Qamar Abbas Mangi, Dr. Majid Hussain Phul, Sarfaraz Ahmed Bhutto, Saqib Munir

The dramatic great recession and stock markets: A study of world leading stock markets

Qamar Abbas Mangi[1]
PhD, Institute of Commerce & Management, Faculty of Management Sciences, Shah Abdul Latif University Khairpur, Sindh, Pakistan.

Dr. Majid Hussain Phul[2]
Lecturer in Economics, Govt. Boys Degree College Pir. Jo. Goth, Khairpur, Sindh, Pakistan.

Sarfaraz Ahmed Bhutto[3*]
PhD Scholar, Institute of Commerce & Management, Faculty of Management Sciences, Shah Abdul Latif University Khairpur, Sindh, Pakistan.
Email: sarfaraz_ahmed0333@yahoo.com

Saqib Munir[4*]
PhD, Department of Economics , Faculty of Social Sciences, Shah Abdul Latif University Khairpur, Sindh, Pakistan.

Abstract:

The period of great recession caused due to the financial burst in the global monetary system. This financial disturbance also effected the stock markets of leading countries. This study includes the stock markets of UK and USA. The study has collected the data from two stock indices NASDAQ and FTSE and used essential statistical techniques. A 17 years of time series were selected from 2003 to 2020. Results report that during the crisis period, NASDAQ100 was least affected & FTSE100 was the most affected by crisis. Moreover, post-crisis period, NASDAQ100 recovered much faster than FTSE. The results are helpful for native and international spectualors to assess the stock market indices to reap maximum return with minimal level of risk.

Keywords: Great recession, Stock Markets, NASDAQ, FTSE, Time series

1. Introduction

The term "Great Recession" refers to the severe drop in economic activity that occurred in the late 2000s. The Sub-Prime Crisis, often known as "The Great Recession," lasted from 2007 to 2009. It is widely considered to be one of the worst financial crises that the world's economy has ever seen. The occurrence of the sub-prime mortgage crisis in the United States of America between 2007 and 2009 was largely attributable to banking industry deregulation. The dramatic increase in high-risk mortgage defaults that contributed to the financial crisis was one of the causes that precipitated

the financial crisis. Hedge funds, banks, and insurance companies issued high-risk mortgages in exchange for customers' asset commitments in many industries, particularly the housing industry. In addition, credit default swaps are reported to be used by insurance companies to protect them. There was a significant surge in demand for mortgages due to the easy availability of loans and loan guarantees. This was the impetus for mortgage lenders to keep lowering rates and requirements for new customers. New borrowers with bad credit histories were subjected to the lenient requirements, making them more likely to default. As a result of the increased foreclosures, a large quantity of 'money was sucked out of various banks, financial institutions, and the economy as a whole'[1], eventually leading to the failure of many lending institutions and hedge funds.

Apart from the obvious, the financial crisis was aided by a number of factors: The Federal Reserve of the United States of America boosted the fed funds rate, causing adjustable mortgage interest rates to rise. Those with adjustable-rate mortgages for housing commitments would be unable to keep up with the increased payments. As a result, demand decreased, as did the prices of the housing sector, for which debt was acquired. They defaulted because they were unable to sell their assets. No one could afford the price, and no one could sell the now-worthless securities. And by attempting to cover, the insurance firm nearly went bankrupt. Mortgage-backed securities allow lenders to group loans together and resell them as a package. This allowed banks to lend more money back in the days of conventional lending. With the introduction of interest-only loans, the risk of the lender defaulting was passed to the borrower via resetting interest rates. They injected so much liquidity into the market that it sparked a boom in a variety of industries, including a phony increase in the value of assets such as houses that were not worth anything. All types of debt were repackaged and marketed as collateralized debt obligations at the time. Hedge funds, businesses, pension funds, and mutual funds were among the holders of collateralized debt obligations. As a result, when property values fell, many homeowners who had been using their homes as ATM machines discovered that their lifestyle could no longer be sustained. Defaults on many types of debt arose as a result of this. As the number of defaulters grew, banks were unable to sell these CDOs, leaving them with less money to lend. People who had money at the time did not want to lend it to banks that were on the point of going bankrupt. The crisis had circled back on itself.

Instead of lending too liberally, banks were able to lend too little, leading the housing market to continue to collapse. It was subsequently dubbed "The Great Recession" due to its far-reaching effects. The weakening of the US economy was bad news not only for India, but for the rest of the globe as well. And, as the cliche goes, when the United States sneezes, the rest of the world catches a cold. This became clear when markets all around the world fell as a result of the US recession. The recession has a major and varying impact on many countries and, as a result, their stock exchanges. The main goal of our research is to look into the impact of the subprime mortgage crisis on the stock markets of three countries: India, the United Kingdom, and the United States of America. On the basis of trends in stock prices, returns, and various risk-adjusted indicators, we compare the NASDAQ100 and FTSE100 from their respective exchanges; NASDAQ, National Stock Exchange, and London Stock Exchange, respectively. For our investigation, the following criteria were used to choose countries: the United States of America and the United Kingdom: 1) The subprime mortgage crisis occurred in the United States. Markets and their impact on the

United States The consequences of a stock market can be felt on a worldwide scale. 2) The United Kingdom is a significant commercial partner of the United States of America, as well as NASDAQ, and has an impact on the United States. The stock market will gradually have an impact on it. Our study goes into greater detail on how we chose two indices from different exchanges.

The NASDAQ Stock Market is a stock exchange in the United States. It is the world's second-largest exchange by market capitalization, and it is also based in the same city. The abbreviation NASDAQ stood for "National Association of Securities Dealers Automated Quotations" when it was created. The National Association of Securities Dealers established NASDAQ in 1971. (NASD). The NASDAQ-100 is a stock market index comprised of 103 equity shares issued by 100 of the NASDAQ's largest non-financial companies. It is a capitalization-weighted index that has been updated.

2. Literature Review

The stock market is an important aspect of a country's economy. [5] The stock market is critical to the development of the country's industries and trade. [5]It is for this reason that the stock market is closely monitored by the government, industry, and even the country's central banks. [5] The stock market is critical from both an industry and an investor's perspective. Various notable scholars from around the world have examined various factors affecting stock markets at various times.

According to Jaspal Singh and Sidharath Seth (2016), the purpose of this study is to compare the CNX NIFTY and the S&P BSE SENSEX, two of the most prominent large cap indices in the Indian stock market. Annualized return, annualized standard deviation, annualized Sharpe ratio, and capital asset pricing model have all been used. According to their findings, there is no statistically significant difference in the relative risk and return of both indexes. Their findings demonstrated that the CNX NIFTY is a better index to invest in for the long term than the S&P BSE SENSEX, with greater annualized returns, somewhat lower annualized standard deviation, positive value of alpha, substantially lower beta, and superior Sharpe ratio.

According to Vanita Tripathi and Varun Bhandari (2015), socially responsible companies in the Indian stock market outperform general corporations in terms of price discovery, return, risk, and various risk-adjusted indicators throughout various structural break periods (i.e. pre-crisis, crisis and post-crisis). Their findings back up the notion that socially responsible investment (SRI) is a benefit for Indian investors amid the current crisis. [10] They also discovered that during times of crisis, the growth rate of the socially responsible index is much higher than the overall index. [10] Their findings revealed that, despite the higher risk, the socially responsible index delivers a much larger return than the general index, outperforming all other indices on the basis of all risk-adjusted measures used during the crisis. [10]

According to Joseph Tagne Talla, Per-Olof Bjuggren, and Louise Nordström (2013), the impact of changes in selected macroeconomic indicators on stock prices on the Stockholm Stock Exchange was highlighted in their article (OMXS30). They employed the unit root test, a Multivariate Regression Model estimated using the Standard Ordinary Linear Square (OLS) method, and the Granger causality test to evaluate the link. They discovered that inflation and

currency depreciation have a considerable negative impact on stock prices based on calculated regression coefficients and t-statistics. Money supply, on the other hand, is positively related to stock prices, though the relationship is not significant.

3. Study Objectives

We employed a dummy regression model and paired sample-t test applied individually to all two stock indices to investigate the relationship between the effect of the sub-prime crisis on the NASDAQ100 and FTSE100 from their respective exchanges; NASDAQ and London Stock Exchange. The investigation was conducted between 2003 and 2020. On the basis of the numerous analytical tools indicated above, the study estimates the conclusion of the below specified objectives.

- To examine how significant was the impact of sub-prime crisis on 2 different nations. For this, the following hypotheses are to be tested:

H0: (1) The growth rate is same for all the indices in pre-crisis period

(2) The growth rate is same for all the indices during-crisis period

(3) The growth rate is same for all the indices in post-crisis period

H1: (1) The growth rate is different for all the indices in pre-crisis period

(2) The growth rate is different for all the indices during-crisis period

(3)The growth rate is different for all the indices in post-crisis period

- To examine the growth rate of the individual indices during the time period taken. For this, the following hypotheses are to be tested:

H0: The growth rate for an individual index is same throughout.

HA: The growth rate for an individual index is different for different periods.

- To study whether returns differ significantly across these indices. For this, the following hypotheses are to be tested:

H0: The difference between the mean returns of paired indices is zero

HA: The difference between the mean returns of paired indices is non-zero

4. Method

The stock indices of the two world's main exchanges, NASAQ 100 and FTSE 100, were used in this study. This is further supported by the correlation matrix shown below. The normalcy test is the first step in comparative analysis. For finishing the above stated objectives, next research will use Dummy regression and Paired Sample T-test. Our research spans a 17-year period, from January 1, 2003, to December 31, 2020. For a better understanding of the impact of the Great

Recession on the two separate stock indices, this era has been broken into three segments. The era is broken into three sections: January 1, 2003-December 31, 2008; Pre-crisis Period; January 1, 2009-December 31, 2010; Crisis Period; and January 1, 2011-December 31, 2020; Post-Crisis Period.

Correlation of Market Indices with Their Respective Stock Indices

Table 1: Paired Samples Correlations

Pairs		Correlation	Sig.
Pair 1	NASDAQ100 & WILLSHIRE5000	.810	.000
Pair 2	FTSE100 & FTSE350	.799	.000

The coefficient of correlation between the NASDAQ100 and the WILLSHIRE5000 and the FTSE100 and the FTSE350 is closer to one in the above matrix, indicating that there is a significant positive linear link between the indices. This means that as the market index rises, so does the value of the other matched index. Furthermore, because the Sig. (2-tailed) value for paired indices is less than 0.01 i.e. 0.000, we can conclude that these stock indices have a statistically significant connection.

Normality Test

Most statistical test rests upon the assumption of normality; therefore we have performed the normality test to check whether our data is normal or non-normal.
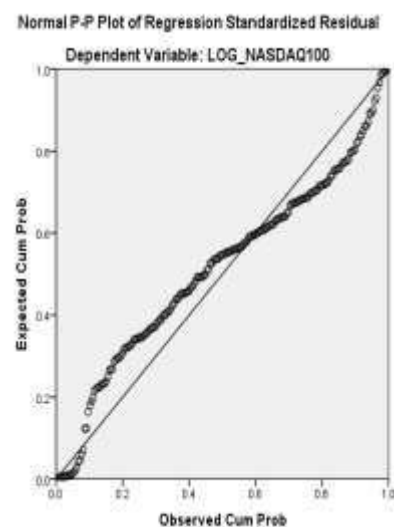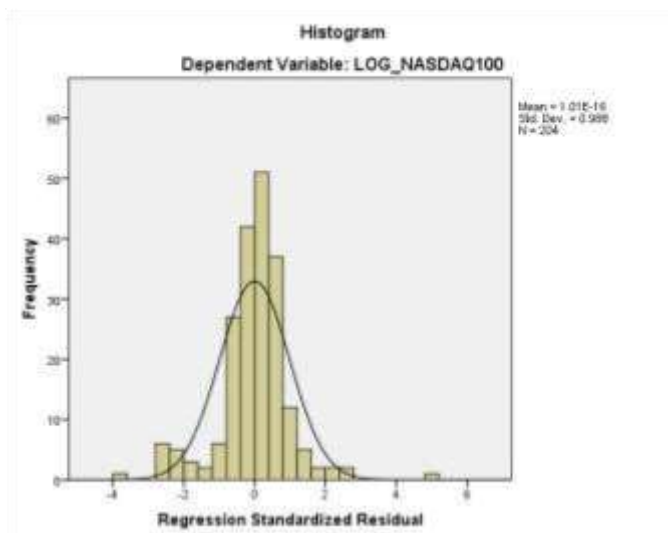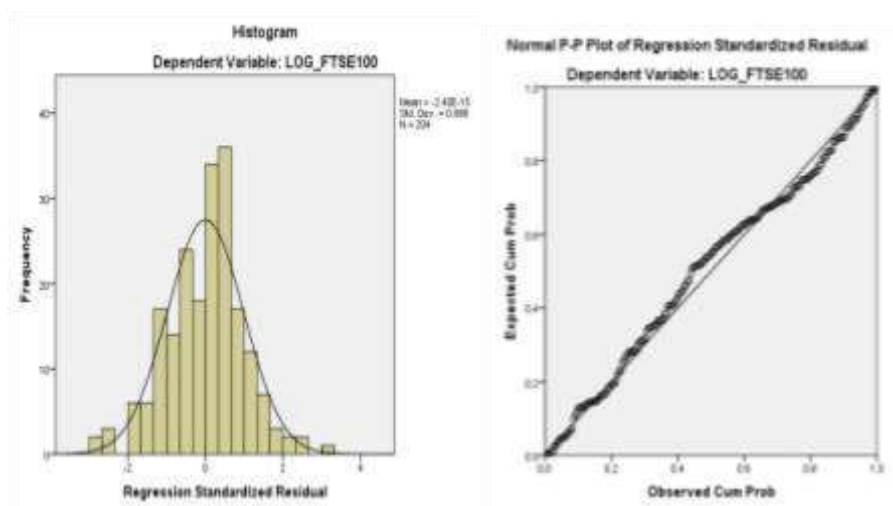
The data follows a normal distribution, as shown in the histograms above. In the Normal P-P plot, the data points are also close to the regression line, indicating that the error term is minimized. This proves that our data is normal and that the statistical analysis that follows may be trusted.

Dummy Regression

Dummy regression is useful since it allows us to represent many groups with a single regression equation (here the different periods). [6] As a result, we don't have to develop individual equation models for each subgroup. [6] We want to know how these indices react during these time periods, which we can do by fitting the following regression equation and utilizing dummies for the distinct breaks. [6]

$$Ln(index\ value) = b_1 + b_2T + b_3D_1 + b_4D_2 + b_5TD_1 + b_6TD_2 \quad (1)$$

Where, Ln(index value)= Natural log of ith index values

D1=0, D2=0 for pre-crisis period

D1=1, D2=0 during crisis period

D1=0, D2=1 for post-crisis period b1=Constant/ intercept for pre-crisis period b1 + b3 = Constant/ Intercept during crisis period of ith index values b1 + b4 = Constant/ Intercept for post-crisis period of ith Index values b2 = Growth rate for pre-crisis period of ith Index values b2 + b5 = Growth rate during crisis period of ith Index values b2 + b6 = Growth rate for post-crisis period of ith Index values.   T = Time period (1 for Jan 2001, 2 for Feb 2003,........, for Dec 2020) i covers two indices viz. NASDAQ 100 and FTSE 100.

Table 2: Results of Dummy Regression with Applied Data

S. No	COEFFICIENTS	NASDAQ100	FTSE100
1.	**CONSTANT(b_1)**	7.176***	8.426***
2.	**TIME(b_2)**	0.003***	0.002***
3.	**D1(b_3)**	1.083***	1.302***
4.	**D2(b_4)**	-1.057***	-0.185***
5.	**TIME.D1(b_5)**	-0.012***	-0.015***
6.	**TIME.D2(b_6)**	0.010***	-0.001*

*** SIGNIFICANT AT 1% LEVEL OF SIGNIFICANCE * SIGNIFICANT AT 10% LEVEL OF SIGNIFICANCE

In reference to the above given table, the intercept of the pre-crisis period intercept during the crisis period is highest of FTSE 100 (i.e. 9.728) in comparison to others. The intercept of post crisis period of NASDAQ100 (i.e. 6.119) is lowest among the others. The p-values of all the intercepts are significant. Now, on the basis of the above table, further analysis of growth rate within and between different countries is done.

The growth rate of different indices during different periods is shown in the following table:

Table 3: Comparison of Different Growth Rates from Dummy Regression

TIME/INDEX	NASDAQ100	FTSE100
PRE-CRISIS	0.30%***	0.20%***
DURING CRISIS	-0.90%***	-1.30%***
POST-CRISIS	1.30%***	0.10%***

Interpretation of Analysis of Growth Rate between Different Countries:

As can be seen in the table above, the growth rates for all indices are considerable over all three periods: pre-crisis, crisis, and post-crisis. As a result, we reject our null hypothesis, implying that growth rates are considerably different for each of the three periods considered independently. Between 2007 and 2009, there was a global financial crisis. During that time, the UK economy witnessed unexpectedly poor productivity growth. Low wage growth, flexible labor markets, and little technology innovation and investment were all factors. [12] As a result, the UK's economic growth was on a downward trajectory. During the recession, Europe had a trade imbalance as well.

The UK experienced a twofold crisis as a result of these factors, and the FTSE 100 has the lowest growth rate of all the indices.

The global financial crisis, which erupted in full force in 2007, had a similar impact on all countries, at least at first. However, as the financial crisis progressed, the US economy expanded by another six percentage points. The fundamental cause of this disparity is the disparity between private and public consumption, which has widened dramatically in the US economy. During a period of high unemployment and nearly no wage growth in the United States, households were able to reduce their debt burden while maintaining consumption growth. As a result, the US economy grew at a significantly greater rate than the rest of the world. This is further supported by the fact that the NASDAQ 100 has grown at a faster rate than others in t he post-crisis period.

Interpretation of Analysis of Growth Rate within the Countries:

As can be seen in the table above, the growth rates for all of the indices are significant for all three periods; Pre, During, and Post. As a result, we reject our null hypothesis, leading to the conclusion that the growth rate of an individual index varies over time.

As can be observed, all of the indices are trending in the same direction, i.e., growth rates are low in the pre-crisis period. This is due to people's aversion to investing in stock markets. However, during the crisis, growth rates have fallen even more, indicating that the economy is growing at a negative pace. This is due to the influence of the crisis on many countries' stock markets. And, in the post-crisis time, all stock markets are rebounding, and as more people become aware of the benefits of investing in stock markets, growth rates are increasing.

Paired Sample T-Test

We haven't estimated any return equations because the market is so volatile. However, because we need to compare the returns of the three separate indices we're looking at, we've utilized the Paired Sample T-test. The test's goal is to see if there's any statistical evidence that the mean difference between paired observations on a specific outcome is substantially different from zero. We're using the Paired Sample T-test to examine the returns of three different indices over three different time periods.

<center>Pre-Crisis Period</center>

<center>Table 4: Paired Samples Test</center>

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			

Pair 1	NASDAQ100 - FTSE100	-.00322	.05124	.00811	-.02215	.01813	-.427	71	.892

During Crisis Period

Table 5: Paired Samples Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2tailed)
					Lower	Upper			
Pair 1	NASDAQ100 - FTSE100	.00912	.04812	.00544	-.00710	.02213	1.046	35	.402

Post Crisis Period

Table 6: Paired Samples Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 2	NASDAQ100 - FTSE100	.00814	.03110	.00324	.00442	.01813	3.442	95	.000

Conclusion

The impact of the Global Financial Crisis on two major stock markets in the United Kingdom and the United States is examined in this paper. When comparing the growth rates of different countries, we discovered that the NASDAQ100 was the least affected by the crisis, while the FTSE100 was the most affected. The NASDAQ100 recovered significantly faster than the other two indices after the crisis. We discovered that all of the indices followed a similar trend when comparing growth rates within countries, with a low growth rate in the pre-crisis period, a negative

growth rate during the crisis period, and a growing growth rate in the post-crisis period. We discovered that there is a difference between the mean return of the indices during the crisis era, but that difference is minor. The NASDAQ100 has greatly outperformed the FTSE100 in the post-crisis period. As a result, we can infer that while the Great Recession had varied effects on different countries, the NASDAQ100 index on the NASDAQ Exchange was able to adapt to the crisis and recover considerably faster than the other two indexes.

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