Determinants of Firm Profitability in Nigeria: Evidence from Dynamic Panel Models

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Abstract

This study examines the determinants of firm profitability for 114 firms listed on the Nigerian Stock Exchange (NSE) from 1998 to 2012, using the system Generalized Method of Moments (GMM). The results show that lagged profitability exerts significant positive effect on contemporaneous firm profitability. However, short-term leverage, inflation rate, interest rate and financial risk have significant negative effects on firm profitability. The study therefore suggests, among other recommendations, that the cost of borrowing to the real sector of the economy should be reduced in order to minimize costs of production, enhance productivity and profitability while necessary macroeconomic policies should be put in place by the government to curb inflationary pressure in the economy.

Keywords: Firm, Non-financial, Profitability, Leverage, Generalized Method of Moments, Nigeria
JEL Classification: B21, C23, L25

1. Introduction

Maximization of profit is a very crucial objective for a firm to remain in business and to withstand competition from firms operating in similar industry. It is a major pre-requisite for long-term survival and success of a firm while it is a key pre-condition for the achievement of other financial goals of a business entity (Gitman and Zutter, 2012). Profitability is a core measure of the performance of a firm and it constitutes an essential aspect of its financial reporting. It reveals the firm's ability and capacity to generate earnings at a rate of sales, level of assets and stock of capital in a specific period of time (Margaretha and Supartika, 2016). Consequently, firms' profitability and modalities for improving it have generated serious debates in the literature and have remained topical in the field of economics, finance, accounting and management. Profitable firms create value, hire people, tend to be more innovative, more socially responsible and are beneficial to the entire economy through payment of taxes. High rate of performance of firms indeed contribute effectively to income

generation and overall development of an economy (Olutunla and Obamuyi, 2008; Lazar, 2016). Therefore, concerted efforts have been made by researchers to unravel factors driving profitability at both firm and industry level using novel and sophisticated theoretical models (Al-Jafari and Al-Samman, 2015; Pratheepan, 2014).

The investigation of the determinants of the profitability of firms in Nigeria is apt and expedient for a number of reasons. The Nigerian economy has undergone series of reforms since the last one decade under successive democratic governments. However, research efforts towards ascertaining the core determinants of profitability of wide range of firms under these policy reforms have remained sparse. Nigeria, along countries like South Africa, Egypt, has a very large stock market but the performance of firms has remained abysmally poor. Many Nigerian firms have performed far below expectation in terms of innovation, overall output, revenue generation and profitability. This dismal performance is attributable to high costs of production and the prevailing macroeconomic conditions. Many of these firms lack unfettered access to loanable funds while the costs of borrowing are quite unimaginable. The business environment has remained very unfriendly, with many businesses, regardless of their years of existence, witnessing downward trend in their profit earnings. In recent years, a sizeable number of the firms have relocated to neighbouring African countries, including Ghana. The situation has remained unabated despite the implementation of policy mix by successive governments.

While the literature is replete with studies on determinants of firm profitability (or performance) in Nigeria, findings from these studies have remained mixed and inconclusive. Many of the studies on Nigeria are focused on selected sector(s) of the economy (Olutunla and Obamuyi, 2008, Dare and Funso, 2010; Onimisi, 2011; Akintoye, 2008; Oke and Afolabi, 2011; Enekwe, Okwo and Ordu, 2013; Angahar and Ivarave, 2016). A number of these studies only examined the effect of capital structure on firms performance while others investigated the impact of a single factor or variable on firm profitability (see Onaolapo and Kajola, 2010; Oke and Afolabi, 2011). Another common and peculiar feature of a vast number of these studies is their focus on relatively few numbers of firms. To this extent, this study employed a larger sample size, covering 114 quoted firms across all the non-financial sectors of the economy in determining core drivers of profitability in Nigerian firms. In the same vein, the study investigates dynamic interaction among various determinants of profitability.

The remainder of this paper is into four sections. Section 2 is on the review of relevant theoretical and empirical literature. Section 3 is on data and the methodology adopted while section 4 focuses on presentation and discussions of the results. Section 5 concludes the paper.

2. Literature Review

2.1. Theoretical Review

Discussions on the performance of firms commonly measured by profitability have hovered around selected theories. Prominent among these theories are the structure-conduct-performance (SCP) paradigm, relative market performance hypothesis (RMPH), efficient structure hypothesis (ESH), the quiet-life hypothesis, the X-efficiency hypothesis (XEFF) and the scale-efficient firm hypothesis (SEFF). The structure-conduct performance (SCP) paradigm and the efficient structure hypothesis (ESH) emanated from the earliest industrial organization theories in industrial economics and constitute both structural and non-structural approaches for examining the correlation between market structure and firm performance

(Seelanatha, 2011). The SCP paradigm posits that market concentration promotes collusion among large firms in an industry and consequently aids higher profitability. It thus implies that market concentration tends to have favourable and direct impact on firm's performance (Goldberg and Rai, 1996; Worthington, Briton and Rees, 2001). The SCP model is culled from the neoclassical theory.

The relative market performance hypothesis (RMPH) is an outgrowth of SCP paradigm. It submits that only firms that control large market share and offer well-differentiated products gain market power required to increase their profits through the adoption of non-competitive price-setting strategies (Berger, 1995). Meanwhile, the efficiency structure hypothesis (ESH) offers a clearer perception of the possible relationship between market structure and firm performance. The ESH posits that when efficient firms behave aggressively in the market, their market shares and size improve. These foster their political strength, aid their ability to control prices and output, and eventually maximize their profits in their respective market (Lloyd-Williams, Molyneux and Thornton, 1994). It also lays credence to the positive association between concentration and profit, which emanates from highly efficient production processes and management that lower costs of production.

On the other hand, the quiet-life hypothesis holds the assumption that individuals in charge of firms with relatively large market shares tend to trifle with efficiency in the use of resources while merely relying on their price-setting power for profit maximization (Punt and Rooij, 1999). Owing to this view, large firms will make use of their market power quietly and tactically for realization of profit. This is achieved without paying due attention to efficiency and productivity. The scale-efficient firm (SEFF) hypothesis argues that when firms operate at an optimal scale of production, they lower their costs relative to others thereby obtaining higher profits while retaining higher market share. In addition, this view relates to the heterogeneity in economies of scale of production among firms. However, X-efficiency (XEFF) hypothesis suggests that differences in firm profitability are due to technical efficiency as well as superiority in management and production relative to others (Seelanatha, 2011). Aside from the aforementioned hypothesis, other two broad theoretical approaches are quite relevant in studying the firm performance. These are the resource-based view (RBV) and the market-based view (MBV). The resource-based view centres on firm-specific resources employed by the business organization to increase its performance and earn more profit. However, the market-based view emphasizes firm's environment and the features of the market (Lazar, 2016).

2.2. Empirical Review

2.2.1. Evidence from Nigeria

A sizeable number of studies exist on firm performance or firm profitability in Nigeria. A large chunk of these studies focused on the effect of capital structure on firm performance while others examined the effect of a single factor like size, leverage, firm growth, etc, on profitability. Similarly, studies that examined a mix of these determinants are scanty with larger percentage of them concentrating on a single or very limited sectors or industry in the economy. In the same vein, the sample size in many of these studies is rather small while they failed to investigate the dynamic interaction between profitability and its determinants.

Akintoye (2008) examined the effects of capital structure, financial flexibility, business risk and taxation on the performance of firms operating in Nigeria's food and beverage industry. Olutula and Obamuyi (2008) applied fixed effects model to 115 randomly selected small and medium enterprises (SMEs) in Ondo State, Nigeria. Size, interest rate and loans have significant positive association with profit but sales exerted an insignificant positive effect.

On the other hand, age of firm exerted negatively on profit. In addition, Aburime (n.d.) examined the determinants of profits in Nigerian banking industry using a sample of 138 banks from 1980- 2007. The levels of competition as well as degree of foreign ownership have negative relationship with profitability. But using the First Bank of Nigeria Plc as a case study, Aremu, Ekpo and Mustapha (2013) revealed that credit risk, capital adequacy and cost efficiency were inversely related to firm performance while money supply and labour efficiency were directly associated with firm performance. They employed cointegration and error correction techniques.

Onaolapo and Kajola (2010) investigated the effect of capital structure (measured by debt ratio) on the performance of 33 listed non-financial firms from 2001-2007. Capital structure has a negative effect on firm performance. In addition, Oke and Afolabi (2011) examined the impact of capital structure on firm performance with the aid of five quoted firms. Capital structure is measured using debt financing, equity financing and debt – equity ratio. A negative relationship exists between debt financing and firm performance while both debt-equity ratio and equity financing had positive relationship with profitability index. Chechet and Olayiwola (2014) also reported that debt ratio had a significant negative effect on firm profitability while equity financing had an insignificant positive effect on profitability after applying fixed and random effects models to data on 70 listed firms (from 2000-2009). Abata and Migro (2016) also investigated capital structure and performance for 30 listed Nigerian firms and found that leverage and debt/equity mix exerted negatively on firm performance.

Meanwhile, Akinlo and Asaolu (2012) found a positive association between size and firm performance while a negative relationship was found between leverage and performance. With the aid of 5 quoted pharmaceutical firms, Enekwe et al. (2013) however found that inventory turnover is the core driver of firm performance while debtor turnover ratio, creditors' velocity and asset turnover ratio are insignificant in determining firm performance. While employing data on 4 listed cement manufacturing firms in Nigeria, Angahar and Ivarave (2016) deduced that short-term debt, long-term debt and shareholders' funds exerted positively and significantly on firm performance. This is contrary to findings from Chechet and Olayiwola, 2014; and Abata and Migro, 2016. Okwo, Ugunta and Agu (n.d) found that selling and general administrative expenses, inventory/cost of goods sold, account receivables to sales and account payable/cost of goods sold had significant and positive effects on profit earnings while depreciation had a significant negative effect on firm profitability. It is evident from the review that findings from these studies are quite mixed and inconclusive.

2.2.2. Evidence from other countries

Litany of empirical studies exists on the factors determining the profitability of firms. Many of these studies focused on either selected sectors or industries. A wide range of the studies is country-specific (for example Feeny, 2000; Naceur, 2003; Aburime, 2008; Seelanatha, 2011; Al-Jafari and Al-Samman, 2015; Pratheepan, 2014). The determinants of profitability were examined in cross-section of countries by studies like Bourke, 1989; Goddard, Tavakoli and Wilson, 2005; Demirguc-Kunt and Hunizinga, 1999; Abreu and Mendes, 2002; Crespo and Clark, 2012.

Earliest studies on firm performance have provided copious evidence in terms of core determinants of profitability in developed economies. For example, Short (1979) found a direct relationship between bank concentration and return on equity (ROE) – a measure of firm performance-for banks in Japan, Canada and Western Europe. Using data on selected firms in US, Bartel (1995) deduced that investment in training of staff improved productivity and eventually influenced firm profitability positively. In the same vein, Lichtenberg and Siegel (1991) inferred that market share and industry's profitability have significant direct

influence on firm profitability. In an examination of the determinants of profitability for a sample of 45 UK electrical companies, Grinyer and Mckiernan (1991) revealed that growth of sales, working capital, market share, decentralization and capital intensity are the most significant factors determining firms' profitability. The study employed multiple regression analysis. Feeny (2000) found a very significant positive relationship between size, capital intensity and profitability for 180,738 tax entities from Australia. In a study covering manufacturing industry in New Zealand from 1986-1987, Bennenbrook and Harnis (1995) found that profit earning of firms are mainly influenced by market efficiency and market power. However, in a study involving a sample of selected manufacturing firms in Scotland, Keith (1998) revealed that firm-level characteristics like size, industry group, location and even age are not significant in determining profitability. McDonald (1999) found that industry concentration and lagged profitability are the most important determinants of profit earnings for Australian manufacturing firms. Berger and Wharton (2002) found that higher leverage positively influenced the profitability of firms in the US banking industry. Goddard et al. (2005) examined the effects of size, market share, and liquidity and lagged profitability on firm performance for France, Spain, UK, Belgium and Italy. They found that lagged profitability exerted positively on firm's profit while firm size contrarily exerts negatively on the performance of firms. In addition, Nunes, Serrasqueiro and Sequeira (2009) found company size to exert positively on profitability for firms in Portugal. Yazdanfar (2013) however deduced that age of the firm and industry affiliation influenced profitability negatively in Sweden while a positive relationship exists between growth of the firm, lagged profitability, productivity and profit earning of non-financial micro firms. Meanwhile in another study on Swedish SME firms, Salman and Yazdanfar (2012) deduced that industry affiliation influenced profitability negatively but productivity and lagged productivity indicated positive influence. With the aid of a panel of 3,094 Greek manufacturing firms, Agiomirgianakis, Voulgaris and Papadogonas (2006) revealed that age, size, fixed assets growth, efficiency in management of assets, exports, reliance on debt as well as sales growth impacted significantly on firm performance.

Estimating a dynamic profit model for 961 large Australian firms from 1995 to 2005, Stierwald (2010) found that lagged profitability, size, leverage, lagged productivity and contemporaneous productivity impacted positively on current profit margin of firms. Asimakopoulos, Samitas and Papadogonas (2009) also investigated the determinants of profit earnings of non-financial firms listed on the stock exchange in Greece and found that leverage and working capital were influencing profitability negatively. They found sales growth, size and investment to exert positively on firm performance. The study covered a sample of 119 non-financial firms for the period of 1995–2003. An investigation of the factors influencing profitability in the Greek tourism industry revealed that size, low cost access to bank financing and age exerted positively and significantly on firm performance (Agiomirgianakis, Magoutas and Sfakianakis, 2013). In a study on oil and gas sector in Pakistan, Amir, Shah and Sana (2006) revealed that sales growth, age of inventory and average collection period have inverse relationship with profitability while number of days of accounts payable influenced firm performance positively. Dong and Su (2010) found negative relationship between cash conversion and operating profit for firms listed on the stock market in Vietnam. In a study on Indian automobile firms, Vijayakumar (2011) found that the size, age and growth rate of the firm exerted positively on profitability. Ramasamy (2005) investigated the effects of firm size and ownership in performance in the Malaysia palm oil industry. It was found that firm size exerted negatively on firm performance. In the case of Egypt, no relationship exists between financing decisions and firm profitability (Ebaid, 2009). Bhayami (2010) found that age, interest rate, liquidity, operating ratio and inflation were the core drivers of firm profitability in Indian cement industry. Charumati

(2012) also found that leverage, equity capital and growth of premium exerted negatively on profitability of life insurance firms in India while size and liquidity had significant positive relationship with profitability. Malik (2011) found a significant positive relationship between volume of capital, size and profit earnings in a study of 35 life and non-life insurance firms in Pakistan.

Seelanatha (2011) explored factors affecting firm performance in China and found liquidity, growth and asset structure to exert significant positive effects on firm performance. On the other hand, the size of the firm had a significant negative relationship with firm performance, implying that larger firms tend to have a quiet-life approach to market. Findings from the study do not corroborate either the structure-conduct-performance (SCP) hypothesis or the efficient structure hypothesis (ESH) but supports the relative market performance hypothesis (RMPH). Alipour (2011) confirmed a significant relationship between working capital and profitability using multiple regression analysis and Pearson's correlation test, employing data on 1063 companies in Iran. Also, a significant relationship was found between liquidity and profitability for Islamic banks in Qatar (Elsiefy, 2013). On the other hand, Pratheepan (2014) revealed that leverage and liquidity have negative insignificant effect on profitability for 55 listed manufacturing companies in Sri Lanka between 2003 and 2012. He however found a significant positive relationship between size and profitability and a significant negative relationship between tangibility and profitability. Meanwhile, Pantea, Gligor and Anis (2013) found capital intensity, firm size and number of employees to be positively associated with firm performance in Romania. Based on a sample of 126 listed Romania companies, analyzed using pooled OLS, fixed effects, Random effect and generalized method of moments, Vatavu (2014) found that debt, tangibility, risk, inflation and tax exerted negatively on profitability while size, lagged profit and liquidity impacted positively on profit margin.

On the other hand, Lazar (2016) found that firm size, leverage, tangible intensity and labour intensity exerted negatively on firm performance while corporate value added and sales growth had a positive impact on listed non-financial companies in Romania Bucharest Stock Exchange. In the case of Ghana, Boadi, Antavi and Lartey (2013) found a significant positive relationship between liquidity, leverage and firm profitability. With the aid of generalized method of moments (GMM), Al-Jafari and Alchami (2014) showed that bank size, liquidity ratio, management efficiency and credit had significant impact on profitability of banks in Syria. Size and liquidity have significant positive effect on profitability of Malaysian construction firms but capital structure impacted negatively and insignificantly on profitability (Zaid, Ibrahim and Zulqernain, 2014). For a sample of 17 listed industrial firms in Oman republic from 2006 to 2013, Al-Jafari and Al-Samman (2015) inferred that a significant relationship existed between growth, fixed assets, firm size, working capital and profitability. Evidence from their panel ordinary least squares model however revealed that leverage and average tax exerted negatively on profitability. Meanwhile, in a study comprising of 22 small and medium enterprises (SMEs) listed on Indonesian Stock Exchange, Margaretha and Supartika (2016) found that firm size, lagged profitability and growth have negative effects on contemporaneous profit margin while industry affiliation and productivity have positive effect on firm profitability. However, firm age is obviously not significant in determining profitability. Focusing on the sovereign debt crisis from 2005 to 2015, Samitas and Kampouris (2017) examined the volatility spillover effects from the southern to the northern part of the Eurozone using the asymmetric dynamic conditional correlation (DCC) model and the Baba, Engle, Kraft & Kroner (BEKK) model. The two models were found flexible in revealing spillover effects, but the asymmetric DCC model fits better in terms of conditional correlation. Negative shocks in Greece tend to be co-moving with French index while Italy and Spain were capable of destroying all the economies in the

northern Eurozone. Maniati and Sambracos (2017a) offered a stochastic model on the decision-making process of maritime finance by 88 banks within the framework of the credibility theory. It was found that optimal decisions of the banks on shipping loan limits were positively affected by interest income on loan and operating profit accounts. Using Data Envelopment Analysis (DEA), Maniati and Sambracos (2017b) examined factors influencing technical efficiency of 71 banks involved in maritime finance worldwide between 2010 and 2015. It was found that their technical efficiency was significantly driven by total deposits and total assets based on both variable returns to scale (VRS-DEA model) and constant returns to scale (CRS-DEA model). However, return on equity (ROE) was only significant based on the variable returns to scale (VRS-DEA model).

3. Data and Methodology

3.1. The Data

The data used in the study covered one hundred and fourteen (114) non-financial firms listed on the Nigerian Stock Exchange (NSE). The secondary data were extracted from the Annual Report of the listed companies and the fact books of the Nigerian Stock Exchange (NSE) on 114 listed firms out of 184 non-financial companies listed on NSE from 1998-2012. The exclusion of the financial firms is due to the distinct and peculiar features of their assets and liabilities compared to the non-financial firms in Nigeria. Additionally too, the sector is under strict regulations of the Central Bank of Nigeria (CBN) and other financial regulatory bodies in Nigeria.

3.2. The Model

In order to capture the determinants of firm profitability in Nigeria, the model for the study is in line with earlier studies by Al-Jafari and Al-Samman (2015), Vatavu (2014) and Stierwald (2010). The baseline model is expressed as:

$$\pi_{i,t} = \alpha + X_{it}\beta + \varepsilon_{i,t} \dots\dots\dots\dots\dots\dots\dots(i)$$

The dynamic model of firm profitability is of the following form:

$$\pi_{it} = \alpha + \psi\pi_{i,t-n} + X_{it}\beta + \mu_i + \upsilon_{it} \dots\dots\dots\dots\dots\dots(ii)$$

Where:

π_{it} denotes contemporaneous firm profitability (i.e. the profitability of firm i in period t, $\pi_{i,t-n}$ denotes profitability for firm i in the period t-n and it measures the effects of past firm's profitability on the current profit earnings of the firm. It also denotes the dynamic component of the relationship and it is meant to test how retained profits contribute to the profitability drive of Nigerian firms. The vector X contains long-term leverage ratio, short-term leverage ratio, firm size and tangibility of assets. It also comprises of measures of financial risk, growth opportunities, firm's age, interest rate and inflation rate that determine firm profitability. α, ψ and β are the parameters to be estimated.

μ_i is the firm-specific effect and it represents permanent differences between firms that could not be observed, but are likely to be correlated with explanatory variables (like leverage, size, age, tangibility, among others). υ_{it} is the remainder disturbance term.

Table 1. Definition /Measurement of Variables

	Variable	Definition and Measurement
1.	Long term leverage Ratio (LTLR)	Long term debt/total debt and total equity
2.	Short term leverage ratio (STLR)	Short term debt/total debt and total equity
3.	Profitability (PROF)	Earnings before interest and tax/total asset
4.	Size (SIZE)	Natural Logarithm of total assets
5.	Assets tangibility (TANG)	Fixed Tangible assets/total assets
6.	Growth (GO) Opportunities	Percentage changes in the logarithm of total assets
7.	Risk (RISK)	Standard deviation of the earnings before interest and tax to asset
8.	Firm Age (AGE)	Year(s) of existence of firms
9.	Inflation rate(INFR)	Annual inflation rate (%)
10.	Interest Rate (INTR)	Rate of Interest (%)

3.3. Estimation Technique

The option of a dynamic model is premised on its two main sources of persistence over time (Baltaghi, 2008). These concern autocorrelation emanating from the inclusion of a lagged dependent variable among the regressors and unobserved interaction effects as well as main effects that are peculiar to the heterogeneity among the firms. Therefore, applying the OLS, the fixed effect (FE) or even the random effects (or the Generalized Least Square estimator) may render the estimates biased and inconsistent. The model in (ii) above is estimated using the system generalized method of moments (GMM) of Blundell and Bond (1998). The choice and appropriateness of this method of estimation is hinged on a number of conditions. One, our sample is characterized by large number of cross-sections (i.e. large N), with a short time period (i.e. small T) while the existing functional relationship is linear. Additionally, the left-hand side variable, firm profitability is quite dynamic while all our independent variables are not strictly exogenous (see Roodman, 2009). Meanwhile, the preference for the system-GMM approach over the difference-GMM of Arellano and Bond (1991) is its allowance for introduction of more instruments that tends to improve efficiency. The system GMM builds system of two equations: the *original equations* and the *transformed* ones. It combines the regressions in the first difference with an estimation run in levels, using lagged levels and lagged difference as instruments. For a very robust analysis, the two-step system GMM is employed as it is proven to be more asymptotically efficient than the one-step.

In order to ascertain over-identifying restrictions, we rely on, the Hansen Statistic developed by Hansen (1982) rather than the Sargan statistic. The Sargan statistic is not robust to heteroscedaticity or autocorrelation while the Hansen statistics does, and it is robust for all one-step and two-step estimation as it is a minimized value of the two-step GMM estimation. As a rule of thumb, the p-value of the Hansen statistic should range between 0.1 and 0.25. Meanwhile, the number of instruments should either be less than or equal to the number of cross-sections (Roodman, 2009). Furthermore, a very necessary condition for the system

GMM is that the error term does not have second-order autocorrelation, otherwise the standard error of the instrument estimates grow without bound (Doytch and Uctum, 2011).

4. Results and Discussion

4.1 Descriptive Statistics

Table 2 reveals that the total number of observations is 1710, while the mean, minimum, maximum and the standard deviation of respective variables are also contained in the table. Short-term leverage has mean value of 0.705 for the period covered by this study while long-term leverage has a mean value of 0.173. This implies that the firms have higher preference for short-term leverage. The standard deviation also confirms that short-term leverage has a higher variability. This probably suggests that firms in Nigeria obviously take more risks. Thus, they are bound to have higher variation in their return on assets and profitability since many of them makes use of highly variable short-term financial leverage. While short-term leverage ranges between 0 and 216.63, long-term financial leverage ranges between 0 and 21.02, with a standard deviation of 0.88. The table also reveals that the oldest firms has existed for 89 years while the average age of non financial firms in Nigeria is 30years.

Table 2: Descriptive Statistics of Variables

Variable	Obs.	Mean	Standard Dev	Min	Max
Long-term leverage ratio	1710	0.173	0.884	0	21.017
Short-term leverage ratio	1710	0.705	9.154	0	216.625
Age	1710	30.674	19.166	0	89
Growth Opportunities	1710	0.156	2.123	-28.790	33.165
Asset tangibility	1710	0.193	0.362	0	10.44
Profitability	1710	0.037	0.091	-0.314	0.621
Size	1710	7.600	5.462	-4.293	20.060
Inflation Rate	1710	72.253	34.700	29.6	141.1
Interest Rate	1710	12.562	3.615	6.125	19
Financial Risk	1710	7.550	83.354	-166.856	2657.495

Source: Author's Computation

The standard deviation of opportunities for growth is 2.1. This implies that growth opportunities are reasonably high for the firms. The firm with growth opportunities of 33.16 has the highest growth opportunities. The average tangibility reveals a low usage of tangible assets- 19.3% of total assets. This suggests that firms do not really own assets based on their business activities. The mean value of profitability is 0.037, with the value ranging between -0.31 and 0.62. The standard deviation is 0.091, indicating a very low variation in profitability. The average size of the firms covered by the study is 7.60 while the firm with the maximum size has a value 20. Thus on the average, the firms are quite large. Meanwhile, the average inflation rate between the period 1998 and 2012 was 72.2%, the minimum was 29.6% while maximum was 141.1. The variation in inflation rate under the reviewed period was 34.7%. Furthermore, the average interest rate stood at 12.56 with a minimum of 6.13 and a maximum

of 19. The variability of interest rate is quite low as the value of the standard deviation is below the mean value. The financial risk variable indicates a minimum value of 7.55 and a maximum of 2657.5. It also has a standard deviation of 83.4, which far exceeds the mean value. Thus, the variability of financial risk is indeed very high.

4.2. Correlation Matrix

The degree and direction of association among the variables are shown in Table 3. A number of the signs tend to conform with a priori expectation while others do not conform. Firm age, size, growth opportunities, financial risk and asset tangibility have positive correlation with firm profitability. On the other hand, inflation rate, interest rate, short-term financial leverage, long-term financial leverage are all inversely associated with firm profitability. No serious problem of multicollinearity exists, as the Pairwise correlation coefficient for any of the variables does not was found to exceed 0.80 (Gujarati, 2003).

Table 3

Correlation Matrix

Variables	AGE	GO	INFR	INTR	LTLR	PROF	RISK	SIZE	STLR	TANG
AGE	1.000									
GO	0.012	1.000								
INFR	0.196	0.072	1.000							
INTR	-0.152	-0.051	-0.734	1.000						
LTLR	-0.068	-0.008	0.001	-0.017	1.000					
PROF	0.112	0.044	-0.042	0.035	-0.031	1.000				
RISK	-0.042	-0.006	-0.069	0.062	-0.011	0.024	1.000			
SIZE	0.251	0.059	0.350	-0.278	0.018	0.079	-0.038	1.000		
STLR	-0.026	-0.005	-0.048	0.042	0.003	-0.021	-0.002	0.009	1.000	
TANG	0.114	0.047	0.010	-0.090	-0.021	0.121	-0.001	0.186	-0.027	1.000

4.3. Regression Results

From Table 4, the coefficient of one-year lagged profitability exert positively on contemporaneous firm profitability at 1 percent level of significance. Hence, the higher the profit earned in the preceding year, the higher tends to be the profit earned in the current year. This corroborates findings from Vatavu, 2014; McDonald,1999; Stierwald, 2010; Goddard et al., 2005. This also implies that higher earnings in the past potentially provides basis for earning higher profit in the future. This assertion is proven further by the positive and significance effect of two-year lagged profitability on the contemporaneous profit earnings.

Benefits from such initial profit could be possibly harnessed by firms through re-investment of retained profit in labour re-training, research and development, product rebranding and effective innovations. This result is however contrary to the finding of Margaretha and Supartika (2016) who reported negative effect of lagged profitability on contemporaneous profit.

Long-term financial leverage exerts negative but insignificant effect on profitability of firms. In the same vein, short-term leverage was found to affect firms drive for profitability negatively. However, its impact is significant at 5 percent. This indicates that short-term

leverage is relatively a more important determinant of profitability for Nigerian firms. The reported negative relationship between leverage and profitability is in line with findings by Asimakopolous et al., 2009; Lazar, 2016; Al-Jafari and Al-Samman, 2015; Pratheepan, 2014; Seelinatha, 2011; Akinlo and Asaolu, 2012; Chechet and Olayiwola, 2014; Abata and Migiro, 2016, among others. The negative relationship between leverage and profit earning of firms is not unanticipated as firms would require more resources for repayment (particularly higher value debt) thereby depleting resources or funding available for re-investment. It also implies that higher leverage firms bear greater risk of bankruptcy.

Table 4: Estimates from System GMM

Dependent Variable: Profitability

Variable	Blundell-Bond (Two-step)
Profitability$_{t-1}$	0.64421***
	(0.06216)
Profitability $_{t-2}$	0.12996**
	(0.06398)
Long-term Leverage	-0.00705
	(0.00853)
Short-term Leverage	-0.00005**
	(0.00002)
Age	0.00017
	(0.00012)
Growth Opportunities	0.00055
	(0.00092)
Asset Tangibility	-0.00778
	(0.00525)
Size	0.00006
	(0.00030)
Inflation rate	-0.00015**
	(0.00007)
Interest Rate	-0.00103*
	(0.00058)
Financial Risk	-0.00002***
	(6.30e-06)
Instruments	89
Hansen Test	0.1
AR(1)	0.00
AR (2)	0.19
Observations	1710
Number of Firms	114

Notes: Standard error are in parentheses; ***p< 0.01; **p< 0.05 and *p< 0.1. The values for Hansen test, Arellano-Bond test for first order serial correlation AR (1) and Arellano-Bond test for second-order serial correlation AR (2) are probability values.

It is noteworthy to state that Stierward, 2010; and Burga, 2011; reported a significant positive effect of leverage on profitability for large Australian firm. Boadi et al. (2013) also found a positive relationship between leverage and profitability for Ghanaian firms.

A positive but insignificant relationship exists between age and profitability. This suggests that the longer the existence of a firm, the higher tends to be its profitability. This is in line with Vijayakumar, 2011. It implies that young firms are less profitable than older firms are.

The positive association between firm age and profitability is contrary to findings from Olutunde and Obamuyi, 2008; Margaretha and Supartika, 2016; Yazdanfar, 2013; Salmad and Yazdanfar, 2011. The coefficient of growth opportunities measured by the percentage change in the total assets exerted an insignificant positive effect on profitability of the firm. This conforms with findings from Nunes et al.,2009; Yazdanfar, 2013; Lee, 2009; Al-Jafari and Samman, 2015. It thus implies that the rate of growth in the assets of firms has the potential of improving the drive for higher profitability in the organization.

In addition, the coefficient of asset tangibility is found negative and insignificant in determining firm profitability. The negative effect of tangibility is premised on the fact that certain components of firm's assets (like land and building) are not directly involved in production of goods for sales while a number of them (e.g. vehicles) tends to depreciate over time. This finding corroborates those of Lazar, 2016; Vatavu, 2014; and Pratheepan, 2014. By implication, Nigerian firms are not likely to be using their tangible assets in a profitable manner.

The results in Table 4 also indicate that firm's size exerted positively on profitability. This corroborates findings from Ayele, 2012; Stierwald, 2009; Vijayakumar, 2011; Pratheepan, 2014; Vatavu, 2014; Zaid et al., 2014; Yazdnafar, 2013; Mistry, 2012; Malik, 2011; Akinlo, 2012; Olutunla and Obamuyi, 2008; Asimakopolous et al., 2009. Thus, large firms tend to be more profitable than smaller firms are. This is because firms with bigger size have more advantage in negotiating the price for their inputs, thereby reducing unit cost and thus increase their profitability (Asimakopolous et al., 2009). Furthermore, the relatively better adaptation of larger firms to the macroeconomic environment may likely improve their profitability. However, studies by Ramasamy, 2005; Dhawan, 2001; Lazar, 2016; Al-Jafari and Samman, 2015; Margaretha and Supartika, 2016, reported a negative relationship between firm size and profitability. Meanwhile Seelanatha (2011) gave mixed results consequent upon the dependent variable used to measure firm profitability in his study.

The coefficient of inflation, which is a measure of prevailing economic condition or economic stability, is negative and significant at 5 percent. This finding corroborates that of Vatavu (2014) for Romania. This vividly reveals that the macroeconomic environment in Nigeria exerts negatively on the ability of firms to earn more profit. When inflation rate soars unabated (like in the case of Nigeria), it increases the costs of production and eventually reduces the profit margin of firms. In the same vein, the coefficient of interest rate exerted negatively on profitability at 10 percent level of significance. This indicates that the high interest rates charged by financial institutions are highly inimical to profitability of Nigerian firms. When the cost of borrowing is high, it increases the cost of production of firms, and eventually reduces the profit margin of firms. This is also a reflection of the prevailing macroeconomic policy in Nigeria. This finding runs contrary to Olutunla and Obamuyi (2008) that reported a positive effect of interest rate on profitability using a fixed-effect model. The coefficient of financial risk exerts negatively on profitability at 1 percent level of significance. This supports results from GMM estimation for Romania by Vatavu, 2014. It is therefore plausible to contend that firms experiencing higher financial risk tend to record poor profit. This may cause disincentive for investment, particularly for highly risky businesses. This indicates that investments in Nigeria are financially riskier. The probability values obtained for the Arellano-Bond tests for the first and second order autocorrelation i.e. AR (1) and AR (2) are 0.00 and 0.19 respectively. Expectedly, there is high first order autocorrelation while there is no problem of second order autocorrelation. This indicates that the models are well-specified. The numbers of the instruments used for the system GMM are 89, which is quite less than the number of the cross-sections while the probability value of the

Hansen test falls between 0.1 and 0.25. This confirms the validity of the instruments and conforms with the rule of thumb as suggested by Roodman, 2009.

5. Conclusion

This paper examined the determinants of profitability by applying system GMM to data on 114 non-financial firms in Nigeria from 1998-2012. The study revealed that lagged profitability exerted positively and significantly on contemporaneous profitability of firms in Nigeria. It was also found that short-term leverage, inflation rate, interest rate and financial risk have significant negative effects on firm profitability during the sampled period.

However, long-term leverage ratio, age of firm, size, asset tangibility and growth potentials or opportunities were not significant in determining profitability of firms in Nigeria. Findings from this study only support the structure-conduct-performance (SCP) model or the resource-based approach to firm profitability partially as it is evident from the current study that the prevailing macroeconomic environment also plays a very vital role in driving profitability.

Owing to these findings, it is very necessary to reduce cost of borrowing to the real sector of the economy in order to reduce costs of production, enhance productivity and profitability. Additionally, necessary macroeconomic policies should be put in place by the government to curb inflationary pressure in the economy. Firms should also seek long-term financial leverage rather than short-term financial leverage that tend to pose more adverse effects of the latter on profitability.

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