CAPITAL FLIGHT AND DYNAMICS OF STOCK PRICES: A TIME VARIANT ANALYSIS FROM NIGERIA STOCK EXCHANGE

ANYAMAOBI, Chukwuemeka
Department of Banking and Finance, Faculty of Management Sciences,
Rivers State University, Port Harcourt, Nigeria
chukwuemeka.anyamaobi@ust.edu.ng

and

ROGERS-BANIGO, Idanyingi
Department of Banking and Finance, Faculty of Management Sciences
Rivers State University, Port Harcourt, Nigeria
idhartins@gmail.com

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ABSTRACT

This study examined the effect of capital flight on the dynamics of stock prices in the Nigeria Stock Exchange. Time series data was sourced from Central Bank of Nigeria Statistical Bulletin from 1985-2019. All share price index and aggregate stock price were modeled as a function of net error and omission, debt servicing, change in current account balance deficit, change in external reserve and depreciating naira exchange rate per us dollar. The study employed multiple regression models to estimate the relationship that exists between capital flight and dynamics of stock prices. Ordinary Least Square (OLS), Augmented Dickey Fuller Test, Johansen Co-integration test, normalized co-integrating equations, parsimonious vector error correction model and pair-wise causality tests were used to conduct the investigations and analysis. The study found that capital account has positive and significant effect on all share price index and aggregate stock prices. Depreciating naira exchange rate have positive but no significant effect on all share price index but negative and no significant effect on aggregate stock prices. Debt servicing have negative but no significant effect on all share price index but positive and no significant effect on aggregate share prices. External reserves have positive and no significant effect on all share price index and agate stock prices while net official financing have negative and no significant effect on all share price index and aggregate stock prices. From the regression summary, the researcher conclude that capital flight have significant effect on stock prices.

The study recommends need for further macroeconomic and financial sector reform to effectively hold up capital flight from Nigeria. The regulatory authorities should ensure that the stock market is sound by promoting stability in the macroeconomic environment to enhance investors' confidence and attract both domestic and foreign investors to hold their equity investments in the Nigerian Stock Market.

Keywords: Capital Flight, Dynamics of Stock Prices, Debt Servicing, Net Errors and Commission, Nigeria Stock Exchange

INTRODUCTION

Capital flight refers to the massive exodus of financial resources from investments in one country to another in order to avoid country-specific risks (such as inflation, political turmoil and exchange rate volatility), or in search of higher returns (Ndikumana, 2014). Theoretically, capital flight comprises a broad variety of activities ranging from legal to those that are illegal and harmful to the economy. Based on its illegality, Adedayo and Ayodele (2016) defined capital flight as the illicit outflow of capital from one country to another through money laundering, child trafficking, drug trafficking, poor governance and bad institutional quality where corrupt public authorities take advantage of their position to siphon public funds.

The legal aspect of the phenomenon entails the outflow of financial resources and investments due to investor's perception that capital could lose its value due to volatile exchange rate, hyperinflation, political upheaval and fear of expropriation. This implies that in a period of unpalatable economic atmosphere in a country, investors will seek for countries with safe economy to channel their resources. Epstein (2005) defined capital flight to mean the transfer of assets abroad in order to reduce loss of principal, loss of return, or loss of control over one's financial assets due to government sanctioned activities. Capital flight manifest in the form of huge budget deficits, rising external debt burden, increasing current account deficit, frequent occurrence of exchange rate overvaluation and high rate of inflation.

Following Rational Expectation Theory, the price of a stock or bond depends partly on what prospective buyers and sellers believe it will be in the future. Rational Expectation theory is a building block for the 'random walk' or efficient markets' theory of securities prices. A sequence of observations on daily stock price is said to follow a random walk if the current value gives the best possible prediction of future values. The Efficient Markets theory of stock prices uses the concept of rational expectations to reach the conclusion that investor's buy

stocks they expect to have a higher-than-average return and sell those they expect to have lower returns. When they do so, they bid up the prices of stocks expected to have higher-than-average returns and drive down the prices of those expected to have lower-than-average returns. The menace of capital flight has been documented by financial and economic experts in diverse literature explaining its measurement and determinants. According to the literature, the issue of capital flight poses serious concern for a developing country like Nigeria. This is because capital flight contributes to the paucity of financial resources which limits the capacity and ability of domestic resource mobilization and access to foreign investment inflow required to finance growth and development (Massa, 2014).

The factors driving stock price movements have become issue of concern to both researchers in academics and professional portfolio managers. While few researchers have approached the determinants of stock price movements from the micro perspective, few others approached it from macro perspective. Incidentally, few studies in Nigeria have attempted to provide empirical evidence of the determinants of stock price movements (Udegbunam and Eriki, 2001; Akani and Lucky, 2014; Lucky, Akani and Anyamoabi, 2015), while few others have done that at theoretical level (Meristem Research, 2008) empirical studies on the effect of capital flight on stock prices in Nigeria stock exchange is lacking, therefore this study examined the effect of capital flight on the stock prices in Nigeria Stock Exchange.

LITERATURE REVIEW

Theoretical Review

Market Efficiency Theory

Efficient-market hypothesis (EMH) asserts that financial market is "informationally efficient". There are three major forms of the hypothesis: "weak", "semi-strong", and "strong". Weak EMH claims that prices on traded assets (for example, stock bonds, or property) already reflect all past publicly available information. Semi-strong EMH states that prices reflect all publicly available information and that prices instantly change to reflect new public information. Strong EMH additionally claims that prices instantly reflect even hidden or "insider" information. Efficient market theory implies that market will react quickly to new information. Thus, it is important to know when the accounting report first became publicly known. The accounting report is informative only if it provides data not previously known by the market.

In efficient markets, it is expected that when information arises it is reflected quickly into the prices of stocks. When the price of a financial asset reflects all the relevant information that is available about the intrinsic value of an asset, the market is termed an efficient market. The informational efficiency of stock prices helps investors to determine their trading strategies in order to earn excess returns or beat the market. Malkiel (2003) notes that neither technical analysis, which is the study of past stock prices in an attempt to predict future prices, nor even fundamental analysis, which is the analysis of financial information such as company earnings, asset values, etc., help investors to select stocks. However, most investors focus on companies rather than on stocks. Froidevaux (2004) asserts that investors need to understand that a good company is not necessarily a good investment. The basis of efficient market hypothesis is that any variable change announcements should only have an impact on stock prices if they are unanticipated by capital market participants. Thus the individual investor lacking prior knowledge of any expected earnings or dividends announcements will react to this new information and affect share prices at the stock market.

Theory of market efficiency or the efficient market hypothesis provides an appropriate theoretical framework for the study. According to the theory, share prices on the market place react fully and instantaneously to all information available (Fama, 1991). According to the Efficient Market Hypothesis (EMH), an operationally efficient stock market is expected to be externally and informationally efficient; thus security prices at any point in time are an unbiased reflection of all the available information on the security's expected future cash flows and the risk involved in owning such a security (Reilly and Brown 2003). Such a market provides accurate signals for resource allocation as market prices represent each security intrinsic worth. Market prices can at times deviate from the securities true value, but these deviations are completely random and uncorrelated.

The Investment Diversion Thesis

The investment diversion theory stipulates that there are two factors that give rise to capital flight, namely; macroeconomic and political uncertainty in developing countries and the better investment opportunities in advanced economies. Better investment opportunities is brought about by a high foreign interest rate, a wide range of financial instruments, political and economic stability, friendly tax regime (lower taxes or tax exemption), and concealment of accounts in tax haven countries. The argument of favorable tax climate seems to suggests that countries

would be better off, in terms of capital flows, had they framed their tax policies towards a lower or even a tax-free system. However, Muchai and Muchai (2016) cautioned that lowering tax and offering tax incentives in order to attract or retain capital causes market distortions and tax favouritism, which in turn leads to further capital losses. What is more aggravating is that in the eve of tax break uplift, international capital repatriate their funds to regions that have a favourable tax regime. This is so that they avoid paying high taxes, and in the same instance contributing to a country's capital flight. The consequences of these actions are: a decrease in the overall investment, low economic growth which leads to a fall in the level of employment which ends up increasing the dependency ratio and poverty.

One way countries in LDCs could overcome the challenge of a narrower tax base is by establishments of international tax treaties and agreements which allows countries to liaise information. These actions would facilitate to broaden the tax base with much success as this will not only include tax revenue by local residents, but also those collected from residents' holdings of foreign assets (Cuddington, 1986). Of course, other economic conditions such as macroeconomic stability and a well-developed financial market are indispensably necessary. Notwithstanding, Alam and Quazi (2003) contended that governments reformed their taxation policy of accelerated utilization of corporate tax base and, instead, follow policies that are grounded on a more judicious utilization of all tax bases. That is to say, if corporate taxes should be raised too high vis-à-vis other taxes, it will strongly encourage the owners of corporate capital to send their capital abroad. This will lead to a fall in corporate tax base, which eventually will cause a decline in government revenues.

The Debt Driven Capital Flight or Debt Overhang Thesis

The debt overhang thesis is an extension of the investment diversion thesis. The thesis propagates that external debt is one of the catalysts for capital flight. It advocates that in the event of a country's huge external debt, residents tend to smuggle their financial resources outside the country. Furthermore, the theory postulates that capital flight discourages people from saving and investing since it leads to a devaluation of the exchange rate, fiscal crisis and expropriation of assets to pay the debt (Wujung & Mbella, 2016), any efforts to defend the exchange rate from devaluating only leads to further losses in international reserves.

The Tax Depressing Thesis

The tax depressing thesis stipulates that capital flight cause a significant loss of tax revenue. This is to say that government have got no power whatsoever to tax the wealth held abroad by its domestic residents since it is beyond their control. This potentially diminishes government's capacity to service its debt, thereby increasing the debt burden which limits economic growth and development. By all means, it implies that capital flight cripples government revenue generating power.

The Austerity thesis

The austerity thesis can be described as strict fiscal stance by the government aimed at narrowing its debt and budget deficit. Persistent deficit spending have far-reaching repercussions since it causes distortions in the taxes system for most developing economies by, for instance, increasing the expected tax rates; thereby, leading to capital flight (Ndikumana and Boyce, 2013). In order to attain a narrow debt and budget deficit, austerity measures, like a decrease in government spending or raise in taxes, are put in place in order to align government revenues closer to the expenditures. The resultant of austerity programs is not without controversies; in fact, those against it often contend that austerity measure lowers economic growth and development. It also widens the gap between the rich and the poor, thereby creating an unequal society with regards to the redistribution of wealth. In simpler terms, the austerity thesis observes the poor being dragged into further debts because of the hostile policies, such as high taxes, adopted to service the debt obligations from the international financial markets.

Conceptual Review

Capital Flight

Capital flight is a subset of international asset deployments or portfolio adjustments undertaken in response to an unusual perceived deterioration in risk/return profile associated with assets located in a particular country that occur in presence of conflict between the interests of asset holders and governments. Two-way flows of capital occur because of the differential impact on domestic and foreign investors arising from asymmetries in information, risk, return and the impact of political risk. These two-way flows occur to arbitrage a yield or risk differential. Asymmetries can arise due to various reasons but they always result in discriminatory treatment of domestic capital. Cuddington (1986) refers to capital flight as short-term capital outflows involving hot money

that responds to political or financial crises, burdensome taxes, a prospective tightening of capital controls or a major domestic currency devaluation as well as actual or developing hyperinflation. On the other hand, Morgan Guaranty Trust Company (1986) defines capital flight to constitute the reported and unreported acquisition of foreign assets by the non-bank private sector and elements of the public sector.

Hardt (2000) saw capital flight as an abnormal flow of funds whose holder seeks safe havens from financial uncertainty and taxation or seeks to launder proceeds from illegal activities. Murphy (2004) in his paper, "Fiscal Paradise or Tax on Development" defines capital flight as the movement of cash and investments out of one's country to a place in which they believe the assets will be safe for their use. Here the intention is to hide the capital from the prying eyes of the authority.

Schneider (2013) defines capital flight as that part of the outflow of resident capital which is motivated by economic and political uncertainty. In his own contribution, Mahon (1996) argues that capital flight is a way of preserving savings against the depredations of bad politicians. Soesterberg (2016) explained that capital flight is the movement of large sums of money from one country to another to escape political or economic turmoil or to seek higher rates of return. The problem here is that it is difficult to measure offshore holdings; estimates can only be made. Capital flight according to Helleiner (2001) refers generally to an outflow of capital from a country where capital is relatively scarce and that is not part of normal commercial transactions. Chipalkatti and Rishi (2001) interpret capital flight as consisting of private capital outflows of any kind that result in the acquisition of foreign assets by the residents of a country. This definition is based on the motivations of the holders of capital. It rests on the assumption that an individual's control over capital is not complete, but it is subject to complex and alterable social control.

Measures of Capital Flight

Theoretical literatures offer more than one method of measuring capital flight. This is due to differences in the way the phenomenon of capital flight has been defined by different authors.

The Residual Method: This is also known as the broad measure is an indirect approach that uses balance of payments and international asset data. It weighs the country's sources of funds, as given by the net increase in external debt and

the net inflow of foreign investment against the uses of these funds as given by the current account deficit and the change in foreign reserves. If the recorded sources are greater than the recorded uses then there is capital flight from the country" (Brada, Kutan and Vukšić, 2008).

Algebraically, this is expressed as follows:

$$KFr = (\Delta ED + FDI) - (CAD + \Delta FR) \quad (1)$$

Where: KFr represents capital flight
Δ ED is the change in the stock of gross external debt,
FDI is the net foreign investment inflows,
CAD is the current account deficit, and
ΔFR is the change in the stock of official foreign reserves

The main shortcoming of the Residual Method is that it fails to discriminate between abnormal (mainly driven by short-run speculative interests) from normal (which are driven by long-term interests) capital flight; consequently, it measures all private capital outflows as capital flight (Alam and Quazi, 2003). The Residual approach is slightly improved by Morgan Guaranty Trust (1986, as cited in Claessens and Naude, 1993) who takes into account the change in short term foreign assets of the domestic banking system (ΔB). This additional item is subtracted from the Residual Method (KFr), implying that the banking system has nothing to do with capital flight. Therefore, equation (1) is reinstated as:

$$KFr = \Delta ED + FDI - (CAD + \Delta FR) - \Delta B \quad (2)$$

One of the criticisms of the Morgan Guaranty Trust argued by Naylor (1987) cited in Alam and Quazi (2003) was that occasionally, private banks are guilty of contributing to capital flight through their ability of transferring funds to accounts outside the country.

The Dooley Method: This method seeks to differentiate between the legal and illegal capital flows. Based on this approach, capital flight is said to be equal to the amount of income from foreign assets which are not reported in the home country's balance of payment account. The Dooley Method as cited in Hermes *et al* (2002) computes capital flight as follows:

$$TKO = FB + FDI - (CAD + \Delta FR) - EO - \Delta WBIMF \quad (3)$$

Whereby:
TKO is said to represent total capital outflows,
FB is the foreign borrowing as reported in the BOP statistics,
EO is net errors and omission, and
ΔWBIMF shows the difference between the change in the stock of external debt reported by the World Bank and foreign borrowing reported in the BOP statistics published by the IMF.

The stock of external assets based on interest earnings is given by:

$$ES = INTEAR / ru \quad (4)$$

Wherein: ES is the external assets,
rus is the US deposit rate (assumed to be representative of the international market's interest rate), and
INTEAR shows the reported interest earnings.

Thus, capital flight according to this method is measured as:

$$KFR = TKO - \Delta ES \quad (5)$$

The Hot Money Method: This also known as the narrow (or Balance of Payments) measure of capital flight stipulates that capital flight represents the short term movement of capital of the non-bank public sector plus the errors and omission from the BOP (Cuddington, 1986). The approach suggests that capital flight goes unrecorded because of the illegal nature of these capital movements. One of the weaknesses found in the literature concerning this method is that it merely concentrates on the short term outflows of capital. Consequently, it frequently ends up underestimating capital flight. Capital flight is computed as:

$$KFr = SKO + EO \quad (6)$$

Where:
SKO is short term capital outflow of the private sector, and
EO is the errors and omissions.

Trade Misinvoicing Method: Under this methodology, capital can travel from

one country to another illegally via trade. This can be calculated by taking data from both the importing and exporting countries. In other words, importers are assumed to have been involved in capital flight when there is a mismatch in values of imported goods as opposed to the reported value of the same goods by exporters. Likewise, exporters are involved in capital flight when there is a mismatch in values of exported goods as compared to the reported value of the same goods by importers. Claessens and Naude (1993) content that capital flight arises when there is export under invoicing and import over invoicing. This can be illustrated as follows:

$$\text{Export under invoicing} = (Mw/CIFFOB) - Xc \quad (7)$$
$$\text{Import over invoicing} = (Mc/CIFFOB) - Xw \quad (8)$$

Where:
Mw is the World's import from that country;
Xc is the Country's export to the world;
Mc is the Country's import from the world; and
Xw is the World's export to that country.

It is vital to stress at this point that the import reported by the country and the import as reported by the world should be on a comparable basis. This means that countries are required to adjust by a country's specific CIF/FOB ratio. If the sign is positive, it is an indication of capital flight; otherwise, a negative sign implies that there is capital inflow. The net effect of misinvoicing is the capital flight.

The Asset Method: this considers the total stock of assets held by the non-bank residents of domestic country in foreign banks as capital flight. This is the so-called asset method (Hermes and Lensink, 1992). Nonetheless, since there exist several other forms in which assets can be held, this method falls short of measuring the other forms of capital outflows (Hermes *et al,* 2002). Since this method is so restricted in measuring capital flight, the literature often considers it as a short-cut measure of capital flight. The reason why this approach is considered to be suitable is because it is straight forward to employ. In addition to that, it is believed to be ideal in instances where it is difficult for one to establish whether or not the funds used for capital flight could have been used for more productive and beneficial domestic activities (Brada, Kutan & Vukši**ć**, 2008).

Dynamics of Stock Prices

Stock price is the value of an asset/security as determined by the forces of demand for and supply of the assets. It is the perceived or observed value of an asset on the market. It is also known as current value. It is in fact the mutually accepted worth (cost or price depending on the individual) of the asset after negotiation. Most assets that have market values have their values determined by specialized markets such as the stock exchange. The acceptance of any asset depends on the perception of the potential investor after comparing the stock price to the intrinsic value. An asset is undervalued or under-price or favorably priced if the stock price of the asset is less than the intrinsic value. If the intrinsic value of the asset is less the market value, then the asset is overvalued, over-priced or favorably priced. Where the latter occurs, the investor would ordinarily be acquiring an asset at more expensive value than he would ordinarily have paid. An investor would acquire an overpriced asset if he expects the asset to record a bullish price movement such that if the anticipated price movement crystallizes, the investor can make capital gain.

Market share price is defined as the price which the market assigns to the company's stocks. Stock price volatility represents the variability of stock price changes could be perceived as a measure of risk faced by investors. Shiller (1981) argued that stock prices are more volatile than what is justified by time variation in dividends. Numerous studies have documented evidence showing that stock returns exhibit phenomenon of volatility clustering, leptokurtosis and asymmetry. Volatility clustering occurs when large stock price changes are followed by large price changes, of both signs, and small price changes are followed by periods of small price changes (Mande 1963; Fama, 1965; Black, 1976).

Stock price volatility is an indicator that is most often used to find changes in trends in the market place. Stock price volatility tends to rise when new information is released into the market, however the extent to which it rises is determined by the relevance of that new information as well as the degree in which the news surprise investors. However, economists and financial experts have propounded theories on what causes volatility. Some financial economists see the causes of volatility embedded in the arrival of new, unanticipated information that alter expected returns on a stock (Engle, 1982). Others claim that volatility is caused mainly by changes in trading volume, practices or patterns which in turn are driven by factors such as modifications in macroeconomic policies, shift in investors' tolerance of risk and increased uncertainty (Rajni and Mahendra, 2007). There has been high movement

stock prices in Nigeria stock market such as all share prices index and aggregate stock prices as illustrated in figure 1 and 2 below.

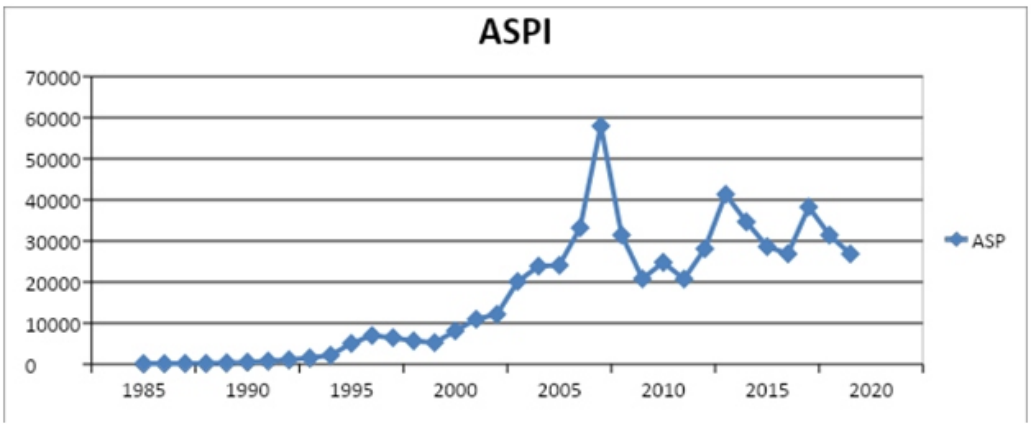

Figure 1: Trend of Nigeria Stock Market All Share Price Index 1985-2019

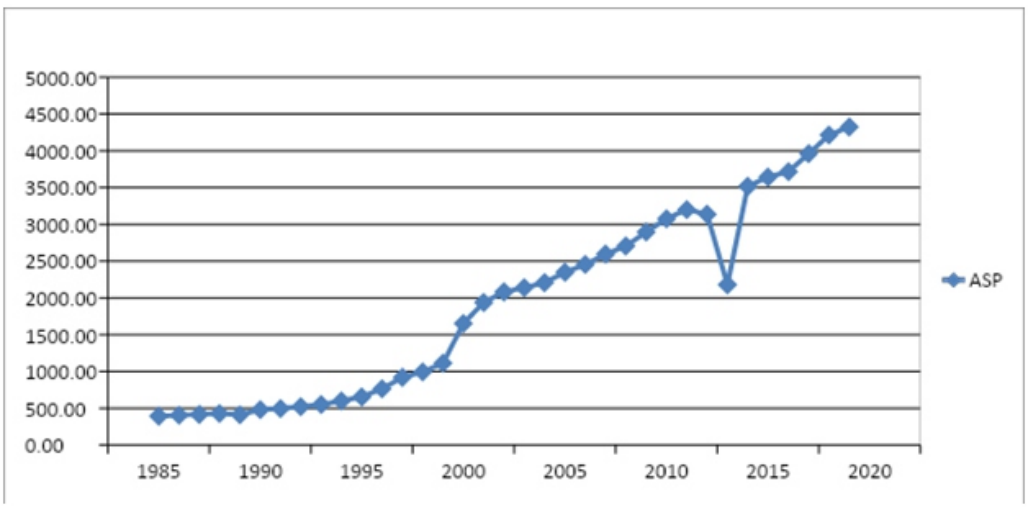

Figure 2: Trend of Nigeria Stock Market Aggregate Stock Prices 1985-2019

Empirical Review

Lionel, Alfa and Samuel (2020) examined the impact of capital flight on domestic investment in Nigeria between 1980 and 2017. Deploying the Auto Regressive Distributed Lag (ARDL) econometric methodology, the study finds that capital flight has negative and significant impact on domestic investment. In

particular, the long run impact of capital flight on domestic investment (0.57) turns out to be more severe than its impact in the short run (0.27), implying that a continuous and persistent build-up of capital flight exerts a negative cumulative effect on domestic investment over time. The study further reveals that the quality of institutions in Nigeria is a disincentive to domestic investment. It therefore recommends the strengthening of institutions to rein in on the illegal outflow of capital from the Nigerian economy in order to guarantee the availability of investible funds. The real sector of the local economy must be grown to bolster the value of the naira. This will stem the tide of capital flight and attract investments into critical sectors.

Adetiloye (2012) used the vector error correction mechanism of the ordinary least squares (OLS) regression methodology to analyze data between 1970 and 2007, finds that capital flight has negative but insignificant impact on domestic investment in Nigeria. As noted above, this finding was without basis as the capital flight variable was conspicuously lacking in the model specification, and in the reported results. Uremadu, Onyele and Ariwa (2016) examined the effect of capital flight on financial savings in Nigeria. The results showed that capital flight exerted a negative and significant effect on financial savings. It was recommended inter alia that investments be directed and focused on infrastructural development and the real sectors of the economy in order to accelerate the level of capital formation induce further growth of both private and foreign investments which would equally generate additional savings for further investments in the long run.

Dim and Ezenekwe (2014) examined capital flight and savings gap, underscoring the socio-economic determinants of capital flight in Nigeria. Among the variables included in the model, only lagged capital flight, fiscal balance and exchange rate were found to be significant in influencing capital flight in the country. The study therefore concluded inter alia that unless sound macroeconomic measures were taken to address these factors, capital flight would continue to paralyze economic activities in Nigeria.

Salandy and Henry (2013) examined the relationship among capital flight, domestic investment and economic growth in the small resource based economy of Trinidad and Tobago. The study utilized capital flight estimates from previous work. A Vector Error Correction Model (VECM) combing short run and long run analysis is presented. The results confirm the a priori expectation that the financial hemorrhage of capital flight is a fundamental problem, which is affecting both the levels of domestic investment and economic growth. Therefore, a reduction of capital flight may provide a stimulus to the overall

economy. These findings provide clear evidence of the harmful effects of capital outflows and provide support for the potential re-introduction of capital controls.

Rahmon (2017) examined the relationship between capital flight and domestic investment in Nigeria. The study made use of secondary data collected from Central Bank of Nigeria's Statistical Bulletin of various issues and National Bureau of Statistics. The empirical analysis covers the period 1980 and 2015. Augmented Dickey Fuller test, Phillip-Perron test, Johansen Cointegration test and Ordinary Least Square estimating technique (OLS) via Microsoft 7.1 econometric software were employed to carry out a detailed analysis of the endogenous and exogenous variables of the model which include Gross Domestic Investment (GDINV), Capital Flight (CAPF), Exchange Rate (EXGR) and Inflation Rate (INFR). The overall results show that capital flight has a statistically significant positive relationship with gross domestic investment in Nigeria contrary to a prior theoretical expectation. The result further revealed that a one naira increase in capital flight would bring about13.74 units rise in gross domestic investment. The results also show that there exists a statistically significant positive relationship between exchange rate and gross domestic investment. A one naira increase in exchange rate would bring about 4.84 units rise in gross domestic investment. Based on the results, government should intensify its efforts to ensure speedy recovery of looted funds by corrupt public office holders from foreign accounts to inject funds into the economy for investment purposes; there should be significant improvement in governance and institutional quality to promote stable political environment necessary for capital inflow by foreign investors, and government at all levels should provide investment friendly environment through the availability of infrastructural facilities such as uninterrupted power supply, motor able roads network, regular supply of water and efficient communication network. In addition, there should be establishment of a stable exchange rate regime capable of reducing capital outflows and encouraging capital inflows inform of private foreign investment into the country, and there should be enactment of law regulating the percentage of local profit to be repatriated to parent companies abroad from their subsidiaries in Nigeria. Benjamin and Chibuike (2014) conducted a study on the relationship between capital flight and exchange rate volatility in Nigeria. The study employed the parametric statistical techniques of ordinary least squares (OLS) regression model. They found that capital flight has a statistically significant positive relationship with exchange rate in Nigeria during the period of study. The study recommended that a stable exchange rate regime should be

established through a drastic reduction in capital flight and increase capital inflows in the form of foreign private investments.

Literature Gap

There are various strands of research on the effect of capital flight, some group of researchers examined the effect capital flight on the growth of Nigeria economic; other examined the effect capital flight on the performance of the industrial sector. The effect of the capital flight on stock price dynamics in Nigeria stock market is lacking in literature, therefore this study examined the effect of capital flight on stock price dynamics in Nigeria capital market.

METHODOLOGY

This study used ex-facto quasi-experimental research design to examine the effect of capital flight on the dynamic of stock prices in Nigeria stock exchange. This study employed secondary data sourced mainly from the Central Bank of Nigeria (CBN) statistical bulletin.

Model Specification

The study models are specified below:

$$ASPI = \beta_0 + \beta 1NEO + \beta_2 DS + \beta_3 CCA + \beta_4 EXR + \beta_5 DNEXR + \mu \quad (9)$$

$$ASP = \beta_0 + \beta 1NEO + \beta_2 DS + \beta_3 CCA + \beta_4 EXR + \beta_5 DNEXR + \mu \quad (10)$$

Where:

ASPI = All share price index
ASP = Aggregate Stock Price
NEO = Net error and omission
DS = Debt servicing
CCA = Change in current account balance deficit
EXR = Change in external reserve
DNEXR = Depreciating naira exchange rate per US dollar

$\phi_0 \alpha_0$ = Constant

$\beta_1 - \beta_5$ = Coefficients of independent variables

μ_{it} = Error Term

A-Priori Expectation

Base on theories such as capital flight and empirical results examined in this study, the variables are expected to have a Negative effect on the dependent variables. The mathematical implication is stated as follows:

$$\beta_1\ \beta_2\ \beta_3\ \beta_4\ \beta_5 < 0 \qquad (11)$$

Techniques of Data Analysis

The main tool of analysis is the Ordinary Least Squares (OLS) using the multiple regression method for a period of 34 years, annual data covering 1985– 2019. Statistical evaluation of the global utility of the analytical model, so as to determine the reliability of the results obtained were carried out using the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test.

i. Coefficient of Determination (r^2) Test: This measure the explanatory power of the independent variables on the dependent variables. R^2 gives the proportion or percentage of the total variation in the dependent variable Y that is accounted for by the single explanatory variable X. The higher the R^2 value the better. For example, to determine the proportion of monetary policy to private sector funding in our model, we used the coefficient of determination. The coefficient of determination varies between 0.0 and 1.0. A coefficient of determination says 0.20 means that 20% of changes in the dependent variable are explained by the independent variable(s). Therefore, we shall use the R^2 to determine the extent to which variation in monetary policy variables are explained by variations in private sector funding variables over the periods covered in this study.

ii. Correlation Co-Efficient (R): This measures the degree of the relationship between two variables x and y in a regression equation. That is, it tries to establish the nature and magnitude of the relationship when two variables are been analyzed. Thus correlation co-efficient show whether two variables are positively or negatively correlated. That is, it takes the value ranging from – 1, to + 1.

iii. F-Test: This measures the overall significance. The extent to which the statistic of the coefficient of determination is statistically significant is measured by the F-test. The F-test can be done using the F-statistic or by the probability estimate. We use the F-statistic estimate for this analysis.

iv. Student T-test: measures the individual statistical significance of the estimated independent variables. This is a test of significance used to test the significance of regression coefficients (Gujurati, 2003). Generally speaking, the test of significance approach is one of the methods used to test statistical hypothesis. A test of significance is a procedure by sample results are used to verify the truth or falsity of a null hypothesis (Ho) at 5% level of significance.

v. Durbin Watson Statistics: This measures the collinearity and autocorrelation between the variables in the time series. It is expected that a ratio of close to 2.00 is not auto correlated while ratio above 2.00 assumed the presence of autocorrelation.

vi. Regression coefficient: This measures the extent in which the independent variables affect the dependent variables in the study.

vii. Probability ratio: It measures also the extent in which the independent variables can explain change to the dependent variables given a percentage level of significant.

Stationarity (Unit Root) Tests

Stationary test therefore checks for the stationarity of the variables used in the models. If stationary at level, then it is integrated of order zeroi, 1(0). Thus, test for stationarity is also called test for integration. It is also called unit root test. Stationarity denotes the non-existence of unit root. We shall therefore subject all the variables to unit root test using the augmented Dickey Fuller (ADF) test specified in Gujarati (2004) as follows.

$$\Delta y_t = \beta_1 + \beta_2 + \delta y_{t-1} + \alpha i \sum_{i-1}^{m} \Delta y_{t-1} + Et \qquad 12$$

Where:

Δy_t = change time t

Δy_{t-1} = the lagged value of the dependent variables

$\sum_i$ = White noise error term

If in the above δ =0 then we conclude that there is a unit root. Otherwise there is no unit root, meaning that it is stationary. The choice of lag will be determined by Akaike information criteria.

Co-integration Test (The Johansen' Test)

It has already been warned that the regression of a non-stationary time series on another non stationary time series may lead to a spurious regression. If the residual is found to be stationary at level, we conclude that the variables are co-integrated and as such has long-run relationship exists among them.

$$ASPI_t = w_O + \sum_{i=1}^{i} \vartheta_t NEO_{t-i} + \sum_{i=1}^{j} \varpi_i DS_{jt-i} + \sum_{i=1}^{j} \varpi_i CCA_{jt-i} + + \sum_{i=1}^{j} \varpi_i EXR_{jt-i} + + \sum_{i=1}^{j} \varpi_i DNEXR_{jt-i} + \mu_{1t}$$

$$ASP_t = w_O + \sum_{i=1}^{i} \vartheta_t NEO_{t-i} + \sum_{i=1}^{j} \varpi_i DS_{jt-i} + \sum_{i=1}^{j} \varpi_i CCA_{jt-i} + + \sum_{i=1}^{j} \varpi_i EXR_{jt-i} + + \sum_{i=1}^{j} \varpi_i DNEXR_{jt-i} + \mu_{1t}$$

Granger Causality Test

Causality means the impact of one variable on another, in other-words; causality is when an independent variable causes changes in a dependent variable. The pair-wise granger causality test is mathematically expressed as:

$$Y_t \pi_o + \sum_{i=1}^{n} x_1^{\ y} \ Y_{t-1} \sum_{i=1}^{n} \pi_1^{\ x} x_{t-1} + u_1 \qquad 15$$

$$\text{and } x_t dp_o + \sum_{i=1}^{n} dp_1^{y} \ Yt-1 \sum_{i=1}^{n} dp1^{x} x_{y-1} + V_1 \qquad 16$$

Where x_t and y_t are the variables to be tested white u_t and v_t are the white noise disturbance terms. The null hypothesis $\pi_1^y = dp_1^y = 0$, for all I's is tested against the alternative hypothesis $\pi_1^x \neq 0$ and $dp_1^y \neq 0$. if the co-efficient of π_1^x are statistically significant but that of $dp1y$ are not, then x causes y. If the reverse is true then y causes x. however, where both co-efficient of π_1^x and dp_1^y are significant then causality is bi – directional.

Vector Error Correction (VEC) Technique

The presence of co-integrating relationship forms the basis of the use of Vector Error Correction Model. E-views econometric software used for data analysis, implement vector Auto-regression (VAR)- based co-integration tests using the methodology developed by Johansen (1991,1995). The non-standard critical values are taken from (Osterward, 1992).

RESULTS AND DISCUSSION OF FINDINGS

Before analyzing the econometric model specified, it is imperative to find the properties of the data employed. Thus, the Augmented Dickey Fuller (ADF) unit root test was employed. The results of the stationarity test are shown below.

Table 1: Unit Root Test

Capital Flight and All Share Price Index				Capital Flight and Aggregate Stock Price			
Variable	ADF	5%	Prob.	Variable	ADF	5%	Prob.
ASPI	-4.182859	-2.986225	0.0034	ASP	-8.354405	-2.957110	0.0000
CCA	-8.065594	-2.986225	0.0000	CCA	-8.065594	-2.954021	0.0000
DNEXR	-9.18303	-2.954021	0.0003	DNEXR	-8.524742	-2.957110	0.0000
DS	-6.262068	-2.951125	0.0000	DS	-6.262068	-2.951125	0.0000
EXR	-6.778351	-2.967767	0.0000	EXR	-6.771688	-2.960411	0.0000

Source: Extract from E-view 9.0

It can be seen from the table 2 above that the unit root test results, using the ADF unit root test suggest that all series are stationary at order I(1) because they become stationary after being differenced once. Therefore, the Engle and Granger (1987) can be employed

Table 2: Short Term Regression Results

Capital Flight and All Share Price Index				Capital Flight and Aggregate Stock Prices			
Variable	Coefficient	t-test	Prob.	Variable	Coefficient	t-test	Prob.
CCA	-0.032505	8.397309	0.0000	CCA	10.12698	3.822894	0.0006
DNEXR	0.224131	-0.936053	0.3570	DNEXR	-0.158869	-1.318334	0.1977
DS	-0.261216	1.648348	0.1101	DS	1.780172	1.412902	0.1683
EXR	1.039569	0.446158	0.6588	EXR	1.400710	0.491920	0.6265
NEO	-0.171778	-1.164731	0.2536	NEO	-1.073986	-0.617832	0.5415
C	-12.76361	-0.055400	0.9562	C	-80.70302	-1.631142	0.1137
R^2	0.797681			R^2	0.548135		
Adj R2	0.762799			Adj R2	0.470227		
F-Stat	22.86764			F-Stat	7.035689		
F-Prob	0.000000			F-Prob	0.000205		
DW	0.723295			DW	0.613030		

Source: Extract from E-view 9.0

To find out how well the model fits a set of observations, the adjusted R^2 indicates that 76.2 and 47 percent of the variation in all share price index and aggregate stock price is explained within the model. The F-statistic and probability justifies that the models are statistically significant. The Durbin Watson statistics shows that presence of serial autocorrelation within the time scope of the study. The results found that capital account have positive and significant effect on all share price index and aggregate stock prices. Depreciating naira exchange rate have positive but no significant effect on all share price index but negative and no significant effect on aggregate stock prices. Debt servicing have negative but no significant effect on all share price index but positive and no significant effect on aggregate share prices. External reserves have positive and no significant effect on all share price index and agate stock prices while net errors and omission have negative and no significant effect on all share price index and aggregate stock prices.

Table 3: Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**

Capital Flight and All Share Price Index					**Capital Flight and Aggregate Stock Prices**				
None *	0.837342	157.5605	95.75366	0.0000	None *	0.895603	174.2452	95.75366	0.0000
At most 1 *	0.657404	97.62906	69.81889	0.0001	At most 1 *	0.684256	99.67981	69.81889	0.0000
At most 2 *	0.556221	62.27937	47.85613	0.0013	At most 2 *	0.600795	61.63668	47.85613	0.0015
At most 3 *	0.418037	35.46920	29.79707	0.0100	At most 3 *	0.449682	31.33344	29.79707	0.0330
At most 4 *	0.334006	17.60470	15.49471	0.0237	At most 4	0.291849	11.62387	15.49471	0.1759
At most 5 *	0.119268	4.191060	3.841466	0.0406	At most 5	0.007116	0.235656	3.841466	0.6274

Source: Extract from E-view 9.0

From table 3, the results of the Johansen co-integration test shows that we adopt the alternate hypotheses of the presence of co-integrating equation at the 5% level of significance. Model one of the study proved 5 cointegrating equations while model two proved 3 cointegrating equations. The presence of long run relationship among the variables confirms our a-priori expectation.

Table 4. **Normalized Cointegrating Coefficients**

ASPI	CCA	DNEXR	DS	EXR	NEO
1.000000	-7.244157	-0.105156	-3.405709	6.369946	-15.29093
	(2.01732)	(0.08447)	(1.13460)	(2.34738)	(1.60135)
ASP	CCA	DNEXR	DS	EXR	NEO
1.000000	17.60145	-0.237360	1.093343	-2.756926	20.02984
	(2.92703)	(0.08928)	(1.21642)	(2.49030)	(1.70814)

Source: Extract from E-view 9.0

One of the challenges of the Johansson cointegration test is the inability to identify that directional of long relationship among the variables. The normalized cointegration test presented in the table 4 the direction of long run

Table 5: Error Correction Model

	Capital Flight and All Share Price Index			Capital Flight and Aggregate Stock Prices			
Variable	Coefficient	t-test	Prob.	Variable	Coefficient	t-test	Prob.
C	0.318478	0.498507	0.638864	C	-1.553655	-3.217659	0.482852
D(ASPI(-1))	1.114012	0.117936	9.445907	D(ASP(-1))	0.467946	0.314646	1.487217
D(ASPI(-2))	-2.002410	0.230389	-8.691445	D(ASP(-2))	0.140191	0.332466	0.421670
D(ASPI(-3))	2.034135	0.230873	8.810625	D(ASP(-3))	0.214869	0.324617	0.661915
D(CCA(-1))	0.062249	0.110453	0.563578	D(CCA(-1))	-0.979218	-0.767765	-1.275413
D(CCA(-2))	-0.546712	0.195229	-2.800362	D(CCA(-2))	-0.560293	-0.858766	-0.652440
D(CCA(-3))	-0.212479	0.111665	-1.902826	D(CCA(-3))	0.217549	0.620712	0.350483
D(DNEXR(-1))	0.161848	0.041683	3.882790	D(DNEXR(-1))	-0.087768	-0.175689	-0.499568
D(DNEXR(-2))	-0.140290	0.047654	-2.943913	D(DNEXR(-2))	0.077413	0.203449	0.380502
D(DNEXR(-3))	-0.034679	0.028112	-1.233590	D(DNEXR(-3))	0.048892	0.096754	0.505321
D(DS(-1))	-0.126292	0.075814	-1.665813	D(DS(-1))	0.006608	0.287633	0.022975
D(DS(-2))	-0.036865	0.086920	-0.424125	D(DS(-2))	0.035611	0.344307	0.103429

D(DS(-3))	0.021362	0.057987	0.368391	D(DS(-3))	-0.004496	0.268265	-0.016761
D(NEO(-1))	-0.633898	0.130841	-4.844794	D(EXR(-1))	-0.278734	0.627558	-0.444156
D(NEO(-2))	-0.512018	0.117938	-4.341434	D(EXR(-2))	-0.237923	0.670818	-0.354677
D(NEO(-3))	-0.486506	0.125221	-3.885189	D(EXR(-3))	-0.334350	0.697431	-0.479402
D(EXR(-1))	0.009063	0.120015	0.075519	D(NEO(-1))	0.119985	0.391439	0.306522
D(EXR(-2))	0.420893	0.196529	2.141631	D(NEO(-2))	0.278508	0.544892	0.511125
D(EXR(-3))	0.493564	0.138533	3.562786	D(NEO(-3))	0.213104	0.706998	0.301421
ECM(-1)	-0.097195	0.042605	-2.281310	ECM(-1)	-0.127052	0.081823	-1.552769
R2	0.972059			R2	0.868363		
Adj R2	0.923798			Adj R2	0.640989		
F-Stat	20.14155			F-Stat	3.819096		
F-prob	0.000006			F-prob	0.013514		
DW	1.269093			DW	2.229340		

Source: Extract from E-view 9.0

The corresponding sign of Error Correction Term (ECT) is not negative but not significant. This means that there is a long run causality running from independent variables to the dependent variable. The negative sign of (ECT) indicates a move back towards equilibrium following a shock to the system in the previous year. The R^2 from the models proved that the independent variables can explain 92.3 percent changes on all share price index and 64 percent variation on aggregate stock prices. The models are statistically significant from the value of f-statistics and probability. The Durbin Watson statistic of 1.269093 and 2.229340 (which is approximately 1.5 and 2.5) shows that the estimated error-correction model is free from serial correlation. The ECM term in the result has the expected negative sign and is significant at 0.09 and 0.12 percent. The error correction term capture the speed of adjustment from short run equilibrium. The coefficient indicates that the contemporaneous adjustment of economic growth is about 0.9 and 12 percent which is very low.

Table 6: Granger Causality Test

Null Hypothesis	Obs	F-Statistic	Prob.	Null Hypothesis	Obs	F-Statistic	Prob.
Capital Flight and All Share Price Index				**Capital Flight and Aggregate Stock Prices**			
CCA does not Granger Cause ASPI	33	0.07258	0.9302	CCA does not Granger Cause ASP	33	5.15920	0.0124
ASPI does not Granger Cause CCA		0.46480	0.6330	ASP does not Granger Cause CCA	33	13.7372	0.0005
DNEXR does not Granger Cause ASPI	33	8.91924	0.0010	DNEXR does not Granger Cause ASP	33	0.49411	0.6153
ASPI does not Granger Cause DNEXR		2.27525	0.1215	ASP does not Granger Cause DNEXR	33	0.80924	0.4553
DS does not Granger Cause ASPI	33	0.37878	0.6882	DS does not Granger Cause ASP	33	0.40858	0.6685
ASPI does not Granger Cause DS		0.74417	0.4843	ASP does not Granger Cause DS	33	0.09106	0.9132
EXR does not Granger Cause ASPI	33	0.66432	0.5225	EXR does not Granger Cause ASP	33	0.14004	0.8699
ASPI does not Granger Cause EXR		0.61768	0.5464	ASP does not Granger Cause EXR	33	0.73914	0.4866
NEO does not Granger Cause ASPI	33	0.36019	0.7007	NEO does not Granger Cause ASP	33	0.33366	0.7191
ASPI does not Granger Cause NEO		3.53173	0.0429	ASP does not Granger Cause NEO	33	0.43016	0.6546

Source: Extract from E-view 9.0 (2020)

From model one, the study found a uni-directional causality from depreciating naira exchange rate to all share price index and a uni-directional causality from all share price index to net official financing within the periods covered in this study. Model two found a bi-directional causality from current account balance of payment to aggregate stock prices and from aggregate stock prices to net errors and omission.

DISCUSSION OF FINDINGS

The empirical relationship between capital flight and stock prices in Nigeria stock exchange was exhaustively examined, specifically to determine the extent and direction of relationship between measure of capital flight and stock prices. For this purpose, a multivariate regression model was specified to depict the empirical relationship between the dependent variables and the independent variables as formulated in the models. Using annual time series data covering the period 1985 – 2019, Cointegration test, Error correction model and Granger causality test were employed in estimating the specified model. The study found that depreciating naira exchange rate and external reserves have positive relationship with all share price index. The positive effect of the variables on all share price index contradicts our a-priori expectation as the study expected a negative relationship between the dependent and the independent variables. The positive effect of the variables contradicts the findings of Lionel, Alfa and Samuel (2020) that capital flight has negative and significant impact on domestic investment. The findings of Adetiloye (2012) that capital flight has negative but insignificant impact on domestic investment in Nigeria. The findings of Uremadu, Onyele and Ariwa (2016) that capital flight exerted a negative and significant effect on financial savings. The study found that current account balance, debt servicing and net errors and omission have negative effect on Nigeria stock market all share price index. The negative effect of the variables confirms our a-priori expectation and empirical finings of Lionel, Alfa and Samuel (2020), Adetiloye (2012) and Uremadu, Onyele and Ariwa (2016).

Furthermore, the estimated regression model found that there is positive relationship between current account balance, debt servicing and external reserves on the aggregate stock prices of Nigeria stock market. The positive effect of the variables contradicts our a-priori expectations and can be traced to government policies directed to manage capital flight such as financial sector and macroeconomic reforms. The positive effect of the variables contradict the findings of Salandy and Henry (2013) that there is negative relationship between capital flight and economic growth, but confirm the findings of Rahmon (2017) that capital flight has a statistically significant positive relationship with gross domestic investment in Nigeria and the findings Benjamin and Chibuike (2014) that capital flight has a statistically significant positive relationship with exchange rate in Nigeria during the period of study. The study found that there is negative relationship between depreciating naira exchange rate net errors and omission and aggregate stock prices. This finding confirms the a-priori expectation and the empirical findings listed above.

CONCLUSION AND RECOMMENDATIONS

From the findings, the study concludes that capital account has positive and significant effect on all share price index and aggregate stock prices. Depreciating naira exchange rate have positive but no significant effect on all share price index but negative and no significant effect on aggregate stock prices. Debt servicing have negative but no significant effect on all share price index but positive and no significant effect on aggregate share prices. External reserves have positive and no significant effect on all share price index and agate stock prices while net official financing have negative and no significant effect on all share price index and aggregate stock prices. The study thus recommends as follows:

1. There is need for further macroeconomic and financial sector reform to effectively hold up capital flight from Nigeria. The regulatory authorities should ensure that the stock market is sound by promoting stability in the macroeconomic environment to enhance investors' confidence and attract both domestic and foreign investors to hold their equity investments in the Nigerian Stock Market.
2. With the long run shock to capital flight exerting high level of influence on stock prices from Nigeria, the study recommend that management of the capital market and the policy makers should enhance the operational efficiency of the capital through reforms on existing policies such as internationalization of all trading points and full deregulations of the stock prices.
3. There is need to improve the infrastructural facilities in the Nigerian Stock Market to match or even beat what is obtainable abroad. As such, foreign investors will be attracted to the Stock Market and the incidence of capital flight will be drastically reduced.
4. The monetary authorities should formulate policies of effective utilization, investment and management of external debt to leverage the financial market the negative effect of external debt on stock prices in Nigeria stock market.
5. Nigeria exchange rate per US dollar should be well structured and defined. Policies to leverage the depreciation naira exchange rate should be formulated and there is need to strengthen Nigeria bilateral, unilateral and multilateral trade and investment relationship for better naira exchange rate that will enhance stock prices.

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