friskz	-0.00258**	-0.00260**	-0.00114	-0.00536***	-0.00524***	-0.00524***
	(0.00129)	(0.00128)	(0.00144)	(0.00180)	(0.00191)	(0.00192)
Bstabz	0.00259***	0.00270***	0.00267***	0.00283***	0.00280***	0.00279***
	(0.000400)	(0.000402)	(0.000398)	(0.000392)	(0.000420)	(0.000674)
Div					-0.00755	-0.00705
					(0.0394)	(0.0417)
Capital						0.00270
						(0.0727)
Constant	0.0256	0.0874**	0.0921**	0.328***	0.325***	0.325***
	(0.0233)	(0.0419)	(0.0415)	(0.0734)	(0.0754)	(0.0757)
Observations	200	200	200	196	196	196
R-squared	0.203	0.217	0.236	0.297	0.298	0.298

5. Conclusion

Banking reforms after the financial crisis in Pakistan have triggered the need to investigate the performance of banks. Our results indicate that Funding Risk is negatively affecting the bank's performance whereas Bank Stability is positively affecting bank performance. The results from our control variable suggest that as the coefficient of Bank Size is significantly negative, it means that in the case of Pakistan, banks are not able to avail of economies of scale benefits. It may be attributed to the phenomenon that larger banks are not efficiently utilizing their funds thus the size of the bank is not supporting to perform well. Also, Liquidity Risk is negatively affecting the bank's performance and it shows that banks having too much liquidity risk may not be able to capitalize in terms of performance. Also, diversification and credit risk too are negatively associated with bank performance in the case of Pakistan. So, we may conclude that Pakistani Banks need to focus more on risk management especially funding risk and credit risk to enhance their performance for a better outlook. Also, Bank Stability was found to be a significant factor in bank performance, so the more stable the bank is, the more it will perform.

6. Discussion

The back-bone of every modern economy of the world is the effective flow of funds. The prime responsibility lies with the banking system of the economy to saturate it with sufficient needed funds at every single spot. This puts a lot of responsibility on the banking sector of the economy to keep progressing in order to keep the economic cycle rolling at a reasonable pace. This context puts stress on the performance of the banking sector more than any other sector. Measurement of the banking sector performance is a multi-faceted study, but this research strives to bring into discussion the majority of the factors responsible for the performance of the banking sector. The banking sector with complete interest-based income not only depends on single-sourced income but contributes less to the development of the economy.

The research conclusions derived from the quantitative analysis of the referred data depict that Funding Risk and Bank Stability are affecting bank performance. There exists a negative relationship between Banking Performance and Funding Risk whereas a positive relationship exists between Banking Performance and Bank Stability. This research contributes that Banks in Pakistan are unable to cater to economies of scale. This may be due to the reason that efficient utilization of funds might not be taken care of by large banks. Bank Stability plays a vital role in bank performance; hence, better performance is expected from stable banks. Effective risk management is also a must for bank performance; research reveals that Pakistani banks need to focus on managing risk i.e. funding risk and credit risk.

7. Managerial Implication

The research findings have several managerial implications for policymakers and banking institutions in Pakistan. Some of these implications include:

Prioritizing Bank Stability: Given that bank stability positively affects bank performance, policymakers and banking institutions should focus on implementing robust risk management frameworks and practices. This includes monitoring and maintaining healthy levels of capital adequacy, asset quality, and liquidity to enhance overall stability.

Mitigating Funding Risk: The study highlights the negative impact of funding risk on bank profitability. It is crucial for banking institutions to carefully manage their funding sources and maintain a well-diversified funding base to reduce dependence on volatile funding channels. This could involve optimizing the mix of deposits and other funding sources to ensure a stable and sustainable funding structure.

Addressing Credit Risk and Liquidity Risk: The research identifies credit risk and liquidity risk as significant factors negatively affecting bank performance. Policymakers and banking institutions should focus on effective credit risk management practices, including robust loan underwriting standards, monitoring of borrower creditworthiness, and appropriate risk mitigation measures. Similarly, maintaining adequate liquidity buffers and implementing liquidity risk management strategies are essential to ensure smooth operations and mitigate potential liquidity crises.

Consideration of Bank Size: The study reveals that larger banks in Pakistan do not seem to benefit from economies of scale in terms of improved bank performance. This suggests that policymakers and banking institutions should carefully evaluate the impact of bank size on operational efficiency, cost management, and profitability. Strategies should be designed to enhance efficiencies and reduce costs, regardless of the size of the bank.

Strategic Focus on Bank Performance: The research underscores the importance of bank performance for overall profitability. Policymakers and banking institutions should adopt a holistic approach to managing performance by actively monitoring key performance indicators (such as Return on Assets) and implementing strategies to improve operational efficiency, asset quality, and profitability.

Overall, the research suggests that enhancing bank stability, mitigating funding risk, addressing credit risk and liquidity risk, and strategic evaluation of bank size can significantly contribute to improving bank profitability in Pakistan. Policymakers and banking institutions should consider these implications and integrate them into their decision-making processes and operational strategies.

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Nexus among Economic Policy Uncertainty, Stock Returns and Macroeconomic Variables New Evidence from Developing Country's Stock Market Using NARDL Cointegration Approach

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Abstract

Uncertainty generates hype which creates difficulty to predict the returns in the stock market. To answer this phenomenon this study is carried out which aims to investigate the nexus of Economic Policy Uncertainty with Stock Return having macroeconomic variables as controlled, in Pakistan over the period of 2010 to 2022. A novel technique non-linear ARDL (NARDL) co-integration statistical approach to estimate and explore the asymmetric effect has been employed. The findings of this study show that a significant long-term co-integration exists between shifts in Economic Policy Uncertainty with stock returns in developing economy. We also found the short-run and long-run shocks (Positive and Negative) of Economic Policy Uncertainty have significant effect on stock return along with exchange rate and consumer price index. This means high uncertainty in economic policy can decrease the stock returns and low uncertainty (means high certainty) can increase the stock returns in Pakistan. More interestingly, we found an asymmetrical relationship between Shifts in Economic Policy Uncertainty with stock returns which means no symmetry or no linearity in the relationship. Concisely, inflows from positive Economic Policy Uncertainty shocks have a long-term negative impact on stock returns and negative Economic Policy Uncertainty inflows shocks have a long-term positive impact on stock returns in Pakistan. To overcome political instability, stock market declines, rising inflation, and currency devaluation, this study can be useful for policymakers, the government, regulatory authorities, investors, equity market, and so forth.

Keywords: Economic policy uncertainty; stock returns; macroeconomics variables; asymmetric cointegration.

JEL Classification: D8, E7, G4

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1. Introduction

While making any decision either by investor or Government, uncertainty factor is considerable for favorable results. On one side, the Government sets economic policies, which include tax rates, budgets, money supply, interest rates, as well as labor markets, property rights, and many other areas of government intervention in the economy. On the other side, investors decide their investment strategies on the basis of these economic policies. These policies can be divided into either fiscal policy that deals with government behavior related to taxes and spending, or monetary policy that deals with central bank behavior related to money supply and interest rates, Hu, Zhining et al. (2022). In connection with uncertainty, Baker et al. (2016) developed a new index called Economic Policy Uncertainty (EPU) based on the newspaper coverage frequency and economic-related policies reported in newspapers. EPU is an indicator of the economy which can support regulatory authorities or bodies to formulate appropriate monetary and fiscal policies along with trade regulations and others. Yaya et al. (2021). The Economic Policy Uncertainty index is used to measure also the uncertainty in fiscal, monetary, and other pertinent policies and investors check these reports to invest in stock markets. Like, recently multiple studies (Brogaard & Detzel, 2015; Wisniewski & Lambe, 2015; Arouri et al., 2016) concluded the impact of Economic Policy Uncertainty on the stock as well as bond markets is growing hence this EPU is also considered as a driver for the stock market uncertainty.

This uncertainty is considered as a significant factor which influences behavior of the investors.Uncertainty has long been considered as a significant factor that influences investors' behavior (Menzly et al., 2004; Bekaert & Hoerova, 2016). When comparing the effects of EPU on economic growth and monetary or fiscal policies, the results obtained much greater effects found on economic growth than fiscal or monetary policies, Handley and Limao (2015). According to Barrero et al. (2017), this uncertainty also influences significantly future investment decisions as well as the economic growth of developing countries. During the last 25 years a lavish enhancement was observed in many jurisdictions by role of economists (Katsoulacos et al., 2020). It seems a high priority that almost all economies wish their economic growth on the first rank. This growth is illustrated in various forms such as proper economic policies & financial policies and their stability, high-tech manufacturing techniques, increment in capital, skilled personnel and also advancement in social and political institutions (Sengupta & Puri, 2020).

According to Bekaert and Hoerova (2016), uncertainty looks like an important item that could harm investors in their investment decisions. High uncertainty pushes economic proper towards a depressing direction which causes weakening in the stock price as well as the earnings of the investors (Christou et al., 2017; Chiang, 2019). According to Sum (2012) when there is high uncertainty in the market then most investors are hesitant to go for spending or investment decisions. Various forms of uncertainty are observed in the market, such

as political, economic and financial policies. On uncertainty and stock market connection, Gulko (2002) argued that the stock market slowly and gradually crashes when there is a peak in political uncertainty. It might be that fluctuation comes in stock return as a result of policy uncertainty. Another reflection of his study is that economic policy uncertainty does not co-integrate with stock market volatility but for pricing the market assets it plays its key role.

In the light of global financial crises policy uncertainty was observed as the main concern and robust to tackle in 2009 in the United States due to Federal Open Market. During 2012 and 2013 the International Monetary Fund (IMF) suggested to US and European regulatory authorities that one of the main causes of abrupt weakening as well as slowdown in recoveries from 2008 to 2009 was uncertainty in monetary and fiscal policies. As uncertainty was considered a major issue to be sorted out by formulating effective strategies, in this connection, a new Economic Policy Uncertainty (EPU) has been introduced by Scott Baker, Nicholas Bloom, and Stevin Davis, researchers. This EPU is used as a proxy or index of Economic Policy Uncertainty. The syntax of index is capturing the ten leading newspapers of the US or articles which emphasized or highlighted the words such as "uncertain or uncertainty", "economic or economy", connected with "congress", "legislations", "Federal Reserves", or even "White House" (Baker et al., 2012). Various authors argued on Economic policy uncertainties with different aspects, summarized in the Literature review part of this study.

In terms of the Pakistani economy, Choudhary et al. (2020) developed a similar index of EPU using four leading printed newspapers such as The Dawn, Express Tribune News, The News and Business Recorder. All the articles on related matters published in these newspapers were extracted to set the EPU index for Pakistan thus the data has been comprised from 2010 till the present. This EPU has been investigated with a concentration of various other proxies such as macroeconomic variables, Islamic and conventional stock returns in Australia, China, Japan and other countries but in Pakistan, this study has found the gap that is still exists and hence it is investigated in this research. Wide thoughts of numerous researchers pertaining to the negative effect of uncertainty on economic activities are found, such as Bernanke (1983) argued that firms' investments declined if they face uncertainty. Similarly, Baker et al. (2012) concluded as the uncertainty increases in in economic policy the output level of firms reduces.

EPU from the perspective of the United States, has a negative impact on its equity market specifically rising risk premiums Brogard and Detzel (2015). Not limited to the US, the EPU with Stock returns has been investigated in other countries too like Chen et al. (2018) found significant results while investigating the impact of EPU on stock return prediction. They used monthly data from 16 countries (US, Japan, Australia, Brazil, China, South Africa, India, Ireland, Italy, Canada, France, UK, Spain, Russia, Germany, Netherlands and South Africa) and concluded that out of sixteen only 10 countries' stock excess returns can be predictable using EPU of respective economies. Moreover, according to Zhang et al. (2019),

Global EPU (GEPU) has been studied on the volatility of the Chinese market.

In the first set of the data set, they found that changes in GEPU can be useful in the Stock volatility of the Chinese Stock market whereas the second data set supported the prediction of stock volatility through Global Economic Policy Uncertainty.The above discussed current studies are considered as the main motivation to carry out this study which examines the shifts in Economic Policy Uncertainty (EPU) on Stock Returns pertinent to the Pakistani Stock Market. Keeping in view the political instability of Pakistan which creates hypes in financial markets to predict the stock returns by investors, a few macroeconomic variables have been employed as controlled variables in this study such as Inflation (CPI used as Proxy) & Real Effective Exchange Rate (REER).

Our study adds contribution to literature as well as in fetching novelty in statistical techniques in terms of the following features:

Firstly, Economic Policy Uncertainty from the perspective of the Pakistani economy has been investigated with stock returns. Evidence indicated that no such type of study exists yet. Secondly, in this study two different shocks or shifts of Economic Policy Uncertainty have been introduced that can be treated as positive as well as negative shocks which tested individually on stock returns. Thirdly, as Shin et al. (2014) developed extensive model in Auto Regressive Distributed Lag Model (ARDL) that is Non-Linear Auto Regressive Distributed Lag Model (NARDL), this latest statistical technique in terms of studied variables has been used. Finally, symmetrical or asymmetrical relationship has been considered withholding macroeconomic variables as controlled.

1.1 Significance of the Study

The study is beneficial for various types of investors either individual or firm-based, regulatory authorities, policymakers- economic & financial, financial institutions, stock market consultants and the Government as well.

2. Literature Review

Economic Policy Uncertainty has been investigated by various researchers either globally or by just capturing a few rich economies with the association of macroeconomic variables, exchange rates or stock returns separately. Mbanyele (2023) conducted a study on EPU and Stock Liquidity using Brazilian firms from 2002 to 2015. His results demonstrated that EPU contributes excessively to stock liquidity for high-risk small companies. Kundu and Paul (2022) studied the effects of EPU on Stock market return and stock volatility using monthly data of G7 countries from 1998 to 2018. He considered bullish and bearish market approaches and concluded that an increase in EPU brings an increment in market volatility

and reduces the returns. Moreover, as a result of the positive uncertainty shock, volatility falls and return increases. In a specific way, he found an asymmetric relationship between EPU and risk & return. The impact of Shifts in EPU on the UK economy was examined by Nilavongse et al. (2020).

Global Economic Policy Uncertainty in terms of shifts affects only domestic industrial production, but the UK-EPU has a significant impact on its real exchange rate as they concluded in the study. Likewise, Chiang (2020) conducted his study on EPU with stock returns using data of the Japanese market and concluded that negative shifts in stock returns decrease the stock returns whereas positive shocks in EPU increase the stock returns. Predicting stock returns using numerous techniques has remained a challenge for investors for the past many years, such as conditional variance series seems to be used to detect the effects of stock price jumps/fluctuations. Value-at-risk (VaR) techniques are used to measure the downside risk. In explaining the excess stock returns this VaR is treated as a significant factor, Chen et al. (2018). According to Peng and Xiong (2006) financial market's behavior as well as the uncertainty of the stock market can be predicted or accessed by newspapers or media. Another study conducted by Kirange and Deshmukh (2016) argued that analyzing the content of headline news, which is classified as emotions, is one of the methods used to predict stock market prices. But in the recent study of EPU index developed by Baker et al. (2016) which is capable of explaining stock market behavior, following this index various studies conducted on the stock return such as Bahmani-Oskooee and Saha (2019), Chiang (2019), Bali et al. (2017) and Christou et al. (2017) concluded that with the shifts in EPU, the stock returns are negatively correlated.

Ongan and Gocer (2017), examined the association between Economic Policy Uncertainty with Stock Indices from the US perspective. They selected Dow Jones and Standard & Poor's with NASDAQ 100 using a monthly set of data starting from October 1985 to December 2016. As per their conclusion, US EPU supported the causal relationship from all the US stock linearly and non-linearly but NASDAQ 100 was highly affected in the short and long runs by the effects of US EPU.For the latest proxy of uncertainty, Economic Policy Uncertainty is quite useful to get robust results. Different studies were conducted that measured the impact of Economic Policy Uncertainty on variations of the stock market. Likewise, Mezrich and Ishikawa (2013), concluded from their study that EPU is irregularly more significant as compared to market volatility. Additionally, their findings also highlighted that Economic Policy Uncertainty is directly linked with fluctuation in stock market prices itself.

2.1 Research Hypotheses

Based on the above studies, we drafted our first hypothesis demonstrated as given:

H1: There is a Long-run Cointegration that exists between Shifts in Economic Policy Uncertainty and Pakistan Stock Returns.

Apart from studies on EPU with stock return that have been conducted individually, few more studies which employed macroeconomic variables too such as Abdalla and Murinde (2017) argued on the role of exchange rate and their co-integration with the stock market. They focused on emerging markets such as Pakistan, India, Philippines and Korea. Their studied period was from 1984 to 1994, and by using monthly data they concluded two different results; one of them found a unidirectional causal association between stock returns and exchange rates in Pakistan, India and Korea, whereas, the second of them concluded that there was no significant association for the Philippines. A similar approach of bivariate causality between exchange rates and stock prices was carried out by Granger et al. (2000). They employed that study from the perspective of Asian domain. The data from 1986-M1 to 1998-M6 in daily frequency have been used. They employed the VAR model for examining the causality and concluded differently for different countries. Using impulse response approach, for South Korea, the exchange rate led the stock prices and opposite results for the Philippines were observed. For Hong Kong, Taiwan, Singapore, Thailand and Malaysia the exchange rate indicates strong feedback relation but there was no force for such association observed for Indonesia and Japan. As numerous studies have been carried out to examine effects or association using two different variables as dependent and independent with additional macroeconomic variables as controlled variables, hence, our other hypothesis has been drafted as under for test.

H2: There is a significant effect of Positive and Negative Shocks of EPU on Stock Returns, Inflation (CPI) and the exchange rate of Pakistan.

In order to meet another objective of the study, this study has employed NARDL (Nonlinear Auto Regressive Distributed Lag Model) approach that was developed by Sine et al. (2014) which is the extension of the ARDL (Auto Regressive Distributed Lag Model). This model of NARDL is useful to examine dynamic error correction description by decomposing the model into two shocks such as positive and negative shocks in the short as well as long run which results in either symmetrical or asymmetrical effects of the studied exogenous variable on an endogenous variable (Mensi et al., 2017). Therefore, the study emphasized the above literature and designed another hypothesis which is associated to measure positive and negative shocks or shifts of EPU that is summarized as under.

H3: There is an asymmetrical relationship between Shifts in Economic policy Uncertainty in Pakistan and Pakistan Stock Returns.

3. Research Methodology

A quantitative nature of the study has been employed which captured time series data with monthly frequency for the period from M1 2010 to M12 2022. The positive and negative shocks or Shifts in EPU of Pakistan (SEPU) are used as the independent variable whereas Pakistan Stock Return's proxy is used as KSE-100 Index returns as the dependent variable. For controlled macroeconomic variables, Inflation and Real Effective Exchange rates have been considered. For Inflation, the proxy Consumer Price Index (CPI) and Real Effective Exchange Rate (REER) have been employed in our study. The data has been taken using three popular sources; for EPU, its website has been used, for stock returns and macroeconomic variables, Bloomberg terminal along with world bank data sources are used.
In order to specify the econometric model, the first equation of our study looks like:

$$PSR_t = \beta_0 + \beta_1 SEPU_t + \beta_2 CPI_t + \beta_3 REER_t + \varepsilon_t \quad (1)$$

Here PSR is Pakistan Stock Returns, and SEPU is Shifts in Economic Policy Uncertainty of Pakistan.

Starting from the unit root test a series of econometric techniques have been employed, starting from Ordinary Least Square (OLS) to Optimal Lag Selection model specification. For examining the short and long-run relationship between SEPU and PSR, the Auto Regressive Distributed Lag Model (ARDL) which was proposed by Pesaran et al. (2001), has been employed. After that, an extensive model of nonlinear ARDL (NARDL) developed by Shin et al. (2014) has been used to check asymmetrical or symmetrical relationship among variables as proposed in the hypothesis as stated in equation (2). This NARDL is useful to examine dynamic error correction description by decomposing the model into two shocks such as positive and negative shocks in the short as well as long run which results in either symmetrical or asymmetrical effects of the studied exogenous variable on an endogenous variable (Mensi et al., 2017).

Following the series to meet the objective of the study, the significance of asymmetry or symmetry between studied variables and the magnitude of positive and negative shocks (equations 3 & 4) have been checked using the Wald test and NARDL Multiplier graph respectively. Finally, for stability in model, a popular technique CUSUM and CUSUMSQ was executed along with a diagnostic test.In order to test the hypothesis related to the asymmetric relationship, the original model has been decomposed into sub-model as equation 2:

$$\Delta PSR_t = \alpha_o + \sum_{k=1}^{n1} \alpha_1 \Delta PSR_{t-k} + \sum_{k=0}^{n2} \alpha_2 \Delta SEPU_{t-k} + \sum_{k=0}^{n3} \alpha_3 \Delta ER_{t-k} + \sum_{k=0}^{n4} \alpha_4 \Delta Inf2_{t-k}$$

$$+ \beta_1 PSR_{t-1} + \beta_2 SEPU\_t-1 + \beta_3 ER_{t-1} + \beta_4 Inft-1 + \mu t \quad (2)$$

As the approach used is Nonlinear ARDL (NARDL), hence for positive and negative shocks measurement the model is further decomposed as equations 3 and 4:

$$POS = lnSEPU_t^+ = \sum_{j=1}^{t} \Delta\, lnSEPU_j^+ = \sum_{j=1}^{t} max\,(\Delta\, lnSEPUj\,,\ 0) \quad (3)$$

$$NEG = lnSEPU_t^- = \sum_{j=1}^{t} \Delta\, lnSEPU_j^- = \sum_{j=1}^{t} min\,(\Delta\, lnSEPUj\,,\ 0). \quad (4)$$

This POS is considered a positive shock of EPU and NEG measures negative shocks of the independent variable.

3.1 Empirical Results

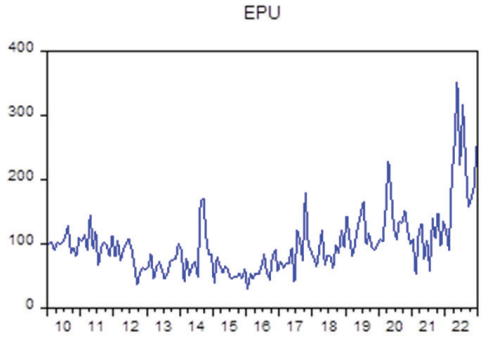

Figure 1: EPU of Pakistan Original Values

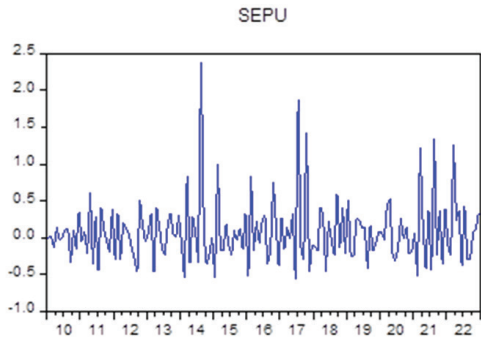

Figure 2: Shift in EPU (SEPU) of Pakistan

The actual data has been depicted in the graphical representation in figures 01 to 05 pertaining to economic policy uncertainty (EPU), shifts in economic policy uncertainty (SEPU), Pakistan stock returns (PSR), the real effective exchange rate (REER) and consumer price index (CPI) respectively. It has been observed that except REER and CPI rest of the variables do not have any trend whereas exchange rate and consumer price index have trended in series from the data from 2010 to 2022.

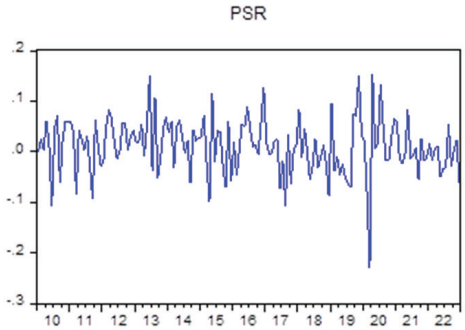

Figure 3: Pakistan Stock Returns

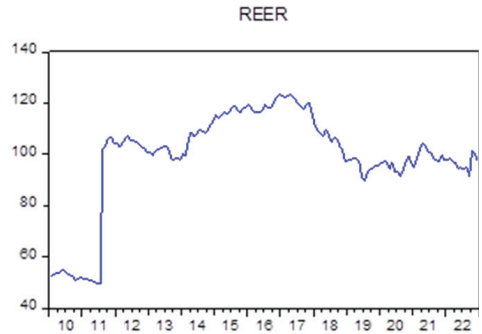

Figure 4: Real Effective Exchange Rate

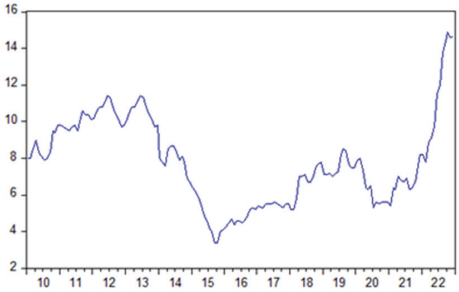

Figure 5: Consumer Price Index (CPI)

From a descriptive point of view, the data seems to be normally distributed as in Table 01, all variables' residuals used in this study have a p value of Jarque-Bera test is more than 5% which confirms their normality. Whereas the average score of stocks returns is 1.08% with its highest statistic value of 15.26% along with a minimum of negative signs (22.86%) during 13 years. And shifts in economic policy uncertainty have an average score of 7.6% with its uppermost value of 2.378 along with the lowest in negative (0.548) observed. The controlled variables of the study in which real effective exchange rate's peak score is illustrated as 123.51 with a bottom of 49.66 along with its average value of 99.05. Another controlled variable used in this study is consumer price index which reaches a maximum at 14.9 statistics and minimum at 3.4 along with average point value at 7.99 as shown in table 01.

Table 1
Descriptive Statistics of Studied Variables

	PSR	EPU	SEPU	REER	CPI
Mean	0.010812	100.0647	0.07645	99.05716	7.799359
Median	0.01325	91.655	0.023975	101.8122	7.65
Maximum	0.1526	352.24	2.378177	123.5133	14.9
Minimum	-0.2285	30.06	-0.548009	49.66	3.4
Std. Dev.	0.055014	50.32276	0.435065	19.4983	2.434285
Skewness	-0.353973	2.03251	1.950196	-1.446279	0.545972
Kurtosis	4.790133	8.901507	9.378653	4.416468	3.026886
Jarque-Bera	24.08745	333.7891	363.3518	67.4263	7.75492
Probability	0.09	0.2109	0.05121	0.076322	0.020703
Sum	1.6867	15610.09	11.92616	15452.92	1216.7
Sum Sq. Dev.	0.469117	392518.9	29.33869	58928.5	918.4899
Observations	156	156	156	156	156

In order to meet the objective to check the long-term cointegration that exists among the studied, the first unit root test for stationarity has been employed (Table 2). It's a precondition to use ARDL that the data series should be stationary either at 1st difference I(I) or a combination of level I(0) and I(I). Two popular tests Augmented dicky fuller and Phillip Peron have been employed. Our studied variables met the criteria using both approaches. PSR and SEPU were already stationary at a level whereas REER and CPI were non-stationary at level but after applying 1st difference those variables became stationary and ready for further procedure.

Table 2
Unit-Root Test Results

	Level		**First Difference**	
Variables	ADF	PP	ADF	PP
PSR	-12.64***	-12.41***		
SEPU	-18.35***	-17.78**		
REER	-0.2942	-0.2678	-12.021***	-12.01***
CPI	0.76808	-0.3326	-9.4224	-9.5681***

Note: ** and *** depict the levels of significance and 5% and 1% respectively. ADF = Augmented Dicky Fuller and PP = Phillip Peron Tests of Unit Roots

After checking stationarity next optimal order of lag has been determined using Vector Auto Regression (VAR). There are different criteria used by various researchers but the most prominent are, from literature, Akaike Information Criterion (AIC), Hanan-Quinn Information Criterion (HQIC) and Schwarz Information Criterion (SIC). Here, AIC is used for ARDL as well as NARDL model specification (table 03). For appropriate models ARDL is specified at (1,1,0,1) and NARDL at (1,01,0,0).

Table 3
Optimal Lag and Model Specification criteria.

Model	**AIC***	**SIC**	**HQ**	**Model Specification**
ARDL	5.4296	5.8346	5.5941	ARDL (1, 1, 0,1)
NARDL	5.2195	5.6228	5.7397	NARDL (1, 0, 1, 0, 0)

To test the first hypothesis of the study, NARDL bound test has been employed. As per the criteria if the f statistic is greater than upper bounds I(I) then it is confirmed that there is a long term co-integration that exists between variables. And if this value is less than lower bounds I(0) then results will be meeting as co-integration. But if the value of the f statistic lies in between upper and lower bounds then a conclusion cannot be drawn as either co-integration exists or not, for that decision, an error correction model will be used to confirm the

co-integration. Here, the f statistic (Table 04) is 28.13 whereas upper bounds at all probability values are lower than the f value, hence it is concluded that there is long-term co-integration that existed between Pakistan Stock Returns and Shifts in Economic Policy Uncertainty holding other variables constant. The hypothesis is supported.

Table 4
Bounds Test Result for testing Co-integration in Non-linear Model Specification

Model	**F-Statistic**	**Upper Bound**	**Lower Bound**
NARDL	28.13		
Critical Values			
10%		3.2	2.37
5%		3.67	2.79
3%		4.08	3.15
1%		4.66	3.65

Our next hypothesis is to examine the significant effects of positive and negative shocks of economic policy uncertainty on the Stock Returns of Pakistan in the long-run. To test the hypothesis, the original equation is decomposed into positive and negative shocks and Shin et al. (2014) developed Non-linear Auto Regressive Distributed Lag Model (NARDL) technique applied and results of short and long-run asymmetric relations were documented in table no. 5 and the 6 respectively. In the short run, only positive shocks of EPU were found significant (p = 0.0728) at a level of 10%. Whereas real effective exchange rate as well as consumer price index were found significant at a 5% and 1% respectively.

Table 5
Short-Run asymmetric relationship

Variables	**Coefficient**	**St. Error**	**t-stat.**	**P**
D(SEPU_POS)	-0.020513*	0.011352	-1.806993	0.0728
D(SEPU_NEG)	-0.019766	0.012283	-1.609211	0.1097
D(REER)	-0.000586**	0.000265	-2.208422	0.0288
D(CPI)	-1.058211***	0.001975	-535.912227	0

Note: *, ** & *** are significance levels at 10%, 5% and 1% respectively.

More specifically, for predicting a long-term asymmetric association as one of the objectives of the study, its results are presented in Table 6. We found all variables significant but at different levels of significance as short-run results were obtained. Positive shocks (p = 0.0703) and negative shocks (p = 0.0839) are significant at a 10% level, the exchange rate (0.0329) is at 5% and the consumer price index (p = 0.000) is significant at 1%.

Table 6
Long-run asymmetric relationship

Variables	Coefficient	St. Error	t-stat.	P
SEPU_POS	-0.021056*	0.011551	-1.822945	0.0703
SEPU_NEG	-0.020144*	0.011575	-1.740366	0.0839
REER	-0.000602**	0.000279	-2.153976	0.0329
CPI	-1.086212***	0.091001	-11.936235	0
C	0.031636	0.035901	0.88119	0.3797

Note: _POS and _NEG are positive and negative changes.

The coefficient of positive shocks in economic policy uncertainty is negative (-0.021056) and significant at 10%, which declares the inverse relationship between EPU_POS and the Stock returns of Pakistan. More clearly, if uncertainty in economic policy is increasing by one unit or information, then the returns of stocks will be decreased by 2.1 %. Hence an uncertain information in market leads to a decline in returns of stocks held by the investors. On the other side, the coefficient of negative shocks in economic policy uncertainty obtained were also negative (-0.020144) at a 10% significance level which posits the opposite association between EPU_NEG and the Stock returns of Pakistan. It can further be interpreted that if uncertainty in economic policy decreases by one unit or information, then the returns of stocks will be increased by 2.01 %. The investors. Returns of the stock in the market seem to be increased when there is less uncertain situation existing in the market or the market situation is more in certain conditions to be predicted.

Table 7
Asymmetrical Effect for Long NARDL Model

Null Hypothesis (Ho)	Alternative Hypothesis (Ha)	F-Statistic Value	Level of Significance	Decision	Symmetry/Asymmetry PSR & SEPU
Ho: $-\tau_3/\varpi_0 = -\tau_4/\varpi_0$ $Ho: \sum_{i=1}^{q} \varpi_1^+ = \sum_{i=1}^{q} \varpi_1^-$	Ha: $-\tau_3/\varpi_0 \neq -\tau_4/\varpi_0$ $Ha: \sum_{i=1}^{q} \varpi_1^+ \neq \sum_{i=1}^{q} \varpi_1^-$	**1318.342**	**0.0012**	Ho: Rejected $p < 5\%$ in Long-Run	Asymmetry relationship Exist No Symmetry

Note: Ho: There is no Asymmetry, i-e Symmetry between PSR and SEPU

For controlled variables, such as exchange rate and consumer price index, both are significant and negative for long-run relationship which can be concluded as when there is one unit increase in real effective exchange rate then the stock return would decline up to a minor level of 0.06%, and with the one percent increase in inflation (CPI) observed in the market there will be a 10.8% decrease in the stock returns of Pakistan.

Another objective of this study is to investigate whether there is a symmetrical or asymmetrical relationship between the Stock Returns of Pakistan and shifts in Economic Policy Uncertainty. Using the NARDL approach we found both positive and negative shocks of EPU that have negative coefficients and a difference in magnitude sizes. Which infers the asymmetrical association between both variables (PSR & SEPU). In order to take more a robust test for examining asymmetrical relationships, the Wald test has been employed in which coefficients of positive and negative shocks of independent variable have been made equal with negative signs and divided by coefficient of lag dependent variable such as (Ho: $-\tau3/\varpi0= -\tau4/\varpi0$). On the contrary, its alternative hypothesis depicts (Ha: $-\tau3/\varpi0\neq -\tau4/\varpi0$) and its significance level confirms the rejection of the null hypothesis. As in this study, the null hypothesis advocates that there is no asymmetrical relationship that exists between SEPU and PSR. The result of the Wald test are summarized in the table 06. The f statistic is 1318.342 with a p value of 0.0012 which clearly rejects the null hypothesis and supports the alternative that there is an asymmetry between Pakistan Stock Returns and Shifts in Economic Policy Uncertainty. Hence, the non-linear relationship is validated.

Table 8
Diagnostic Inspection

Test	Problem	χ2 p-value	Decision
LM	Serial correlation	0.7147	*Don't Exist*
Jarque-Bera	Normality	0.11901	*Exist*
Breusch Pagan – Godfrey	Heteroscedasticity	0.2644	*Don't Exist*
Ramsey RESET	Model Specification	0.6841	*Correctly Specified*
VIF	Multicollinearity	0.2163	*Don't Exist*
ECM (-1.0582)***	Speed of Adjustment	0.0000	*Desirable*
Adj. R^2 (51.72%)	Model fitness		
CUSUM	Stability in Model	NA	*Stability Exist*
CUSUMSQ	Stability in Model	NA	*Stability Exist*

Several diagnostic tests were employed to confirm the reported results of the studied model. The coefficient of Error correction model (ECM) is negative and is significant at 1% which is desirable. It advocates the speed of adjustment towards the long-run (Table 8). The monthly adjustment is about 1.058 for the stock returns of Pakistan. To test the normality among residuals of studied variables, a popular technique Jarque-Bera test was used in which the null hypothesis suggests that the residuals are normally distributed and in the results of our NARDL model, we found that the p-value is insignificant ($p = 0.11901 > 5\%$) which confirms that null hypothesis cannot be rejected and hence data is normally distributed has been confirmed. Additionally, in order to check that data doesn't have any serial correlation issue, we tested the model using the Lagrange Multiplier (LM) test, which suggests if the p-value is

more than 5% then the data has no issue of serial correlation. In our model, the LM is insignificant (p = 0.7147) and it advocates that no serial correlation exists.

In order to detect the heteroscedasticity, a popular technique, namely Breusch Pagan Godfrey test has been used. Its null hypothesis stated that there is homoscedasticity in the data and hence the result of the studied model confirms (p = 0.2644) that the model has not suffered from the heteroscedasticity issue. For model specification, the Ramsey RESET test was used which also confirmed that the studied model is appropriately specified. The value of variance inflation factor (VIF) has been reported at (0.213), which is more than 5%, and it depicted that the data has no issue of multicollinearity. Finally, adjusted R2 is reported as 51.72%, which seems fit to the NARDL model specification.

Brown et al. (1975) suggested one of the prominent tests which checks stability in short-run and the long-run through the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ). If the residuals of the optimum error-correction model are stable, it can be denoted by "S" otherwise for Un-stability in estimates, it shows "U". The desirable results are that both should be stable.

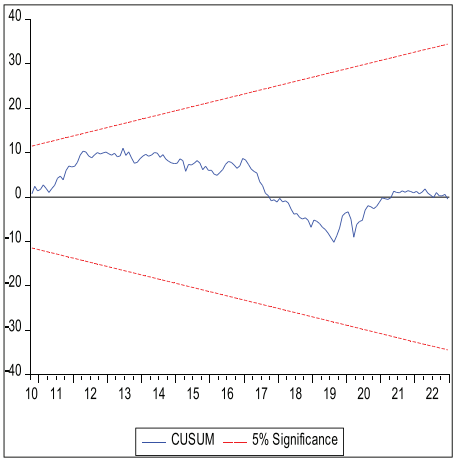

Figure 6: CUSUM

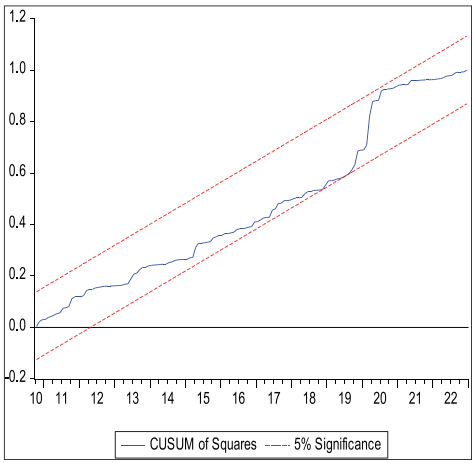

Figure 7: CUSUMSQ

Finally, asymmetric cumulative dynamic multiplier graphs have been accessed which show the pattern of adjustments of dependent variable (PSR) to its long-run equilibrium. Following POS and NEG shocks in the independent variable (EPU). As shown in fig. 08, the black color line illustrates the movement of Economic policy uncertainty due to positive change in stock return, whereas the black dotted line depicts the movement of EPU due to negative shocks in stock returns. The red dotted line shows an asymmetry plot with two red upper and lower lines indicating the class interval bound. This red dotted line touches both intervals which infers an asymmetry relationship. Moreover, black line moves down

indicating that positive EPU inflows shocks have a long-term negative impact on stock returns. In contrast, black dotted lines move up which highlights that the negative EPU inflows shocks have a long-term positive impact on stock returns. The positive shock is more prominent as compared to negative shock in the long run.

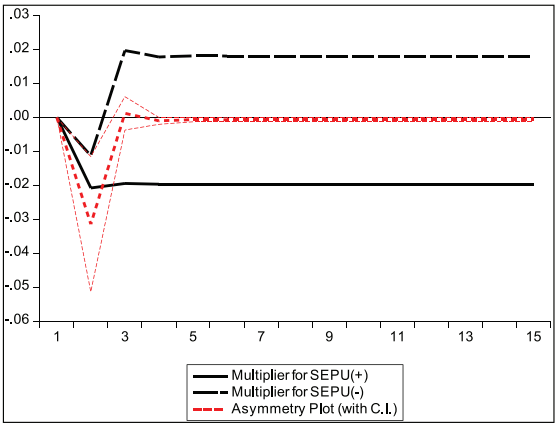

Figure 8: Dynamic Multiplier

Table 9
Hypotheses Summary

S.No	Description	Results
H_1	There is a Long-run Cointegration that exists between Shifts in Economic Policy Uncertainty and Pakistan Stock Returns.	Supported
H_2	There is a significant effect of Positive and Negative Shocks of EPU on Stock Returns, Inflation (CPI) and the exchange rate of Pakistan.	Supported
H_3	There is an asymmetrical relationship between Shifts in Economic Policy Uncertainty in Pakistan and Pakistan Stock Returns.	Supported

Note: H1-H3 are alternative hypotheses proposed in this study.

4. Conclusion

The main objective of this study was to investigate the nexus of Economic Policy Uncertainty with Stock Return having macroeconomic variables as controlled in Pakistan over the period of 2010 to 2022. The monthly data was obtained from Bloomberg terminal, World Bank, State Bank of Pakistan and CEIC global data websites. To meet the stated objective, this study employed a novel technique: non-linear ARDL (NARDL) co-integration

statistical approach to estimate and explore the asymmetric effect of shifts (changes) in Economic Policy Uncertainty on the stock returns of Pakistan, 100 stock Index keeping real effective exchange rate and consumer price index as controlled variables. The main significance of this technique is that it captures, simultaneously, short as well as long-term dynamics among studied/projected variables. There were three main hypotheses addressed in this study such as there is a long-run cointegration that exists between shifts in economic policy uncertainty and Pakistan stock returns, there is a significant effect of positive and negative shocks of EPU on stock returns, inflation (CPI) and the exchange rate of Pakistan and there is an asymmetrical relationship between shifts in economic policy uncertainty and stock returns. To test the hypotheses, a series of econometrics pre-requisites econometric tests were employed such as ADF & PP test for stationarity, Jarque-Bera (JB) for Normality, Lagrange Multiplier (LM) for serial correlation, Breusch Pagan Godfrey test for heteroscedasticity, Ramsey RESET for model specification, Variance Inflation Factor (VIF) for multicollinearity and CUSUM and CUSUMSQ for model stability. When all prerequisites were met then techniques for testing hypotheses were employed.

Such as Bounds Test, NARDL co-integration, and the Wald test. The findings of bounds test show that shifts in Economic Policy Uncertainty have significant long-term co-integration with stock returns in Pakistan. Similarly, for short-run except negative shocks, the positive shocks of EPU have a significant effect on stock return along with exchange rate and consumer price index. But the long-term positive and negative shocks of EPU have an inverse significant effect on the stock return along with negative and significant exchange rate and CPI on stock return in Pakistan. This means high uncertainty in economic policy can decrease the stock returns and low uncertainty (means high certainty) can increase the stock returns in Pakistan. More interestingly, we found an asymmetrical relationship between SEPU and stock returns which means no symmetry or linearity exists in the relationship. Concisely, positive EPU inflows shocks have a long-term negative impact on stock returns and negative EPU inflows shocks have a long-term positive impact on stock returns in Pakistan.

4.1 Managerial Implications

From this study, it is apparent that the policymakers in Pakistan are facing challenges to maintaining political stability in the country, which creates more uncertainty when any hypes are generated in the stock market. Also, inflation control is another challenge for them and finally control of depreciation in Pakistani Rupee (PKR) is considered as a big challenge for them. Thus, our study encourages the policymakers in Pakistan to formulate policies which ensure political and Government stability specifically in macroeconomic policies such as fiscal and monetary policy. There is a need for investors and speculators who can predict the stock market in a better way. For bureaucracy, there is also a need for implementation of proper governance system which decreases the uncertainty in the markets. Lastly, policies for building good international relations could be prioritized which assures the country that in

challenges and tough times the allies will support to uplift the economy as well as the country.

4.2 Future Directions

As this study is limited in terms of taking two macroeconomic variables as controlled variables such as REER and CPI, the scholars may use other variables like exchange rate, export or import, and FDI to examine the association. Moreover, EPU has been checked with the 100 Index of the Pakistani economy, other indices may be used to test the same hypotheses. Finally, the impact of Covid-19can also be checked in such a relationship.

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