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Corporate liquidity and financial performance: A panel study of non-financial firms listed on the Ghana stock exchange (GSE)

Mohammed MUSAH[1], Yusheng KONG[2], Stephen Kwadwo Antwi[3]
[1-3] School of Finance and Economics, Jiangsu University, 301 Xuefu Road, Zhenjiang, Jiangsu, P.R China

Abstract
This study examined liquidity and the financial performance of non-financial firms listed on the Ghana Stock Exchange (GSE). Specifically, the study sought to establish the relationship between liquidity and the financial performance of the firms and to examine the effect of liquidity on the financial performance of the firms. Generally, this study was a quantitative research because, it provided the fundamental connection between empirical observation and mathematical expression of quantitative relationships. All the non-financial firms listed on the Ghana Stock Exchange (GSE) totaling twenty-eight (28) formed the target population of the study. However, a sample of fifteen (15) representing 53.57% of the population qualified to be used in the study. A ten (10) year panel data deduced from the audited and published annual reports of the selected firms was used for the study. The study adopted the descriptive and inferential techniques of data analyses using the STATA version 15 software package with a 5% level of significance ($p<0.05$). From the study's Pearson Product-Moment Correlation Coefficient estimates, liquidity measured by the current ratio and the operating cash flow ratio had a significant relationship with the firms' financial performance as measured by ROA. The study's *Robust Fixed-Effects GLS* regression output also established that, liquidity measured by the current ratio and the operating cash flow ratio had an insignificant impact on the firms' financial performance as measured by ROA. On the control variables, the study's correlation results revealed that, size and growth had significantly positive relationship with ROA. A significantly inverse relationship was further found between efficiency and ROA, whilst tangibility of the firms had an insignificantly positive association with ROA. The study's regression results on the control variables showed that, size of the listed firms negatively affected ROA but the effect was statistically insignificant. Also, growth had an insignificantly positive influence on ROA. Additionally, efficiency had a significantly inverse effect on the firms' ROA whilst tangibility of the firms had a significantly positive effect on the firms' ROA. Finally, current ratio, operating cash flow ratio, size, growth, efficiency and tangibility had a combined significant influence on the firms' financial performance as measured by ROA. Based on the findings the study recommended that, liquidity management is an important component of financial management. Embracing it effectively, is therefore the best way to improve the firms' financial performance.

Keywords: corporate liquidity, financial performance, non-financial firms, Ghana stock exchange (GSE)

1. Introduction

Firm liquidity is one of the most vital issues in the field of corporate finance. Its main focus is on the ability of firms to meet their short-term financial obligations when they fall due, using their short-term financial resources (cash and other components of current assets) available (Christopoulos, Dokas & Mantzaris, 2013; Mohammed & Yusheng, 2019f; Mohammed, Yusheng & Isaac, 2019) [13, 63, 66]. Mueller (2018) [69] also viewed liquidity as the availability of cash and cash equivalents to meet short-term operational needs of firms. According to the author, assets like stocks and bonds are very liquid since they can be converted into cash within days. However, large assets such as property, plant and equipment are not as easily converted into cash. As argued by Bhunia (2010) [7], a firm making no profit may be considered as sick but one having no liquidity will die soon. As a matter of fact, no firm can operate successfully without liquidity.

Firms are required to keep an optimal level of liquidity to support their daily operations (Saluja & Kumar, 2012; Puneet & Parmil, 2012; and Garcia-Teruel & Martinez-Solano, 2007; Mohammed & Yusheng, 2019e) [90, 93, 30, 62]. In other words, firms are to maintain an adequate amount of cash and near cash assets such as securities to meet their short-term financial obligations. This will make them sound and solvent, thereby gaining public confidence (Saluja & Kumar, 2012; Puneet & Parmil, 2012; and Garcia-Teruel & Martinez-Solano, 2007) [90, 83, 30]. As postulated by Bolek and Wojciech (2011), over financing leads to additional expenses mainly reflected in the form of storage and maintenance costs. Also the surplus of cash, inventories and accounts receivables are excess current assets that generate the cost of lost opportunities (Bolek & Wojciech, 2011; Mohammed, Yusheng, Stephen, Mary, Prince & Anthony, 2019) [68]. On the contrary, underfinancing may reduce revenues thereby decreasing profitability (Bolek & Wojciech, 2011).

According to Lamberg and Valming (2009) [47], effective management of liquidity through the investment of excess cash, minimization of inventories, speedy collection of receivables, and the elimination of unnecessary and costly short-term financing, all contribute to profit maximization. According to the authors, firms do so to prevent the issue of illiquidity. Illiquidity is very risky as it creates a bad credit image, loss of creditors' confidence, high-cost of emergency borrowing, unnecessary

legal battles or even the closure of firms (Lamberg & Valming (2009; Mohammed, Yusheng & Stephen, 2019) [47, 67, 68, 106]. Simply put, the liquidity position of firms should neither be too high (under-trading or over-capitalization) nor too low (over-trading or under-capitalization). A well-monitored optimum level of liquidity, at a calculated risk, is therefore viewed as the catalyst for better firms' performance (Orshi, 2016) [80].

According to KPMG (2005) [46], shortening the cash gap releases liquidity and impacts directly on firms' financial performance. This is also the case of non-financial firms listed on the Ghana Stock Exchange (GSE). The operations of these firms entails the investment in inventories, which is financed either through cash or trade credits; they use these trade credits as marketing tools to maintain or expand sales; thereby getting cash to finance their day-to-day operations and any excesses thereof, invested in marketable securities to gain returns. However, prevailing practical occurrences have shown that, some of the firms are faced with the challenge of effectively managing their liquid assets to ensure improved financial performance. This scenario is evidenced by the recent technical suspension of Pioneer Kitchenware Company Limited, Aluworks, Cocoa Processing Company Ltd, Clydestone (Ghana) and Transaction Solutions. These troubled companies listed on the GSE have by December 2018 to rectify their shortcomings or be delisted.

Apart from the above, companies like Ayrton Drugs Manufacturing Company Ltd and Golden Star Resources Ltd did not form part of the study's sample because of the continuous change in their financial year of operations which have affected their trend records and their reluctance to file complete financial statements to the Ghana Stock Exchange (GSE). These firms might be doing so just because, they do not have a good liquidity position as a result of the poor management of their liquid assets. This affirms the assertion that, effective liquidity management leads to improved financial performance, whilst under-performance is the case of the contrary. The continuous technical suspension or closure of firms, the ceaseless change in the financial year of firms' operations and the reluctance of firms to file their annual reports to the Ghana Stock Exchange (GSE), coupled with the lack of a research that particularly sought to investigate into liquidity and the financial performance of non-financial firms listed on the Ghana Stock Exchange (GSE) prompted the researcher to undertake this study. Specifically, the study sought to establish the relationship between liquidity and the financial performance of non-financial firms listed on the Ghana Stock Exchange (GSE), and to examine the effect of liquidity on the financial performance of non-financial firms listed on the Ghana Stock Exchange (GSE).

2. Literature Review

In this section of the paper, reviews of literature that supports the topic understudy are presented. Reviews on the Cash Conversion Cycle (CCC) theory, operating cycle theory and the trade-off theory form the first part of the section, whilst empirical reviews on the relationship between liquidity and financial performance and the effect of liquidity on firms' financial performance form the concluding part of the section.

2.1 Theoretical Review

As posited by Horne (1977) [37], working capital management, which is the root of liquidity management, lacks in theoretical framework. Smith (1980) [95] specifically indicated that, the limited general theory which pertains to working capital management emanates from finance literature and centers on the association between risk and profitability (Mohammed & Yusheng, 2019c; Olufemi & Olubanjo, 2009) [60, 77]. However, the Cash Conversion Cycle (CCC) theory (Cagle, Campbell & Jones, 2013; Olufemi & Olubanjo, 2009; Richards and Laughlin, 1980) [11, 77, 88]; the operating cycle theory (Olufemi & Olubanjo, 2009; Opler, Pinkowitz, Stulz & Williamson, 1999; Horne, 1977) [77, 79, 37]; and the trade-off theory (Pass & Pike, 1984 cited in Lamberg & Valming, 2009; Dash & Hanuman, 2008) [47, 17] are three theories that throws more light on liquidity management. The CCC introduced by Verlyn Richards and Eugene Laughlin in 1980 integrates both current assets and current liabilities leading to the net working capital. Richards and Laughlin (1980) [88] devised this method of working capital as part of a broader framework of analysis known as the working capital cycle. They claim the method is superior to other forms of liquidity analysis that rely on ratio analysis or a decomposition of working capital. According to Olufemi and Olubanjo (2009) [77], the CCC is calculated by subtracting the payables deferral period from the sum of the inventory conversion period and the receivables conversion period. The current ratio and its variations are however, commonly used to assess a company's liquidity, but these measures do not include the element of time. As indicated by Cagle, *et al*. (2013) [11], adding the cash conversion cycle (CCC) to those traditional measures leads to a more thorough analysis of a company's liquidity position. The operating cycle theory is similar to the CCC theory. However, the position of operating cycle theory places limited emphasis on current liabilities. Hence, it weakens the position that, payables are a source of financing the activities of the firm, which proves its inadequacy. Thus, incorporating current liabilities gives a net working capital, which enhances liquidity analysis and understanding (Olufemi & Olubanjo, 2009; and Opler *et al.*, 1999) [77, 79]. According to the trade-off theory, liquidity and profitability are two financial terms at the ends of a straight line such that, movement towards one automatically implies movement away from the other. In other words, there is a trade-off between liquidity and profitability (Saluja & Kumar, 2012; Mohammed & Yusheng, 2019g; Puneet & Parmil, 2012; and Garcia-Teruel & Martinez-Solano, 2007) [90, 64, 83, 30].

From the theory's point of view, firms target an optimal level of liquidity to balance the benefit and cost of holding cash. To the trade-off hypothesis, firms with high leverage attract high cost of servicing the debt thereby affecting their profitability. It therefore becomes difficult for them to raise funds through other sources. Holding cash at that point, becomes an issue for both smaller and larger firms. Therefore, the firms need to balance the liquidity-profitability trade-off in order to determine the optimum level of current assets (Samiloglu & Demirgunes, 2008; Reheman & Nasr, 2007; Yusheng, Mohammed & Stephen, 2019; Akella, 2006; Lazaridiss & Tryfonidis, 2005, Mohammed & Yusheng, 2019d) [91, 85, 67, 68, 106, 1, 48, 61]. The trade-off theory of liquidity

management was adopted for this study. This is because, liquidity is the ability of a firm to meet its short-term obligations as they fall due, and for a firm to enhance and maintain its profitability, it must target an optimal level of liquidity to balance the benefit and cost of holding cash. Thus, the trade-off theory best linked liquidity and profitability, which formed the input and output variables of this study. In addition, the general claim in literature centered on liquidity-profitability trade-off hypothesis which posits that, the two financial terms pose conflicting ends to an organisation, hence a pursuit of one will mean a trade-off of the other (Dash & Hanuman, 2008; Mohammed, Yusheng & Agyemang, 2019) [17, 65].

2.2 Empirical Review

On companies listed on the Tehran Stock Exchange, Moein-Addin (2013) [56] explored the relationship between modern liquidity indices and stock return. The study's findings revealed a significantly positive relationship between comprehensive liquidity index and stock returns, while there was an insignificant relationship between the index of cash conversion cycle as well as net liquidity balance and stock returns. In Iran and the Arabic countries of Persian Gulf area, Heibati (2009) [36] conducted a study to examine and compare the performance of private banks. Through regression analysis of cross panel data, the study disclosed a statistically significant relationship between liquidity and the profitability of the banks especially during their initial years of operations.

A research on the "impact of liquidity management on profitability: A study of the adoption of liquidity strategies in financial crisis" was conducted by Lamberg and Valming (2009) [47]. The study's goal was to explore and compare the use and extent of liquidity practices in two time points and to measure, if the change in liquidity strategy was related to profitability. Companies in the small and cap list on the Stockholm Stock Exchange was used as a sample for the study. Using regression analysis, the study revealed that, the adoption of liquidity strategies did not have a significant impact on profitability as measured by return on assets (ROA). However, the increased use of liquidity forecasting and short-term financing during the financial crises, had a positive impact on profitability.

Mohammed and Yusheng (2019b) [59] investigated listed non-financial entities in Ghana. From the discoveries, liquidity had a material connection with the firms' ROA, but insignificant link with the firms' ROE and ROCE. Akhwale (2014) [2] conducted a study on the relationship between liquidity and profitability of companies listed on the Nairobi Securities Exchange (NSE) over a 5 year period (2009-2013) and found out that, current ratio and cash conversion cycle negatively affected the profitability of the companies while the quick ratio as a measure of liquidity did not have any significant effect on profitability of the firms. Orshi (2016) [80] conducted a study on the impact of liquidity management on the financial performance of listed food and beverages companies in Nigeria. Data obtained from the annual reports of 10 selected companies for a ten (10) year period (2004-2013) was used for the study. Employing descriptive, Pearson correlation and Generalized Least Squares multivariate regression analysis, the study disclosed that: current ratio had an insignificantly positive relationship with return on investment while cash conversion cycle, size and leverage had a significantly positive relationship with return on investment; current ratio, cash conversion cycle and leverage had an insignificantly negative relationship with return on equity while size had an insignificantly positive relationship with return on equity; and current ratio, size and leverage had an insignificantly positive relationship with earnings per share while cash conversion cycle had an insignificantly negative relationship with earnings per share.

Mohammed and Yusheng (2019a) [58] researched on some body corporates quoted on the Ghana Alternative Market (GAX) and uncovered a trivial affiliation amid liquidity and the firms' viability. Omesa (2015) [78] studied into the effect of liquidity on the financial performance of 19 financial institutions listed on the Nairobi Securities Exchange (NSE) for the period 2010-2014. Secondary data obtained through the audited annual financial statements of the firms was used for the study. Liquidity proxied by cash and deposits due from banks to total assets, served as the study's regressors, whilst financial performance proxied by return on assets (ROA) represented the study's regressand. Capital structured as measured by the debt ratio served as the control variable for the study. Through the descriptive, Pearson's correlation and regression analysis, the study disclosed a weak relationship between liquidity and financial performance with an adjusted R-squared value of 55.17%. It was also revealed that, capital structure had a significant relationship with ROA, whilst liquidity had an insignificant association with ROA. Further, the study found out a negative relationship between the cash position and ROA of the financial institutions. In conclusion, liquidity was not the lone influencer of financial performance, but there existed other factors that affected the ROA of the financial institutions.

A study conducted by Zygmunt (2013) [108] on Polish listed IT companies disclosed a positive association between receivable conversion period, inventory conversion period and corporate profitability. The study also established that, an increase in the days of accounts payable resulted in an increase in the profitability of the companies. In conclusion, liquidity had an association with the companies' profitability. Ramadan, Kilani and Kaddumi (2011) [86], researched into the determinants of banks profitability in Jordan. A balanced panel data of ten selected banks for the period 2001 to 2010 were used. Adopting ROA and ROE as proxies for profitability, the study revealed that, liquidity significantly explained the variations in the banks' profitability. From the study, high Jordanian bank profitability tendered to be related to well-capitalized banks, high lending activities, low credit risk and the efficiency of credit management. The study also disclosed that, the estimated effect of size did not support significant scale economies for Jordanian Banks. In Pakistan, Saleem and Rehman (2011) [89] examined the impact of liquidity ratios on the profitability of Oil and Gas companies. From the study's results, liquidity had a positive relationship with profitability as measured by ROA, however, no association was found between liquidity and profitability as measured by ROE. It was suggested in the study that, the companies should manage their liquidity and profitability relationship in a great manner.

On a sample of 929 joint stock companies in Saudi Arabia, Eljelly (2004) [26] empirically examined the relationship between profitability and liquidity as measured by current ratio and cash gap. Through correlation and regression analysis, the study disclosed a significantly negative relationship between the firms' profitability and liquidity level, as measured by current ratio. This

relationship was more profound for firms with high current ratios and long cash conversion cycles. However, at the industry level, the study revealed that, cash gap or cash conversion cycle was more vital as a measure of liquidity than the current ratio that affected profitability. Throwing more light on the relationship between liquidity and profitability, Ehiedu (2014) [25] researched into the impact of liquidity on profitability of some selected companies in Nigeria and found out a significantly positive relationship between current ratio and profitability. From the study, two companies showed a negative association between acid test ratio and return on assets, whilst 50% of the companies analysed indicated a significantly negative correlation between current ratio and acid test ratio. Maaka (2013) [49] also researched into the relationship between liquidity risk and financial performance of commercial banks in Kenya and found out that, the profitability of the commercial banks was negatively affected due to the increase in liquidity gap and leverage.

In Somalia-Mogadishu, a study by Sheikhdon and Kavalae (2016) [94] established a significant and a positive influence of liquidity management drivers on the financial performance of commercial banks. Vintilă and Nenu (2016) [101] conducted a study on the liquidity and profitability analyses of listed Romanian Companies. Using correlation and multivariate regression models, the study found out a statistically significant negative relationship between liquidity and corporate financial performance. This finding was in contrast with that of Anup and Muntasir (2007) [3] who conducted a research on working capital management practices in pharmaceutical companies listed on the Dhaka Stock Exchange and found out a positive correlation between current assets management and financial performance of the firms. Kartal (2016) [41] in Turkey studied on the effect of liquidity on financial performance (in terms of profitability) of Borsa Istanbul (BIST) listed retail merchandising firms for the period 1998-2015. Using time series data of the firms, the study revealed a significantly positive relationship between financial performance and liquidity. This finding supported that of Uremadu, Egbide and Enyi (2012) [99] who examined the effect of working capital management and liquidity on the profitability of 25 manufacturing firms in Nigeria for a two year period, and found a significant relationship between liquidity and profitability of the firms. The findings by Kartal (2016) [41] did not however support that of Wambu (2013) [102] whose study on the relationship between profitability and liquidity of commercial banks in Kenya revealed an insignificantly positive relationship between profitability and liquidity. Based on the review of various literature, the following hypothesis were formulated to help direct the focus of the study;

H_{01}: There is no significant relationship between liquidity and the financial performance of non-financial firms listed on the GSE.

H_{02}: Liquidity does not significantly affect the financial performance of non-financial firms listed on the GSE.

3. Research Methodology

According to Bajpai (2011) [5], research methodology is a systematic and a scientific procedure of data collection, compilation, analysis, interpretation and implication pertaining to a problem. This aspect of the study presents the research methodology. The methodology covers, the research design, population and sampling, data collection procedure, model specification and estimation and data analysis.

3.1 Research Design

Generally, this study was a quantitative research. As explained by Given (2008), a quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques. This method was chosen because, it provided the fundamental connection between empirical observation and mathematical expression of quantitative relationships. Specifically, the study was correlational in nature because it sought to establish the relationship between two or more qualified variables. The study was also experimental in nature because it sought to support, refute or validate a hypothesis. In other words, the study sought to establish the cause-and-effect relationship that existed between the input (cause) and the output (effect) variables by demonstrating what outcome could occur when the input variable was manipulated. Thus, the study sought to determine what effect will be on the dependent variable as a result of the direct manipulation of the independent variables. The study was finally a panel or longitudinal in nature because, it followed the sample over time and made repeated observations. It also described patterns of change and helped to establish the direction and magnitude of causal relationships (Forgues, Bernard & Vandangeon-Derumez, 2011) [27].

3.2 Population and Sampling

All non-financial firms listed on the Ghana Stock Exchange (GSE) formed the target population of the study. As of December, 31st 2017, non-financial firms that listed and traded their shares on the GSE were twenty-nine (29) in number. The judgemental, selective or purposive sampling technique was adopted in choosing the study's sample. According to Crossman (2018) [16], purposive sampling is a non-probability sampling technique in which a sample is selected based on the characteristics of a population and the objective of the study. This technique was employed because it was flexible and met multiple needs and interests of the researcher (Black, 2010; and Saunders, Lewis & Thornhill, 2012) [8, 92]. The number of years in existence, technical suspension due to one reason or the other, unaudited financial records, non-existence of trend records, incomplete financial statements and the presentation of annual records in foreign currency either than that of Ghana (because of the non-stability of the Ghana Cedi to major foreign currencies over the study period) were the factors or filters that were considered during the sampling process. Firms that failed to meet any of these factors or filters did not form part of the study's sample. In all, fourteen (14) firms were rejected as they failed in one or more of the factors that were considered for the sampling. The sample therefore totaled fifteen (15) representing 51.72% of the population.

3.3 Data Collection Procedure

A *balanced* panel data used for the study was sourced from the audited and published annual reports of the selected firms. The annual reports covered a ten (10) year period (2008-2017) and comprised of the comprehensive income statement, statement of financial position, statement of cash flows, statement of changes in equity and notes to the accounts. The period 2008 to 2017 was

considered for the study because, it was the period with the latest data and therefore very relevant to the topic understudy. In this study, validity was ensured by collecting data from the right source (GSE). Also, only annual reports audited by authorized Certified Chartered Accountants were considered for the study. To further ensure the validity and accuracy of the final results, the data collection and calculation process was triple checked by the researchers. The researchers' ensured reliability in the data by making sure that, the data collected was within the study period; the data was complete and accurate; and the data was obtained from its original source and not from a source where it might have been manipulated or altered. On ethical considerations, Tripathy (2013) indicated that, if the data is freely available on the Internet, books or other public forums, permission for further use and analysis is implied but the ownership of the original data must be acknowledged. The researchers therefore acknowledged the sources of all secondary data.

3.4 Model Specification and Estimation

The model of this study consisted of seven variables. Financial performance proxied by Return on Assets (ROA) served as the response variable, whilst liquidity surrogated by the Current Ratio (CR) and the Operating Cash Flow Ratio (OCFR) served as the study's main input variables. Because of the individual firm differences or characteristics, the study controlled for Size, Growth (GRO), Efficiency (EFF) and Tangibility (TAN). The study used the Generalised Least Squares (GLS) regression estimator with Fixed Effects (FE). The choice of the estimator was made after running the Durbin-Wu-Hausman model specification test. According to Green (cited in Torres-Reynia, 2007) [97], the fixed effects model is stated as;

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it} \quad \text{.....(eqn.1)}$$

Where;
α_i (i=1……n) is the unknown intercept for each entity (n entity-specific intercepts).
Y_{it} is the dependent variable (DV) where i = entity and t = time,
X_{it} represents one independent variable (IV),
β_1 is the coefficient of that independent variable (IV),
u_{it} is the error term.

From the above econometric model, the following functions were deduced;
Y_{it} = f (financial performance)
But financial performance = f (ROA)
Therefore,
Y_{it} = f (ROA)…… (eqn.2)
Also,
X_{it} = f (liquidity, Z)
Where Z represents control variables
But liquidity = f (CR, OCFR) and
Z= f (Size, GRO, EFF, TAN)
Therefore,
X_{it} = f (CR, OCFR, Size, GRO, EFF, TAN)…… (eqn.3)
Rearranging equation (1)

$$Yit = \alpha_i + \beta_1 X_{it} + u_{it} \text{ …… (eqn.4)}$$

Substituting equation (2) and equation (3) into equation (4), the final working model became;

$$ROA_{it} = \alpha_i + \beta_1 CR_{it} + \beta_2 OCFR_{it} + \beta_3 Size_{it} + \beta_4 GRO_{it} + \beta_5 EFF_{it} + \beta_6 TAN_{it} + u_{it} \text{..... (eqn.5)}$$

Where
α_i (i=1……n) is the unknown intercept for each entity (n entity-specific intercepts) or the unobserved time-invariant individual effect
β_1 represented the parameter of the explanatory variable CR_{it}
β_2 represented the partial slope coefficient of the predictor variable $OCFR_{it}$
β_3 represented the parameter of the independent variable $Size_{it}$
β_4 served as the partial slope coefficient of the exogenous variable GRO_{it}
β_5 was the parameter of the input variable EFF_{it}
β_6 represented the partial slope coefficient of the influencing variable TAN_{it}
ROA_{it} = Return on assets of firm (i) in time (t) calculated as the net profit after tax divided by the total assets of firm (i) in time (t)
CR_{it} = Current ratio of firm (i) in time (t) calculated as the total current assets divided by the total current liabilities of firm (i) in time (t)
$OCFR_{it}$ = Operating cash flow ratio of firm (i) in time (t) calculated as the total operating cash flow divided by the total current liabilities of firm (i) in time (t)
$Size_{it}$ = Size of firm (i) in time (t) calculated as the natural log of the total assets of firm (i) in time (t)
GRO_{it} = Growth of firm (i) in time (t) calculated as the difference between the size of current year and the size of previous year divided by the size of the previous year
EFF_{it} = Efficiency of firm (i) in time (t) calculated as the total gross revenue divided by the total assets of firm (i) in time (t)
TAN_{it} = Tangibility of firm (i) in time (t) calculated as the total fixed assets divided by the total assets of firm (i) in time (t)
i =1, 2, 3, 4, 5, 6, 7…….15
t = 2008-2017 (10 years)
μ_{it} = Stochastic error term

3.5 Priori Expectations of the Study

The researchers expected a positive effect of current ratio and operating cash flow ratio ($\beta_1>0$, $\beta_2>0$) the firms' financial performance because, the higher the CR or the OCFR, the more capable the firms were in meeting their short-term financial obligations, as they had a higher proportion of asset value relative to that of their liabilities. In other words, the CR and OCFR measures short-term solvency and it represents a margin of safety for short-term payables. It evaluates the credit worthiness of a firm. Thus, a CR or OCFR of 2:1 or more is considered satisfactory and capable of improving financial performance.
The effect of size on the firms' financial performance was projected to be positive **($\beta_3>0$)** because larger firms use better technology, are more diversified in terms of risks and have better expense management. A positive effect of size on the firms' financial performance will also be expected because, the firms being big enough, can achieve operating cost efficiency by increasing output and economizing on the per unit cost of innovation in products and process development. A positive linkage will further be expected between size and financial

performance because larger firms possess monopoly power which allows them to set prices above the economic costs involved in the production of products resulting in additional profit.

Growth of the firms could also serve as a sign for future continuous existence and of good investment opportunities. It was therefore projected to have a positive ($\beta_4>0$) effect on the firms' financial performance (Claessens, Djankov, Fan & Lang, 2002; Maury, 2006; and King & Santor, 2008) [14, 54, 43]. Further, efficiency was expected to have a positive ($\beta_5>0$) effect on the firms' financial performance because well managed firms are generally expected to be more profitable which is an indication of efficient utilization of resources (Jamali & Asadi, 2012) [39]. Tangible assets are physical assets that go through a relatively long period of use in the operations of a business, such as land, buildings, machinery and construction in progress. A higher ratio of tangible assets to total assets provides creditors with a high level of security since they would be able to liquidate more assets in the case of bankruptcy. In other words, tangibles are easily monitored and provide good collateral opportunities. As a result, they tend to mitigate against agency conflicts between shareholders and creditors. Tangibility is therefore projected to have a positive **($\beta_6>0$)** influence on the firms' financial performance. It was finally assumed that the current ratio, operating cash flow ratio, size, growth, efficiency and tangibility would have a combined influence on the firms' financial performance, implying, the partial slope coefficients would be statistically significantly different from zero or would be simultaneously not equal to zero. Thus, *($\beta_1+\beta_2+\beta_3+\beta_4+\beta_5+\beta_6\neq0$) or ($\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6\neq0$) or ($\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6\neq0$)*.

3.5 Data Analysis

The study adopted the descriptive and inferential techniques of data analysis. The descriptive technique of data analysis was employed to analyse both the explained and the explanatory variables that were used for the study, whilst the correlational technique of data analysis was used to explore the relationship that existed between liquidity and the firms' financial performance. The multiple regression analysis was finally adopted to examine the effect of liquidity on the firms' financial performance. Before the descriptive and inferential analysis of data, the Durbin-Wu-Hausman test, and the tests for multi-collinearity, data normality, heteroscedasticity and auto-correlation were conducted in order to come out with the variables that were deemed fit to be used in the study and also to determine the appropriate regression estimator for the study. All the data analysis were conducted through STATA version 15 software package with a 5% level of significance ($p\leq0.05$).

4. Results of the Study

This aspect of the paper presents the results of the study. The section is sub-divided into four parts. The first part presents results on the tests for multi-collinearity, heteroscedasticity, data normality, auto-correlation and the Durbin-Wu-Hausman Test. The second part of this section presents the descriptive analysis of the study's variables, whilst the final two parts present the correlation and regression results (inferential analysis).

4.1 Panel Data Diagnostic and Specification Tests

Data for the study was subjected to diagnostic and specification tests. The consequences of model misspecification in regression analysis could be severe in terms of the adverse effects on the sampling properties of both estimators and tests (DeBenedictis & Giles, 1996) [18]. To avoid these severe consequences, researchers are entreated to undertake thorough diagnostic and specification tests. To help establish if the key requirements of the Classical Linear Regression Model (CLRM) were met, the following diagnostic and specification tests were undertaken by the researchers;

4.1.1 Test for Multi-Collinearity

As explained by Kock and Lynn (2012) [44], multi-collinearity is a Phenomenon in which one explanatory variable can be linearly predicted from the others with a substantial degree of accuracy. Serious collinearity was considered as critical because, if two or more predictor variables were to be collinear, then, there existed a stochastic linear relationship between the variables. Therefore, there could be skewed, misleading or imprecise estimates in the effects of the variables (Kock & Lynn, 2012; Gujarati & Porter, 2009; and Belsley, 1991) [44, 34, 6]. Multi-collinearity was detected through the Variance Inflation Factor (VIF) or the degree of Tolerance (1/VIF). According to Gareth, Witten, Hastie and Tibshirani (2017) [29], VIF quantifies the severity of multi-collinearity in an Ordinary Least Squares (OLS) regression analysis. To the authors, VIF provides an index that measures how much the variance of an estimated regression coefficient is increased because of collinearity. The VIF and 1/VIF shown in Table 1 were obtained after regressing ROA on Current Ratio (CR), Operating Cash Flow Ratio (OCFR), Size, Growth (GRO), Efficiency (EFF) and Tangibility (TAN).

Table 1: Variance Inflation Factor (VIF) and Degree of Tolerance

Variable	VIF	1/VIF
CR	2.39	0.419011
OCFR	2.31	0.431975
Size	1.29	0.777327
EFF	1.26	0.790677
TAN	1.08	0.926745
GRO	1.02	0.975818
Mean VIF	1.56	

***Source*:** STATA Output, 2019

The rule of thumb was that, a variable with variance inflation factor more than 5 (VIF>5) or a degree of tolerance less than 0.2 (1/VIF<0.2) was considered to be highly collinear with other independent variables, and from Table 1, all the variables had variance inflation factors less than 5 (VIF<5) and tolerance levels greater than 0.2 (1/VIF>0.2), with the mean VIF being 1.56. This means that, all the variables were fit and reliable to be used together in the model.

4.1.2 Panel Level Data Normality Test

The Shapiro and Wilk (1965) [93] test for normality with the null hypothesis that, a sample $X_1 \ldots\ldots X_n$ came from a normally distributed population was adopted for this study. The alpha level for this study was 5% (α=0.05). Therefore, the Shapiro-Wilk test, *tested* the null hypothesis that, the data values of ROA, CR, OCFR, Size, GRO, EFF and TAN came from a normally distributed population as against the alternative hypothesis that, the data values did not emanate from a normally distributed population. The outcome of the test is as follows;

Table 2: Shapiro and Wilk (1965) [93] Test for Data Normality

Variable	Obs (N)	W	V	Z	Prob>Z
ROA	150	0.23731	88.743	10.169	0.00000
CR	150	0.66227	39.297	8.323	0.00000
OCFR	150	0.72193	32.355	7.882	0.00000
Size	150	0.93758	7.262	4.495	0.00000
GRO	150	0.53107	54.563	9.067	0.00000
EFF	150	0.76662	27.155	7.485	0.00000
TAN	150	0.23683	88.799	10.171	0.00000

***Source*:** STATA Output, 2019

As depicted in Table 2, the Z-values for ROA, CR, OCFR, Size, GRO, EFF and TAN were all significant at the 5% level of significance (p<0.05). The study therefore failed to accept the null hypothesis that, the data values of ROA, CR, OCFR, Size, GRO, EFF and TAN came from a normally distributed population and concluded that, the data values of ROA, CR, OCFR, Size, GRO, EFF and TAN were not normally distributed at the 95% confidence interval. A more Generalised Least Squares (GLS) regression estimator was therefore viewed as appropriate for all the data values of the model because, it could provide a much better regression coefficient estimates than the OLS regression estimator in a non-normal data. In short, the Generalised Least Squares (GLS) regression estimator was viewed as the *Best Linear Unbiased Estimator (BLUE)* for a non-normal data like that of this study.

4.1.3 Panel Level Heteroscedasticity Test

As explained by Giles (2013) [31] a collection of random variables is said to be heteroscedastic if there are sub-populations that have different variabilities from others. According to Gujarati and Porter (2009) [34], one of the assumptions of the classical linear regression models is that, there is no heteroscedasticity; breaking this assumption therefore means, the *Gauss-Markov Theorem* does not apply, indicating that, the Ordinary Least Squares (OLS) estimators are not the Best Linear Unbiased Estimators (BLUE) and their variances are not the lowest of all other unbiased estimators (Ginker & Lieberman, 2017) [32]. In short, the presence of heteroscedasticity implies, the usual hypothesis-testing routine is not reliable, raising the possibility of drawing misleading conclusions.

Table 3: Breusch-Pagan/Cook-Weisberg Test for Heteroscedasticity

Model	chi2(1)	Prob > chi2
ROA	1158.41	0.00000

***Source*:** STATA Output, 2019

The Bleusch-Pagan (1979) [10] and Cook-Weisberg (1983) [15] test was adopted to test for heteroscedasticity in the ROA working model. It tested the null hypothesis that, there was the absence of heteroscedasticity among the fitted values of ROA at the 5% level of significance as against the alternative hypothesis that, there was the presence of heteroscedasticity among the fitted values of ROA. From the results, a *Chi2 (1)* of 1158.41 with a probability of 0.00000 was statistically significant at α=5%. Therefore, the study rejected the null hypothesis that, there was the absence of heteroscedasticity among the fitted values of ROA, and accepted the alternative hypothesis that, there was the presence of heteroscedasticity among the fitted values of ROA.

4.1.4 Panel Level Autocorrelation Test

Gujarati and Porter (2009) [34] defined autocorrelation as the correlation between members of observations ordered in time (as in time series data) or space (as in cross-sectional data). Autocorrelation of the errors violates the Ordinary Least Squares (OLS) assumption that the error terms are uncorrelated, meaning that the *Gauss-Markov Theorem* does not apply, and that the OLS estimators are no longer the *Best Linear Unbiased Estimators (BLUE)* (*ibid*). The Durbin and Watson (1950) [22] and Durbin and Watson (1951) [23] test was used to test for the presence of first-order autocorrelation in the residuals (prediction errors).

The researchers applied this statistic to the residuals from least squares regressions and developed bound tests for the null hypothesis that the errors were serially uncorrelated as against the alternative hypothesis that the errors followed a first order autoregressive process. With the Durbin-Watson test statistic value being *0.0804215* at the 5% level of significance, the study failed to accept the null hypothesis that, the errors were serially uncorrelated and concluded that, there was an evidence of first order positive autocorrelation in the residuals. In other words, the successive error terms were positively correlated.

4.1.5 Durbin–Wu–Hausman Test

According to Durbin (1954) [21], Wu (1973) [105] and Hausman (1978), the Durbin–Wu–Hausman test (also called Hausman specification test or the augmented regression test for endogeneity) is a statistical hypothesis test that evaluates the consistency of an estimator when compared to an alternative, less efficient estimator which is already known to be consistent. To Chmelarova (2007) [12], the Durbin-Wu-Hausman test helps to detect endogenous regressors (predictor variables) in a regression model. This is because, having endogenous regressors in a model will cause the Ordinary Least Squares (OLS) estimators to fail, as one of the assumptions of the OLS is that, there is no correlation between a predictor variable and the error term (Hausman, 1978; Durbin, 1954; Wu, 1973; and Chmelarova, 2007) [35, 21, 105, 12]. In panel data analysis (the analysis of data over time), the Durbin-Wu-Hausman test helps to choose between fixed effects model and random effects model (Chmelarova, 2007) [12]. The null hypothesis of the test is that, the preferred model is random effects, whilst the alternate hypothesis is that the model is fixed effects.

Table 4: Durbin-Wu-Hausman Test Results

Model	Chi2(4)	Prob>chi2
ROA	110.54	0.0000

***Source*:** STATA Output, 2019

In order to choose between the fixed effects model and the random effects model, the residuals of the fixed and random-effects GLS regressions for the fitted values of ROA were used to conduct the Durbin-Wu-Hausman Fixed-Random specification test. The result of the specification test showed a *Chi2 (6)* of 110.54 which was significant at α=5% [(p=0.0000)<0.05]. The study therefore failed to accept the null hypothesis that, the random effects model was preferred over the fixed effects model and concluded that, the *Robust Fixed-Effects GLS* regression estimator was more appropriate for the fitted values of the ROA model. This estimator was used because, it was robust to the issues of heteroscedasticity, autocorrelation, data abnormality and some other violations of the classical linear regression model. The estimator was also employed for the study because it could provide a reliable hypothesis-testing routine which could help to reduce the possibility of drawing misleading conclusions.

4.2 Descriptive Statistics

Both the response and influencing variables were analysed through descriptive statistics and from Table 5, Return on Assets (ROA) which served as the indicator of financial performance, had a mean value of 0.0052693. The mean ROA figure of 0.0052693 implies, the firms were making 0.0052693 pesewas of profit on each cedi of investments made from the year 2008 to 2017. The positive mean figure for ROA is an indication that, the assets or investments of the firms were been used efficiently by management to generate profits. Data values of ROA could rise to a maximum of 0.7656 and could fall to a minimum of -5.6487 leading to a range of 6.4143. ROA for the firms also had a standard deviation of 0.4849762 and a variance of 0.2352019. This implies, data values of ROA deviated from both sides of the average by 0.4849762, which is an indication that, the data values were not too widely dispersed from the average. The figure -10.64317 being the skewness for ROA indicates that, the ROA distribution was highly negatively skewed or skewed to the left. This is an indication that, a greater portion of the ROA distribution fell on the right side. In other words, the left tail of the ROA distribution is longer than that of the right tail.

The kurtosis coefficient of 124.8778 [excess (K)=124.8778-3.0=121.8778] shows that, more of the variances in the ROA distribution were as a result of infrequent extreme deviations, as opposed to frequent moderately sized deviations. In other words, the ROA distribution was not normally distributed which is explained by the wide range of 6.4143. The Current Ratio (CR) of the firms sought to measure the firms' ability to meet their short-term financial obligations.

Table 5: Descriptive Statistics on ROA, CR, OCFR, SIZE, GRO, EFF and TAN

Variables	ROA	CR	OCFR	SIZE	GRO	EFF	TAN
Mean	0.0052693	1.313404	0.3265207	4.600553	0.0175123	1.647483	0.9812759
Std. Dev.	0.4849762	1.195626	0.7158448	0.8196015	0.0550848	1.430299	0.0637665
Variance	0.2352019	1.429521	0.5124337	0.6717466	0.0030343	2.045754	0.0040662
Minimum	-5.6487	0.0358	-1.6939	2.5093	-0.2074	0.1908	0.535
Maximum	0.7656	7.6849	4.4039	5.9545	0.5214	7.9236	1.0000
Range	6.4143	7.6491	6.0978	3.4452	0.7288	7.7328	0.465
Skewness	-10.64317	3.107405	2.787994	-0.4200851	4.369479	1.616951	-5.019578
Kurtosis	124.8778	14.42306	15.23229	1.995274	50.98005	5.100983	29.23077
Obs (N)	150	150	150	150	150	150	150

***Source*:** STATA Output, 2019

From the results, the CR of the firms had an average value of 1.313404, a maximum value of 7.6849 and a minimum value of 0.0358, resulting in a range of 7.6491. The mean CR value of 1.313404 implies, the firms were not too safe in terms of good financial health. Thus, the current assets of the firms were not too much greater than the current liabilities and suggests that, a little portion of the current assets (1.313404-1= 0.313404) would be left if the current obligations of the firms were to be met. The average CR figure is also an indication that, the operating cycle efficiency of the firms was not too good or the firms were not able to turn their products into too much cash. However, the mean CR figure of the firms did not necessarily indicate that, they were in a shaky state of financial well-being. This is because, the firms might have been using their current assets efficiently by managing their working capital appropriately. In other words, a greater portion of the liquid assets of the firms might have been putting into long-term investments. The current ratio of the firms also had a standard deviation of 1.195626 and a variance of 1.429521. This implies, dispersions or deviations around the mean CR was 1.429521, which is an indication that, the data values of CR were a bit widely dispersed from the mean. The skewness value of 3.107405 for CR means, the CR distribution was highly positively skewed or skewed to the right. This is an indication that, a greater portion of the CR distribution fell on the left side. The kurtosis value of 14.42306 [excess (K)=14.42306-3.0=11.42306] is an indication that, the CR distribution was higher and peakier *(leptokurtic)* than the ***Gaussian Distribution*** which shows its abnormality.

The Operating Cash Flow Ratio sought to measure how well the current liabilities of the firms were covered by the cash flows generated from the firm's operations. Operating cash flow ratio was considered as essential for this study because, it was viewed as one of the accurate measures of liquidity since it could not be easily manipulated like earnings. The OCFR of the firms had an average value of 0.3265207, a maximum value of 4.4039 and a minimum value of -1.6939, resulting in a range of 6.0978. The average OCFR value of 0.3265207 depicts that, for the period 2008-2017, the firms were not able to generate more cash than what was needed to pay off their current liabilities when they fell due. In other words, the firms' current liabilities could not be

covered by the cash generated from their operations over the period. However, there could be many interpretations for the mean value because, not all low operating cash flow ratios are indications of poor financial health. For instance, the firms might have invested their cash flows into projects that could render greater rewards in the future. The figures 0.7158448 and 0.5124337 being the standard deviation and the variance of OCFR respectively indicate that, the data values of OCFR were not too dispersed or deviated from the average. The operating cash flow ratio had a skewness value of 2.787994, which is an indication that, the OCFR distribution was highly positively skewed or skewed to the right. The kurtosis value of 15.23229 [excess (K) =15.23229-3.0=12.23229] for OCFR shows that, the OCFR distribution was not normally distributed which is explained by the wide range of 6.0978.

As shown in Table 5, the average size of listed non-financial firms on the GSE was 4.600553 with a standard deviation of 0.8196015 and a variance of 0.6717466. This means, data values of size deviated from both sides of the average by 0.8196015, implying, the values were not too much dispersed from the mean. Size of the sampled firms also had a minimum value of 2.5093 and a maximum value of 5.9545 leading to a range of 3.4452. The data for size was negatively skewed with a coefficient of -0.4200851, implying, the left tail of the size distribution was longer than that of the right tail. The kurtosis value of 1.995274 [excess (K) = 1.995274-3= -1.004726] shows that, the size distribution was of lower, less distinct peak *(platykurtic)*, meaning the size distribution was not normally distributed. Table 4 also shows an average growth of the sampled firms to be 0.0175123 with a standard deviation of 0.0550848 and a variance of 0.0030343. This means that, the data for growth deviated from both sides of the mean by 0.0550848, which is an indication that, the data was not too widely dispersed from the average. The minimum and maximum values of growth were -0.2074 and 0.5214 respectively, leading to a range of 0.7288. The distribution for growth was highly positively skewed with a coefficient of 4.369479, whilst the kurtosis coefficient of 50.98005 [excess (K) =50.98005-3=47.98005] implies, the growth distribution was not normally distributed due to its *leptokurtic nature.*

In the same vein, the average EFF of the sampled firms for the study period was 1.647483 with a standard deviation of 1.430299 and a variance of 2.045754. This means that, data for EFF deviated from both sides of the mean by 1.647483, which is an indication that, the data for EFF was a bit widely dispersed from the mean. EFF also had a minimum value of 0.1908 and a maximum value of 7.9236, leading to a range of 7.7328. The distribution for efficiency was highly positively skewed with a coefficient of 1.616951, indicating that, most of the EFF distribution fell on the left side of the normal curve. The kurtosis value of 5.100983 [excess (K) =5.100983-3=2.100983] implies, the EFF distribution was abnormally distributed. Finally, the average tangibility of the listed firms during the study period was 0.9812759 with a standard deviation of 0.0637665 and a variance of 0.0040662. This shows that, TAN of the sampled firms deviated from both sides of the mean by 0.0637665, indicating that, the data was not too widely dispersed from the average. TAN also had a minimum value of 0.535 and a maximum value of 1.00, leading to a range of 0.465. The data for TAN was highly negatively skewed with a coefficient of -5.019578, whilst its kurtosis coefficient of 29.23077 [excess (K)=29.23077-3=26.23077] implies, the TAN distribution was of abnormal shape.

4.3 Correlation Analysis

The Pearson Product-Moment Correlation Coefficient was adopted to explore the relationship between the variables and from Table 6, there was a significantly positive relationship between CR and ROA at the 5% level of significance [r =0.2061, (p=0.0114)<0.05]. The r value of 0.2061 implies, an increase in CR led to an increase in ROA and vice-versa. The significantly positive relationship that existed between CR and ROA can be substantiated by the coefficient of determination (r^2 =0.0425) which indicates that, 4.25% of the variations in ROA was related to the changes in CR and 4.25% of the changes in CR was related to the variations in ROA. The unexplained variance [95.75% or (1-r^2 =0.9575)] may be attributed to other variables not included in the study.

OCFR also had a significantly positive association with ROA at the 95% confidence interval [r =0.2000, (p=0.0142) <0.05]. The r value of 0.2000 is an indication that, as OCFR increased, ROA also increased in the same direction and vice-versa. The association between OCFR and ROA can also be explained by the coefficient of determination (r^2 =0.0400) which shows that, 4.0% of the changes in ROA was related to the changes in OCFR and 4.0% of the variations in OCFR was related to the variations in ROA. The remaining 96% (1-r^2 =0.9600) of the variations may be attributed to other inherent variabilities. Similarly, Size and return on assets were significantly positively related to each other at α=5% [r =0.2750, (p=0.0007)<0.05]. The correlation coefficient of 0.2750 means, an increase in Size led to an increase in ROA and vice-versa, and a decrease in Size also led to a decrease in ROA and vice-versa. The significantly positive association between Size and ROA can also be justified by the coefficient of determination (r^2 =0.0756) which shows that, 7.56% of the variations in ROA was related to the variations in Size and 7.56% of the variations in Size was related to the variations in ROA. The unexplained changes or variations [92.44% or (1-r^2 =0.9244)] may be accounted for by other factors that did not form part of the study.

Table 6: The Matrix of Pearson Correlation Coefficients

Variables	ROA	CR	OCFR	SIZE	GRO	EFF	TAN
ROA	1.0000						
CR	0.2061*	1.0000					
	(0.0114)						
OCFR	0.2000*	0.7449*	1.0000				
	(0.0142)	(0.0000)					
SIZE	0.2750*	0.0181	0.1024	1.0000			
	(0.0007)	(0.8259)	(0.2123)				
GRO	0.3222*	0.0004	-0.0082	0.0540	1.0000		
	(0.0001)	(0.9964)	(0.9209)	(0.5119)			
EFF	-0.2981*	-0.1493	-0.0354	0.4045*	-0.1076	1.0000	
	(0.0002)	(0.0682)	(0.6675)	(0.0000)	(0.1899)		
TAN	0.0665	0.1523	0.0745	0.2043*	0.0395	0.0192	1.0000
	(0.4191)	(0.0628)	(0.3651)	(0.0121)	(0.6310)	(0.8157)	

***Source*:** STATA Output, 2019

Note: * implies significance at 5% and values in parenthesis ( ) represent probabilities.

Table 6 further shows a significantly positive relationship between growth and ROA at the 5% level of significance [r =0.3222, (p=0.0001) <0.05]. The figure 0.3222 being the

correlation coefficient between GRO and ROA implies, as GRO increased, ROA also increased in the same direction and vice-versa, and as GRO decreased, ROA also decreased in the same direction, and vice-versa. The significantly positive relationship that existed between GRO and ROA is evidenced by the coefficient of determination (r^2 =0.1038) which indicates that, 10.38% of the changes in ROA was related to the changes in GRO and 10.38% of the changes in GRO was related to the changes in ROA. The remaining 89.62% (1-r^2 =0.8962) of the variations may be attributed to a myriad of other factors. Table 6 also disclosed a significantly inverse relationship between EFF and ROA at α=5% [r = -0.2981, (p=0.0002)<0.05]. The correlation coefficient (r = -0.2981) means, an increase in EFF led to a decrease in ROA and vice-versa. The significantly negative association between EFF and ROA can be substantiated by the coefficient of determination (r^2 =0.0889) which indicates that, 8.89% of the variations in ROA was related to the variations in EFF and 8.89% of the variations in EFF was related to the variations in ROA. The unexplained variations [91.11% or (1-r^2 =0.9111)] may be accounted for by other inherent variabilities.

It was finally revealed from the study that, TAN had an insignificantly positive association with ROA at the 95% confidence interval [r = 0.0665, (p= 0.4191)>0.05]. The r value of 0.0665 is an indication that, an increase in TAN led to an increase in ROA and vice-versa even though the increase was not significant. The insignificantly positive association between TAN and ROA can also be explained by the coefficient of determination (r^2 =0.0044) which indicates that, 0.44% of the changes in ROA was related to the changes in TAN and 0.44% of the changes in TAN was related to the changes in ROA. The remaining unexplained variabilities [99.56% or (1-r^2 =0.9956)] may be attributed to a myriad of other factors.

4.4 Regression Analysis

This section of the study sought to examine the effect of liquidity on the financial performance of the sampled firms and from Table 7, ROA of the sampled firms registered an average value of 0.5648272 during the study period when all other variables were held constant. Also, liquidity as measured by current ratio positively impacted on the firms' ROA. However, the effect was statistically insignificant at the 5% level of significance [t=0.37, (p=0.716)>0.05]. All other variables held constant, a unit increase in CR insignificantly increased the ROA of the firms by 0.0149433 on the average.

Table 7: Regression Estimates of ROA (Fixed-Effects Model)

Variables	Coefficient	Robust Std. Err.	t-Statistic	Probability(t)
CR	0.0149433	0.0403094	0.37	0.716
OCFR	0.0644692	0.0318668	2.02	0.063
SIZE	-0.0612718	0.1145224	-0.54	0.601
GRO	1.065283	0.7492566	1.42	0.177
EFF	-0.5363118	0.1614365	-3.32	0.005
TAN	0.5569873	0.2179465	2.56	0.023
Cons	0.5648272	0.6496969	0.87	0.399
R-Squared (R^2):				
Within	0.7104	F(6, 14)	223.66	
Between	0.0190	Probability (F)	0.0000	
Overall	0.0962	AIC	7.097162	
F(6, 14)	223.66	BIC	25.16097	

***Source*:** STATA Output, 2019

Operating cash flow ratio of the firms also had a positive effect on ROA as a unit increase in OCFR led to a 0.0644692 increase in ROA on the average, when all other factors were held fixed. However, the impact was not statistically significant at the 95% confidence interval [t=2.02, (p=0.063)>0.05]. Further, size of the sampled firms negatively affected ROA and the effect was statistically insignificant at α=5% [t= -0.54, (p=0.601)>0.05]. The beta (β) value of -0.0612718 for size is an indication that, on the average, a unit increase in size led to a 0.0612718 decrease in the ROA of the firms when all other factors were held constant. The regression results also shows that, growth insignificantly positively influenced the ROA of the firms at the 95% confidence interval [t=1.42, (p=0.177)>0.05]. GRO had a beta (β) value of 1.065283 implying that, on the average, a unit increase in GRO led to a 1.065283 increase in the ROA of the firms when all other variables were held fixed.

Additionally, efficiency had a significantly inverse effect on ROA at the 5% level of significance [t= -3.32, (p=0.005) <0.05]. The beta value of -0.5363118 for EFF indicates that, on the average, a unit increase in EFF led to a 0.5363118 decrease in ROA when all other factors were held constant. Finally, tangibility of the sampled firms had a significantly positive effect on ROA at α=5% [t=2.56, (p=0.023) <0.05]. The beta (β) value of 0.5569873 for TAN indicates that, when all other variables were held fixed, a unit increase in TAN led to a 0.5569873 increase in the ROA of the firms, on the average.

The F-statistic value was computed to assess the collective effect of the explanatory variables on ROA, and from Table 7, the F-statistic value of 223.66 was significant at the 95% confidence interval [(p=0.0000)<0.05]. This implies, collectively, the input variables significantly accounted for 9.62% of the variations in ROA (R^2 =0.0962). In other words, the current ratio, operating

cash flow ratio, size, growth, efficiency and tangibility had a combined significant effect on ROA at the 5% level of significance.

ROA=0.5648272+0.0149433CR+0.0644692OCFR-0.0612718SIZE+1.065283GRO-0.5363118EFF+0.5569873TAN was finally deduced as the estimated model for the study. This implies, the partial slope coefficients (β_1=0.0149433), (β_2=0.0644692), (β_3= -0.0612718), (β_4=1.065283), (β_5= -0.5363118) and (β_6=0.5569873), for current ratio, operating cash flow ratio, size, growth, efficiency and tangibility were respectively simultaneously not equal to zero. Thus, $(\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6 \neq 0)$ *or* $(\beta_1+\beta_2+\beta_3+\beta_4+\beta_5+\beta_6 \neq 0)$ *or* $(\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 \neq 0)$ and was in line with the priori expectation of the study.

5. Discussions and Tests of Hypothesis

In this aspect of the study, discussions on the major findings of the study are presented. The discussions are conducted in relation to the review of relevant literature that supported the topic understudy and are presented in the order of; the relationship between liquidity and the financial performance of the sampled firms and the effect of liquidity on the financial performance of the sampled firms. Each sub-section concludes with the test of a hypothesis that was formulated for the study.

5.1 Relationship between Liquidity and the Financial Performance of the Sampled Firms

The study revealed a significantly positive relationship between current ratio and return on assets at the 5% level of significance [r =0.2061, (p=0.0114) <0.05]. This finding lends support to that of Ehiedu (2014) [25] who researched into the impact of liquidity on the profitability of some selected companies in Nigeria and found out a significantly positive relationship between current ratio and profitability. The finding also agrees with that of Sheikhdon and Kavale (2016) [94] whose study on commercial banks in Mogadishu-Somalia found out a significantly positive association between liquidity management drivers and financial performance of the banks. The finding is further in line with that of Moein-Addin (2013) [56] who explored the relationship between modern liquidity indices and stock return on companies listed on the Tehran Stock Exchange and found out a significantly positive relationship between comprehensive liquidity index and stock returns.

Additionally, the finding is in tandem with that of Uremadu, Egbide and Enyi (2012) [99] who examined the effect of working capital management and liquidity on the profitability of 25 manufacturing firms in Nigeria and discovered a significant relationship between liquidity and profitability of the firms. The finding also supports that of Anupchowdhury and Muntasir (2007) [3] who conducted a research on working capital management practices in pharmaceutical companies listed on the Dhaka Stock Exchange and found out a positive correlation between current assets management and financial performance of the firms. The study's finding does not however support that of Omesa (2015) [78] who studied into the effect of liquidity on the financial performance of 19 financial institutions listed on the Nairobi Securities Exchange (NSE) for the period 2010-2014 and discovered an insignificant association between liquidity and ROA.

The finding does not also agree with that of Lamberg and Valming (2009) [47] whose study on the impact of liquidity management on profitability during financial crises, disclosed that, the adoption of liquidity strategies did not have any significant impact on the profitability of some selected firms listed on the Stockholm Stock Exchange when ROA was used as a measure of profitability. The study's finding is also not in line with that of Eljelly (2004) [26] whose study on 929 joint stock companies in Saudi Arabia, disclosed a significantly negative relationship between the firms' profitability and liquidity level, as measured by the current ratio. The finding is finally in contrast with Wilson (2004) whose research on joint stock companies found a negative association between profitability and liquidity.

The study also revealed a significantly positive association between operating cash flow ratio and return on assets at the 95% confidence interval [r =0.2000, (p=0.0142)<0.05]. This outcome is in agreement with that of Kartal (2016) [41] whose study on the effect of liquidity on financial performance (in terms of profitability) of Borsa Istanbul (BIST) listed retail merchandising firms in Turkey for the period 1998-2015 revealed a significantly positive relationship between financial performance and liquidity. The finding also supports that of Kirkham (2012) whose study on 25 Australian Telecommunication companies disclosed that, cash flow ratios gave more ideas, approaches and useful values for better future decision making. The finding is also in tandem with that of Akhwale (2014) [2] who found out a significant relationship between liquidity and profitability of some listed firms on the Nairobi Securities Exchange (NSE) in Kenya.

The study's finding also lends support to that of Adebayo (2011) whose study on liquidity management and commercial banks profitability in Nigeria revealed a significant relationship between liquidity and the profitability of the banks. The finding is also in agreement with that of Saleem and Rehman (2011) [89] who examined the impact of liquidity ratios on the profitability of Oil and Gas companies in Pakistan, and disclosed a positive relationship between liquidity and the profitability of the firms as measured by ROA. The finding further supports that of Zygmunt (2013) [108] whose study on Polish listed IT companies found an association between liquidity and the profitability of the companies. The finding however disagrees with that of Orshi (2016) [80] whose study on the impact of liquidity management on the financial performance of listed food and beverages companies in Nigeria disclosed an insignificantly positive relationship between the current ratio and return on investment.

The finding also disagrees with that of Amit, Debashish and Debdas (2005) whose study on the Indian Pharmaceutical Industry concluded with no definite association between liquidity and profitability. The study's finding is also not in tandem with that of Wambu (2013) [102] whose study disclosed an insignificantly positive relationship between profitability and liquidity. The finding finally disagrees with that of Vintilă and Nenu (2016) [101] whose study on the liquidity and profitability analyses of listed Romanian companies, discovered a statistically significantly negative relationship between liquidity and corporate financial performance. The study further disclosed a

significantly positive relationship between size and return on assets at α=5% [r =0.2750, (p=0.0007) <0.05]. This finding supports that of Velnampy and Nimalathasan (2010) [100] whose study in Sri Lanka found a positive relationship between firm size and the profitability of the Commercial Bank of Ceylon. The finding is however in contrast with that of Sufian (2009) [96] who stated that, the large size of banks may leave a negative impact on bank profitability. According to the author, small banks can earn higher profit because they have lower expenses and better performance efficiency.

The study also revealed a significantly positive relationship between growth and return on assets at the 5% level of significance [r =0.3222, (p=0.0001) <0.05]. The finding agrees with that of MacMillan and Day (1987) who indicated that, rapid growth could lead to higher profitability because, new firms normally become profitable when they quickly enter markets on a large scale. The finding is also in line with that of Nunes, Serrasqueiro and Sequeira (2009) [74] who examined profitability in the Portuguese service industry and discovered a positive relationship between size, growth and profitability. The finding is however not in agreement with that of Hoy, Mcdougall and Dsouza (1992) [38] who stated that, the pursuit of higher growth may be minimal or even negatively related with firm profitability.

The study additionally found a significantly inverse relationship between efficiency and ROA at the 95% confidence interval [r = -0.2981, (p=0.0002) <0.05]. This result is in contrast with that of Dhillon and Vachhrajani (2012) [19] who examined the impact of operational efficiency on the overall profitability of Gujarat Industries Power Company Limited (GIPCL) and found an insignificantly positive correlation between operational efficiency and overall profitability.

The finding is also in disagreement with that of Ndolo (2015) [73] whose study on the relationship between operational efficiency and the financial performance of firms listed on the Nairobi Securities Exchange (NSE) discovered a significantly positive relationship between operational efficiency and the firms' performance as measured by ROA. The study finally disclosed an insignificantly positive relationship between tangibility and ROA at α=5% [r = 0.0665, (p= 0.4191)>0.05]. This finding is in tandem with Rafiu, Taiwo and Dauda (2012) [84] who investigated the effects of financial policy and firm specific characteristics on corporate performance and discovered an insignificantly inverse relationship between tangibility and corporate performance. The finding however disagrees with that of Rao, Al-Yahyaee and Syed (2007) [87], Zeitun and Tian (2007) [107], Weill (2008) [103] and Nunes, Serrasqueiro and Sequeira (2009) [74] whose studies found out a negative association between tangibility and corporate financial performance.

Test of Hypothesis One: A significantly positive relationship was found between current ratio and return on assets at the 5% level of significance [r =0.2061, (p=0.0114)<0.05]. A statistically significantly positive association was also found between operating cash flow ratio and return on assets at the 95% confidence interval [r =0.2000, (p=0.0142)<0.05]. The study therefore failed to accept the null hypothesis ***(H_{01})*** that liquidity had no significant relationship with the firms' financial performance and conclude that, liquidity as measured by the current ratio and the operating cash flow ratio had a significant relationship with the firms' financial performance.

5.2 Effect of Liquidity on the Financial Performance of the Sampled Firms

From the study's findings, liquidity as measured by the current ratio had an insignificantly positive impact on the firms' ROA at the 5% level of significance [t=0.37, (p=0.716)>0.05]. The finding though insignificant, agrees with the priori expectation of the study that ***($\beta_1>0$)***. The finding is however in disagreement with that of Ramadan, Kilani and Kaddumi (2011) [86] whose research on the determinants of banks' profitability in Jordan, found out that a significant variations in the banks' profitability was accounted for by liquidity. The finding does not further support that of Akhwale (2014) [2] whose study discovered a significant effect of liquidity on the profitability of firms listed on the Nairobi Securities Exchange (NSE). The finding also disagrees with Eljelly (2004) [26] who empirically examined the trade-off between profitability and liquidity and revealed from his regression analysis that, liquidity had a significantly negative impact on profitability as measured by the current ratio.

The firms' operating cash flow ratio also had a statistically insignificantly positive effect on ROA at the 95% confidence interval [t=2.02, (p=0.063)>0.05]. The finding though immaterial supports the priori expectation of the study that *($\beta_2>0$)*. The finding also agrees with that of Lamberg and Valming (2009) [47] whose regression analysis on firms listed on the Stockholm Stock Exchange, established that the adoption of liquidity strategies did not have any significant impact on profitability as measured by ROA. The finding is however not in tandem with that of Maaka (2013) [49] who researched into the relationship between liquidity risk and the financial performance of commercial banks in Kenya and found out that, profitability of the banks was negatively affected due to the increase in liquidity gap and leverage. The finding is also not consistent with that of Heibati (2009) [36] whose regression analysis of cross panel data on the performance of private banks in the Arabic countries of Persian Gulf area, disclosed a statistically significant effect of liquidity on the banks' profitability, especially during their initial years of operations.

It was further revealed from the study that, size of the firms negatively affected ROA and the effect was statistically insignificant at α=5% [t= -0.54, (p=0.601)>0.05]. This finding supports that of Keith (1998) who examined the relationship between company characteristics, profitability and growth among 38 small manufacturing firms and found size to be of limited value in explaining profitability in the firms. The result is however in contrast with the priori expectation of the study that *($\beta_3>0$)*. The finding does not also support that of Odalo, Achoki and Njuguna (2016) [75] whose study on listed Agricultural firms on the Nairobi Securities Exchange disclosed a significantly positive effect of company size on the firms' financial performance. The result is further not consistent with that of Pervan and Višić (2012) [82] whose study on the influence of firm size on business success, found a significantly positive influence of size on firm profitability in Croatia. The result does not also agree with that of Foyeke, Ojeka and Aanu (2015) [28] whose weighted logistic regression analysis on firm size and financial

performance, discovered a significantly positive effect of size on corporate governance voluntary disclosure. The result finally disagrees with that of Ndolo (2015) [73] whose regression outcome found a statistically significantly negative influence of size on the financial performance of firms listed on the Nairobi Securities Exchange (NSE).

From the study, growth also had an insignificantly positive influence on ROA at the 95% confidence interval [t=1.42, (p=0.177)>0.05]. This finding though insignificant agrees with the priori expectation of the study that ***($\beta_4>0$)***. The result is however in disagreement with that of Margaritis and Psillaki (2010) [53] who found an inverse effect of growth on firms' financial performance in the French chemical sector. The finding is also not consistent with Hoy, Mcdougall and Dsouza (1992) [38] who stated that, the pursuit of higher growth may be minimal or even negatively related with firm profitability. The finding finally disagrees with Mohammed and Hazem (2015) [57] who studied into the determinants of corporate profitability, and discovered a significantly positive effect of growth on the profitability of industrial firms listed on the Muscat Securities Market in Oman.

As disclosed from the study's findings, efficiency had a significantly inverse effect on ROA at the 5% level of significance [t= -3.32, (p=0.005) <0.05]. This finding is not consistent with the priori expectation of the study that *($\beta_5>0$).* The finding is also in contrast with that of Okwo, Okelue and Nweze (2012) [76] whose regression results on Nigerian brewery firms, found fixed assets' investments to have an insignificantly positive effect on the firms' operating profit. The finding further contradicts that of Dhillon and Vachhrajani (2012) [19] whose study discovered an insignificantly positive effect of operational efficiency on the overall profitability of Gujarat Industries Power Company Limited (GIPCL). The finding is also in disagreement with that of Ndolo (2015) [73] whose study on the relationship between operational efficiency and the financial performance of firms listed on the Nairobi Securities Exchange (NSE) discovered a significantly positive effect of operational efficiency on the firms' ROA. The finding does not finally support that of Jamali and Asadi (2012) [39] whose study on 13 auto manufacturing companies listed on the Bombay Stock Exchange for the period 2006 to 2010, disclosed a high degree of association between profitability and management efficiency in the firms.

Finally, tangibility of the sampled firms had a significantly positive effect on ROA at α=5% [t=2.56, (p=0.023) <0.05]. This finding is consistent with the priori expectation of the study that *($\beta_6>0$).* The finding also supports that of Majumdar and Chhibber (1999) and Margaritis and Psillaki (2007) [52] whose studies found a positive effect of tangibility on corporate financial performance. The finding is however not consistent with that of Kotšina and Hazak (2012) [45] who examined the impact of investment intensity (measured by the percentage of fixed assets to total assets) on the ROA of 8,074 companies in six European Union (EU) member states, and found no strong impact of investment intensity on the firms' ROA. The result finally contrasts with that of Rao, Al-Yahyaee and Syed (2007) [87], Zeitun and Tian (2007) [107], Weill (2008) [103] and Nunes, Serrasqueiro and Sequeira (2009) [74] whose studies established a negative impact of tangibility on corporate financial performance.

The Robust Fixed-Effects GLS regression for the fitted values of ROA in Table 7 shows that, the indicators of liquidity together with the control variables accounted for 9.62% of the variations in ROA during the study period (R^2 =0.0962), whilst 90.38% (100-9.62) of the variations was explained by other factors. The Table also reports the fitness of the ROA model at the 95% confidence interval. This is justified by the *F*-value of 4.20 which was largely significant at α=5% [(p=0.0000)<0.05]. Put simply, CR, CFR, Size, GRO, EFF and TAN significantly accounted for the variations in ROA, or had a combined significant effect on the firms' financial performance as measured by ROA. This finding was in line with the priori expectation of the study that *($\beta_1+\beta_2+\beta_3+\beta_4+\beta_5+\beta_6\neq0$) or ($\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6\neq0$) or ($\beta_1$, β_2, β_3, β_4, β_5, $\beta_6\neq0$).*

Test of Hypothesis Two: There was an insignificantly positive effect of current ratio on ROA at the 5% level of significance [t=0.37, (p=0.716)>0.05]. There was also an insignificantly positive effect of operating cash flow ratio on ROA at the 95% confidence interval [t=2.02, (p=0.063)>0.05]. The study therefore failed to reject the null hypothesis ***(H_{02})*** that liquidity as measured by the current ratio and operating cash flow ratio had no significant impact on the firms' financial performance.

6. Conclusion

This study sought to explore the influence of liquidity on the financial performance of non-financial firms listed on the Ghana Stock Exchange (GSE). Panel data extracted from the audited annual reports of fifteen (15) firms for the period 2008 to 2017 was used for the study. In the study, financial performance of the firms was measured through Return on Assets (ROA), whilst the Current Ratio (CR) and the Operating Cash Flow Ratio (OCFR) were used to proxy liquidity. The study adopted the descriptive and inferential techniques of data analyses. All the study variables were analyzed through the descriptive statistics of mean, standard deviation, variance, minimum and maximum values, range, skewness and kurtosis. Since the study was a correlational study, the Pearson Product-Moment Correlation Coefficient technique of data analysis was employed to measure the strength and direction of the linear relationship that existed between liquidity and the firms' financial performance. Whilst the Robust Fixed-Effects GLS regression estimator was employed to examine the effect of liquidity on the firms' financial performance. All the data analysis were conducted through STATA version 15 software package with a 5% level of significance ($p\leq0.05$).

From the study's findings, liquidity as measured by the current ratio and the operating cash flow ratio had a significant relationship with the firms' financial performance as measured by ROA. The study also concludes that, liquidity surrogated by the current ratio and the operating cash flow ratio had an insignificant impact on the firms' financial performance as measured by ROA. On the control variables, the study's correlation results revealed that, size had a significantly positive relationship with return on assets. Growth also had a significantly positive association with return on assets. A significantly inverse relationship was further found between efficiency and return on assets and tangibility had an insignificantly positive association

with return on assets. The study's regression results on the control variables showed that, size of the listed firms negatively affected return on assets and the effect was statistically insignificant. Also, growth had an insignificantly positive influence on return on assets. Additionally, efficiency had a significantly inverse effect on the firms' return on assets. Further, tangibility of the sampled firms had a significantly positive effect on return on assets. Finally, current ratio, operating cash flow ratio, size, growth, efficiency and tangibility had a combined significant influence on the firms' financial performance as measured by ROA.

7. Recommendations

For the success of operations and survival, non-financial institutions should not compromise efficient and effective liquidity management. They are expected to maintain an optimal liquidity level in order to satisfy their financial obligations and to maximize profits for their shareholders. This optimal level of liquidity could be obtained if the firms are to meet the standards stipulated by the Ghana Stock Exchange (GSE). This attempt will help reduce the cases of organizational distress. In other words, the firms should maintain a moderate level of liquidity that does not threaten their going concern status, and yet allows them to make adequate profits on their investments. Thus, the firms should try to find an optimum balance between liquidity and profitability.

Excess liquidity and illiquidity are financial diseases that can easily erode the profit base of the firms as they can affect the firms' attempt to attain higher profitability. Therefore, the firms' in an attempt to maximize their profitability, must adopt effective liquidity management. This could be achieved if the firms reduce amounts held in cash as current assets and concentrate more on investments so that, they could gain higher returns rather than tying them down in idle cash. If this is done, it will go a long way in enhancing the profitability of the firms. From a theoretical perspective, findings of this study lend support to that of previous studies and offer the best illustration of the relationship between liquidity and financial performance as measured by return on assets. Therefore, the firms should pay proper attention to the association between liquidity and financial performance so as to meet the operational and expansion process requirements of the firms, as well as achieving the aspirations of their shareholders by way of wealth enhancement.

In summary, liquidity management is an important component of financial management. This study has proven that, liquidity measured by current ratio and operating cash flow ratio had a statistically significantly positive relationship with the firms' financial performance proxied by return on assets. Therefore, careful consideration and planning of liquidity management is the best way to improve the efficiency of the sampled firms.

8. Limitations of the Study

This study was limited to only fifteen (15) non-financial firms listed on the Ghana Stock Exchange (GSE) for the period 2008-2017. The study was also confined to only published annual reports of the sampled firms. The study was further limited to only the current ratio and operating cash flow ratio (proxies for liquidity) and return on assets (proxy for financial performance). Size, growth, efficiency and tangibility served as the only control variables of the study. It is therefore suggested that, more liquidity and financial performance indicators, as well as, other control variables should be considered in future studies. Also, a study period longer than that of this study will be of much necessity for further studies. It is finally suggested that, further studies should consider both published and unpublished information of financial and non-financial firms listed on the Ghana Stock Exchange (GSE).

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