

ACCOUNTING FOR ENVIRONMENTAL HAZARD: THE IMPACT OF CLIMATIC CHANGE ON SHARE PRICE INDEX

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Abstract

There are many literatures on the effect of internal variables such as Earnings per share, dividend per share and Netbook value on the Equity prices of quoted banks in Nigeria. Some other studies investigated certain external variables such as inflation, interest rate and exchange rate on share prices; very little study both local and international focus on the effect that environmental hazard have on equity share price. This study therefore set out to access climate change and its influence on share prices of the Nigerian quoted banks. Nigerian average temperature was used to represent the weather while Share price index for Nigerian quoted banks was the dependent variable. Linear regression was applied and the result showed that temperature does not have a significant influence on the share prices of the Nigerian quoted banks. This however is not in line with the expected result; there might be need to combine other climatic factors.

Key Words: Share price, Environmental Hazard , Temperature, Climate Change, Nigerian Quoted Bank

Introduction

The increase of firms and their mode of operations have created an environmental risk beyond what the environment can carry. This in turn has caused a continuous increase in environmental degradation moving both the government and certain non-governmental organizations of most countries to suggest more stringent restrictions on firms. This in turn impact on firms' incremental costs in relation with environmental protection policies.

The recent years have revealed a common perspective on the environmental risks' development in the international community; the level of impact these risk have on business operations, considering the burden placed on the natural resources by humans, which is beyond the carrying capacity of the environment resulting in increasing environmental degradation is worth studying (Zhang Hongli & e'tal, 2016).

Firms' are therefore faced with the risk of rising cost of complying with these environmental policies, the risk of paying compensations for damages to an environment or affected individuals, the risk of losing their market shares due to non-compliance and so on. The banks and other financial houses as providers of funds to most of the firms are therefore expected to consider the risk of firm's failure to repay loans. On the order hand, researches have shown that Government seems to assist only the individuals that are faced with certain environmental hazards leaving the firms to their fate (Jeroen, 2019).

The level of risk that environmental hazard have on the financial system is increasingly been paid attention to. The bank of England tried to analyze the risks that environmental degradation and climate change pose to the stability of the financial system (Bank of England,

2019). It investigated two types of risk that could arise, these are: Physical risks from weather events such as more regular or severe storms, floods and droughts including temperature change with the tendencies of destroying assets like factories, homes and offices. The second risk is the transition risks as a result of changes in environmental policy and production technology which will require a huge capital re-allocation. While there are many studies on the physical risk, the transition risk have little attention thus this study hopes to bridge that gap.

Sequel to the vulnerability a firm might face as a result of external shock, many researchers quite agree with the fact that anticipating shock and taking preventive measures is a positive way forward (Dennis, 2013).

Stock price index plays a significant role in any nation's economy. It is therefore a relevant topic of all times. A good instance is the downward trend in stock prices just before the financial crises of 2008 (Onoh, 2002). Shareholders therefore seek increase in wealth by ensuring they put their money in companies with increased performance. They therefore seek to know possible factors that influences the share prices of firms.

Background of Study

Banks and other businesses are directly or indirectly affected by adverse climatic changes in Nigeria. It has been established that climatic changes affects businesses by way of cost incurred in adhering to government policies, settlement of affected areas which includes corporate social services etc (Bo Liu, Jinqiang Yang, Yingjie Niu, Zhentao Zou, 2020). Consequently, Banks and other financial companies provides finance to most of these businesses and are thus faced with the risk of higher level of default.

Many literatures have analyzed the impact of environmental factors on businesses and the economy. However, not much study have been carried out in Nigeria. Little or no attention have been paid to the role of commercial banks as mediators in the financing of companies that are vulnerable to environmental hazard, the possibility of loan default by the affected companies and the effect that this might have on the share prices of the banks. Again, most of the present literature emphasizes on banks' social responsibilities. The researcher opines that understanding the impact of environmental risks on the Nigerian quoted banks' performance should go beyond their social responsibility; it should include managing risks and improving credit structures as it relates to the green economy.

IFRS 9 Financial Instrument included the risk of failure that could be caused by natural disaster and general economic downfall. This is further a pointer that hazard affects businesses and could result to loan default which in turn could affect the quoted banks share price index.

Review of Related Literatures

Climate

Climate has been defined as the average weather conditions of an area during a long time. This condition is a function of many factors present in that zone. It varies from one region to another though it follow almost the same pattern.

The factors that determine the climate are rainfall, maximum, and minimum temperatures during a season, humidity, sunshine time, and so on.

Temperature

This is the amount of heat energy in the air. It is measured in Celsius, degrees or Fahrenheit degrees. Heat is the energy that is radiated from the Sun in the form of light. Riccardo Bridget, Toan and Tim (2018) presented evidences that shows that high temperature influences businesses other than those in the agricultural sector in USA. This is different from the general assumption that temperature only affects the agricultural sector. Daniel (2017) further collaborated this fact by asserting in his study that favourable weather/climatic changes affects economies. Also, Melissa, Benjamin and Benjamin (2011) investigated fluctuations in temperature and how it affects businesses. Their study revealed that high temperature reduces economic growth. These findings are in consonant with studies by (Ayodele and Abidoye, 2015; Deepmala, 2014).

Stress testing as an Effective way of measuring the Impact of Internalizing the Environmental Costs on Commercial Banks

Studies have shown that stress test is a risk management tool for measuring the likely losses caused by possible events. It is a vital approach to identifying and evaluating the possible risks faced by financial institutions. Most of the Money deposit banks in Nigeria have not incorporated environmental risk into their credit rating systems. Though no quantitative approach has been adopted for the measurement of the impact of environmental factors, it is therefore difficult for commercial banks to develop a precise policy towards a greener credit structure.

Empirical Review

Sequel to the effect of Katrina which created the recognition of the possible effect that hurricanes can have on the municipalities along the Gulf Coast. Jacob, Gao and Cezar, (2009) investigated the impact that geologic earthquake risk has on the interest costs for municipal bond issuers in California. The study showed that earthquake risk influences the determination of the interest costs for municipalities issuing debt though not universally.

Lorrein, David and David (2004) investigated to know if any type of publicity about the environmental performance of a company affects the share prices. The result of the research indicated that there is a stock market response to such information particularly as it related to fines, up to 1 week after such news is published. The study further posits that share price movement is principally a function of the relative fine imposed on the firm.

Eromose, and Danny, (2017) studied the effect of climate variability on the poor rural populations, particularly in sub-Saharan Africa (SSA). He asserts the effect that variation in the climatic change has on the livelihood of the SSA farmers. His study showed that these farmers are subjected to hardship at the slightest variation in rainfall. The study draws on a field-based research conducted in the Delta State of Nigeria.

In another study by Klomp, (2019), public spending provided in response to a natural disaster as influenced by the political ideology of the incumbent government was explored. 90 democratic countries were studied. The result from the study disclosed that political parties display different preferences concerning policies regarding income redistribution within a country after the occurrence of a natural disaster. The study resolved that natural disasters have the tendency of reinforcing the insinuations of voters with regards to national identity and

domestic solidarity. The study concluded that the ideology effect is most visible in political systems with direct elections as it is easier to target affected voters in these systems.

In another study, Thu, Kevin and Anh-Tuan Doan, (2018) investigated the interrelationship between risks and bank efficiency. Data of 247 banks of 12 developed and developing economies in East Asia and Pacific area covering the period 2003–2012 were collected and analyzed. The result showed that there are significant relationships among risks, cost efficiency and environmental factors, but they are in different levels when comparing between developed and developing economies, or between the of pre- and post-2008 financial crisis period.

Santomero (1997) classified risk into six types, namely: counterparty risk, operational risk, systematic or market risk (interest rate risk), liquidity risk, credit risk, and legal risks. He further explained that some of these groups are similar; such as credit risk and counterparty risk. However, Crouhy, Galai, and Mark (2006) classified risks into eight different types: liquidity risk, operational risk, legal risks, credit risk, market risk, strategic risk, reputation risk and business risk. Cornett and Saunders (2003), insisted that there are 10 types of risk: interest risk, market risk, credit risk, off-balance-sheet risk, technology risk, operational risk, foreign exchange risk, country or sovereign risk, liquidity risk and insolvency risk.

Ishiak, (2009) examined the macroeconomic variables that are responsible for share price fluctuation in Nigeria. The study covered 1980-2006 using secondary data of the Nigerian stock market share prices. The multiple regression result showed that money supply, inflation, interest rate GDP and total deficits index of industrial production, influence stock prices.

In a study carried out by King (1996), he investigated the Market and industry factor that influences stock price behavior. The study showed that market and industry factors clarify the movement in stock prices. Long (1974) argued that consumer reacts to uncertainty which in turn causes a shift in commodity prices thereby influencing portfolio choices and equilibrium stock prices.

The Urban Institute e'tal, (2007) pointed out that Environmental issues are not solely the cause of failed development deals. The study assert that market factors like possible demand and renovation costs were the principal limits to a project than environmental issues. The study concluded by pointing out that there are three occasions where environmental issues mattered most, namely: when possible market demand is weak or particularly uncertain, when developers or financiers lack the prerequisite expertise to undertake compound deals, and when undeveloped brownfields sites were close to undeveloped, non-polluted sites.

Almumani (2014) applied empirical analysis of a set of independent and dependent variables and applying ratio analysis, correlation and linear multiple regression models, attempted to identify the quantitative factors that affect share prices for the quoted banks in Amman covering 2005 through 2011. The empirical findings show that there is a positive correlation between net book value per share (correlation coefficient = 81) and Market Price of equity shares which is also significant at a 1% probability level.

Mohammad (2014) discovered a 65.37 percent share price volatility from 1975 to 1990 in the Kuala Lumpur market. This overwhelming movement has made Malaysia to go through some difficult times, including the recessions experienced in 1975-76 and 1985-86, the collapse of brokerage houses, the crash in October 1987, the share scandals in Pan Electric crisis, the BMF crisis in Hong Kong-based, Bank Bumiputera, and the crisis in Malaysia with respect to the

Industrial Development Finance Consultancy Services [MIDFCS] crisis. According to the study, only 23% of the change in share prices was determined by dividend yield, payout ratio, Size of the firm, growth of the asset and Company's Debt. Among the listed variables, companies with higher debt and/or asset growth will experience greater share price volatility.

Tsoukalas & Sil (1999) examined dividend/price ratio and dividend growth as a function of share price volatility in the UK stock market. The study covered a period of 1995 to 1996. The result showed that the UK stock market is driven significantly by dividend yield and dividend/price ratio.

In another study by Malhotra & Prakash (2001), two groups were considered tagged "A" and "B" in determining the market price of the Indian Stock. 1989-90 to 1998-99 were covered; correlation and regression analyses were used to test the hypotheses postulated. In the study, group 'B's price behavior was determined mainly by earning per share, book value per share, market price to book value ratio, dividend per share and P/E ratio.

Demir (2001) appraised dividend payout ratio, turnover ratio, earnings per share, net profit growth rate, price to earnings ratio, financial leverage ratio, profitability ratio, return on assets, market value-book value ratio, and the rate of increase in equity using data between 1999 and 2000. His study revealed that profitability ratio, market value-book value ratio, turnover ratio dividend payout ratio, financial leverage ratio, price to earnings ratio, earnings per share and net profit growth rate have a significant influence on stock value. Among all, however, the market value-book value ratio was most influential followed by EPS, P/E ratio and profitability ratio.

There is a significant relationship between returns and accounting variables in the Czech stock market as shown in the work of Jindrichovska (2001). This discovery is similar to the works of Kothari & Zimmerman (1995). Zhu (2003) examined the stock market and volume of current capital stock and discovered a significant positive relationship between stock price and EPS. Similarly, Hadi (2004) looked at the importance of accounting information to investors in the banking sector in the Kuwaiti Stock Exchange. The study by Hadi investigated the content of the information in the accounting data of Kuwaiti banks that aid investors in the stock market. Financial ratios are used in this research and also, regression analysis is used to solve the problems that arise in this research. Net Interest (NIM), Return on Assets (ROA), Loss Ratio (LR) and Earning Assets Ratio (EAR) were the ratios studied. The study revealed the importance of accounting information to investors in Kuwaiti banks. Almost all the ratios were significant.

Irfan & Nishat (2002) classified factors influencing share prices in Pakistan into six, namely Leverage, payout ratio, dividend yield, firm's size, asset growth and change in earnings. This study covered a period of 1981-2000. Ordinary Least Square was used to analyze price changes. The result arising from the research showed that, these major factors do not significantly affect share price deviation in Pakistan. Besides, a related study by Sen & Ray (2003), investigated the major factors that influence stock prices in India. The study covered 1988 - 2000 basing the narrative stock changes as a result of BSE index. Dividend payout significantly influenced stock prices while earnings per share had a weak influence on the share price.

Similarly, Hartono (2004) studied the impact dividend and earnings have on stock prices and the result was in the affirmative with the condition that there is positive earnings information after negative dividend information. Also, there is a negative and significant effect

in equity share pricing when positive dividend information precedes a negative earning information. Conclusively, therefore, the study posits that share price movement is a function of information. Also, Al-Deehani (2005) considered the determining factor of share price on quoted corporations in Kuwait. The analysis displayed cash dividends per share/previous cash dividends per share, earnings per share, return one equity price to book value ratio, previous cash flow per share and cash flow per share as being greatly correlated with the share price.

The study, Dongwei (2003) revealed that the stock price in the Chinese Stock Market reacts to a change in the earning per share. This study further revealed that investors are slow to react to changes since they do not anticipate any change in the EPS. There could be an abnormal return caused by investors trading on the already revealed earnings. However, foreign investors seem to predict changes in EPS better than the local ones. According to the study, firms with EPS that investors view as disappointing will experience a pressured downward movement in share price on days before the actual earnings announcements occur. However, the reverse is the case with firms that operate a strong EPS; they will enjoy upwards movement in the prices, days before it is announced to the market.

Using data from 483 companies Myers & Frank (2004) revealed that Price Earnings Ratio is positively correlated to Dividend Payout ratio. Also, a positive and significant relationship exists between Dividend Payout and Debt to Equity Ratio.

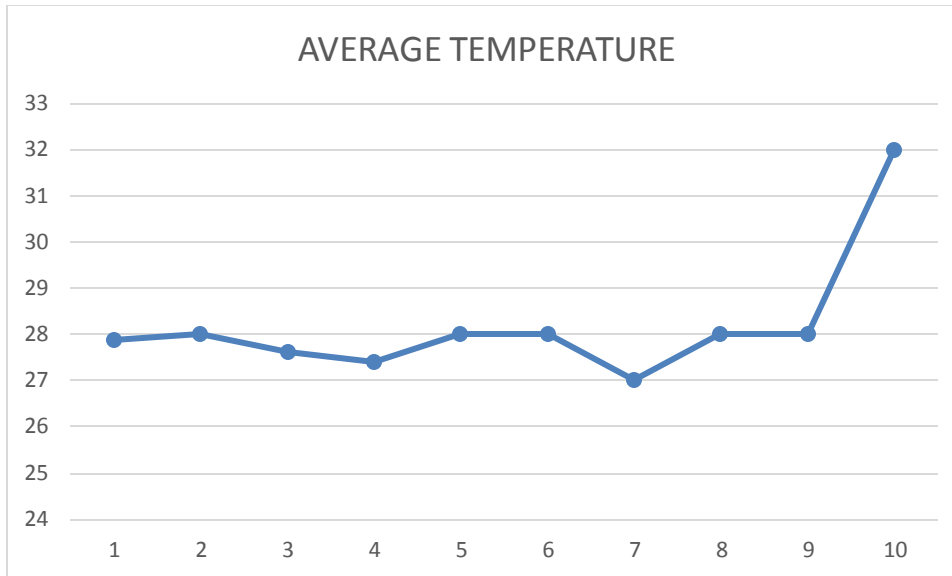
There have been no research known to the researcher that exposes the effect environmental hazard have on the volatility of quoted shares in Nigeria, thus this study hopes to bridge that gap by revealing the effect that temperature changes have on the share prices of Nigerian quoted companies.

Data Presentation and Analysis

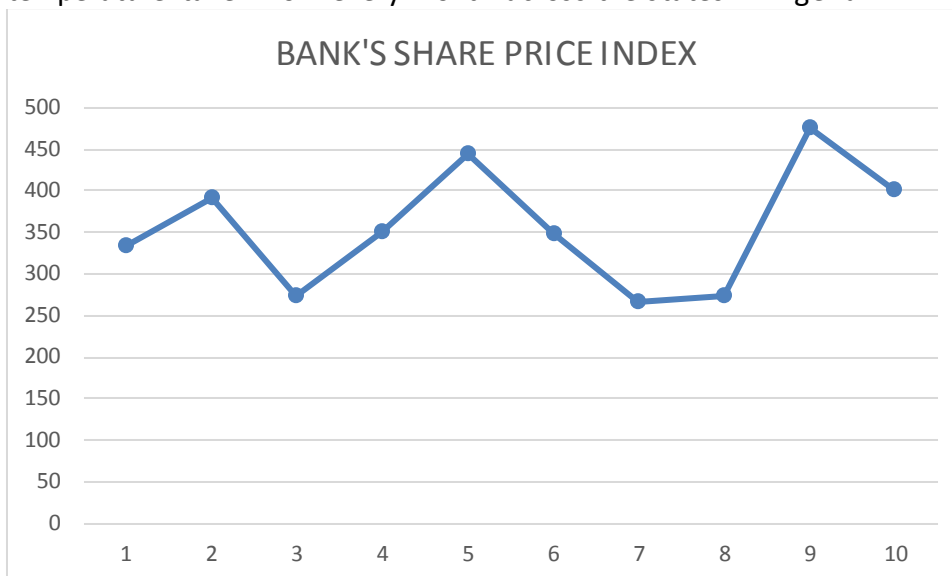
The share price index for the Nigerian banking industry collected from the official web site of the Nigerian stock exchange and the average temperature change are shown in the table below:

YEAR	SHARE PRICE INDEX	TEMPERATURE
2009	334.37	27.90292
2010	392.38	28.00425
2011	272.86	27.62225
2012	351.28	27.40792
2013	443.53	28.00588
2014	347.72	28
2015	265.33	27
2016	272.63	28
2017	475.44	28
2018	400.24	32

The average temperature and the Bank's share index graph are shown below:



The average temperature of Nigeria fluctuated between 28 and 27 until the tenth year (2018) when it shot up to 32. This is quite a sharp move. The temperature is the average temperature taken from every month across the states in Nigeria.



On the other hand, the banks share price index averaged between 260 and 450. It also fluctuated between these averages.

Methodology

The model for this analysis is using the ordinary least square is:

$$SPI_t = a + TEMP_t$$

Where:

SPI = Share price Index and it's the independent variable in the model

TEMP = Average Nigerian temperature

T: time lag

Hypothesis

The hypothesis that will be tested in this study is:

Temperature does not significantly influence Nigerian quoted banks' share price.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Average Temperature	10	27.00	32.00	28.1943	1.37942
Banks' Share Price Index	10	265.33	475.44	355.5780	72.91462
Valid N (listwise)	10				

Source: SPSS 21

The minimum temperature and share price index are 27 and 265 respectively while 32 and 475 respectively are the maximum. The Standard deviation which is the quantity expressing by how much the members of a group differ from the mean value for the group are 1.38 and 72.9 respectively.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.337 ^a	.114	.003	72.80267	2.484

a. Predictors: (Constant), Average Temperature

b. Dependent Variable: Banks' Share Price Index

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-147.257	496.546		-.297	.774
	Average Temperature	17.835	17.593	.337	1.014	.340

a. Dependent Variable: Banks' Share Price Index

The Durbin-Watson shows a value of 2.484 showing that we shouldn't reject the null hypothesis. This is also confirmed by the P-value of the regression of 0.340 which is higher than 5% therefore we accept the null hypothesis which states that temperature does not significantly influence Nigerian quoted banks' share price. This result differs from the a priori expectation, it might probably be due to the fact that there are other factors that determine share prices.

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