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Research article

Examining the factors that influence firm performance in Ghana: a GMM and OLS approach

Regina Naa Amua Dodoo[1,2,*], Michael Appiah[1,3] and Daniel Tetteh Donkor[4]

[1] School of Finance & Economics, Jiangsu University, China
[2] Redds_Haven Ltd., Accra, Ghana
[3] Dorstell Consult Ltd., Koforidua, Ghana
[4] School of Business, University of Capecoast, Ghana

* **Correspondence:** Email: dodooregina0993@gmail.com; Tel: +8618652831570.

Abstract: This research aims to establish the determinants of firm performance in 15 non-financial Ghanaian companies listed on the Ghana Stock Exchange, over a period of 10 years (2008–2017). The analysis is based on two methods of estimation; two-step system generalized method of moments (GMM) and ordinary least square (OLS) method. The new empirical evidence derived from the results of the analysis reveals that firm size (SIZE), growth (GR) and cash flow ratio (CFR), significantly and positively determines firm's performance whereas debt to equity (DE) exerted negative influence on firm performance. Robustness test conducted using the three-stage least-squares regression, indicates similar results with the main findings of the study. These results imply that, firms that rely on debt to execute its operations run at a higher risk of insolvency.

Keywords: firm performance; Ghana Stock Exchange; non-listed firms; GMM panel data

JEL Codes: C23, M40, L25

1. Introduction

Firm performance is commonly regarded as a necessary qualification for long-term firm existence and success; furthermore, the state of a firm affects the accomplishment of other financial objectives (Gitman et al., 2015). According to Burja (2011) firm performance from the perspective of

macroeconomics, is the direct outcome of managing economic assets and ensuring its effective use in operational, investment and monetary ventures.

The study of firm performance is relevant because of its effect on macroeconomic variables such as economic growth and employment. Nonetheless, due to the increasing industrial competition existing in global markets Slater and Olson (2002), enhanced efficiency, technological advancement, pricing pressure, companies are faced with greater struggle in attaining and maintaining performance. However, the economy of many African countries (Appiah et al., 2020; Obeng-Krampah, 2018) including Ghana have been facing significant rise in growth (GDP per capita) influenced by various competitive and strong industries including finance and insurance. This posits as an advantage for many developing economies but rather places financial burdens on other economies who are facing downturns because of the occurrence of free trade and globalisation.

Prior literature (Goddard et al., 2005; Lazăr, 2016; Obeng-Krampah, 2018; Pratheepan, 2014) have empirically analysed the determinants of firm performance from several perspectives. However, discrepancies, for instance, in the theoretical point of view, sample size, calculation of variables, and methodologies utilized, does not make direct comparisons of these studies easier (Yazdanfar, 2013). For example while research conducted in Australia by Feeny (2000) focused on a sample of 180,738 tax entities in 1994/95 to 1996/97. Stierwald (2009) also concentrated on a sample of 961 large Australian firms in 1995–2005 to examine the determinants of firm performance. Additionally, the study undertaken by Asimakopoulos et al. (2009) applied the ordinary least square (OLS) and random and fixed effect method on a sample of 119 Greek non-financial firms listed in the Athens Stock Exchange within the period 1995–2003. Goddard et al. (2005) also uses the two-step system GMM method on a sample of 12,508 firms in service industries in 5 European countries to examine the variables that affect firm performance.

Inclusively, whiles Obeng-Krampah (2018) employs the random and fixed effect method on 30 firms listed on the Ghana Stock Exchange (GSE) from 2007 to 2015 by measuring firm performance with both ROA and ROE to investigate the role of macroeconomics on firm performance. Prempeh et al. (2016) uses Return on Assets (ROA), Gross Profit Margin, and Tobin's Q Ratio to measure firm performance when examining the effect of Debt Policy on firms' performance of five manufacturing companies listed on the Ghana Stock Exchange (GSE) between 2005 and 2015.

Following the different unit of measurements and variables utilised in these studies, different conclusions were drawn on the drivers of firm performance depending on the objective of the study. Thus, revealing the uniqueness of the research.

Irrespective of the various empirical works attempted by many researchers focusing on the variables that affects firm performance, the issue gives room for further studies. Thus, the concentration of this literature on Ghana to add up to existing research on determinants of firm performance with new empirical outcomes and consequently relevant to stakeholders such as managers, investors, researchers, practitioners, and the government.

This paper contributes to the study by employing current advances in panel data econometrics to analyse the factors that influence firm performance in 15 listed non-financial firms in Ghana, within the period 2008–2017. It further employed the two-step system generalized method of moments (GMM) and ordinary least square method (OLS) to give a new empirical evidence adding to previous literature on determinants of firm performance.

The rest of this paper is organized as follows. Section 2 comprises the literature review. Section 3 describes the research methodology. Section 4 contains the empirical results and discussions. Section 5 deals with conclusion.

2. Literature review

Firm performance is influenced by several factors and this has necessitated attention over the years in different areas of research. Several empirical studies have been conducted to examine if there is somewhat (positive, negative or no effect) between firms' performance and its determinants. Presently, there are two highly contrary theories in the strategy research to elaborate on why certain firms perform in a superior way leading to firm value. They include the; resource-based view (RBV) and market-based view (MBV).

According to Barney (1991), a leading resource-based view (RBV) advocate, resource-based view (RBV) of the company is centred on the resources and competencies of the firm's to illuminate firm performance. From this view, firms with competitive advantage are unique and possess valuable firm-specific resources that competitors are incapable of replicating. The resource-based view (RBV) is categorized under three main groups: physical, human, and organizational capital resources. These assets are utilized by the firms to increase performance.

In contrast, the market-based view (MBV) focuses on the markets in which the firm competes, taking an exterior market angle to face this issue. This mainly concentrates on the state of finished products on the market as a guarantee for greater profits in the future and better firm performance in the interim (Tallman, 1991). From this view, competitive advantage is based on restrictions to competition ascending from the market construction. Firm value is generated from the competitiveness of its exterior product markets. Thus, the market power of the firm describes its performance. The market power can be achieved via monopoly, barriers to entry and bargaining power (Grant, 1991). Thus, the stronger the firms market power, the higher the firm's performance (Makhija, 2003). However, for the purpose of this study, the determinants of firm performance is centred on the resource-based view.

The research conducted by Goddard et al. (2005) reports that, market share and liquidity influenced profitability positively whereas size and firms gearing ratio adversely affected profitability. The study employed the two-step system GMM method on a sample of 12,508 firms in 5 European countries. Contradictory, Pratheepan (2014) applied the ordinary Least Square (OLS) and random and fixed effects on a sample of 55 firms between 2003 and 2012. The findings stated that, liquidity and leverage impacted firm performance negatively whiles firm size is positively and statistically significant to firm performance.

Using a sample of 119 Greek non-financial firms listed in the Athens Stock Exchange within the period 1995–2003. Asimakopoulos et al. (2009) finds a positive size and sales growth impact on firm performance whereas leverage exerts negative influence. The outcome was based on utilizing the ordinary least square method (OLS) and random and fixed effect method. This contrasts with Lazăr (2016) who discovers that size and leverage negatively affects firm profitability whereas sales growth proved positive after applying the random and fixed effect method. Yazdanfar (2013) use the SUR model on 12,530 non-financial micro firms in Sweden between 2006 and 2007. The result show that growth exercises positive and significant influence on firm performance. Kaen and Baumann (2003) opposes this result by indicating a significant and negative influence between growth and profitability.

In the case of (Coad, 2007; Markman & Gartner, 2002), no connection is found between growth and firm performance.

Feeny (2000) concentrated on a sample of 180,738 tax entities from Australia in 1994/95 to 1996/97. It was documented that firm performance is significantly and positively affected by size whiles the entity's gearing showed negative influence on performance. This does not allow corroboration with Stierwald (2009), who employed the random and fixed effect method on a sample of 961 large Australian firms in 1995–2005. It was realised that size and debt to equity (DE) ratio exercised positive impact on firm profitability. The reason may be that lucrative firms take advantage of debt financing rather than depending entirely on equity capital.

Similarly, Vătavu (2014) applied OLS, fixed and Random effect model and Generalized Method of Moments (GMM) and found size to positively determine firm profitability whereas debt to equity exerts negative effects. Berger and Di Patti (2006) contradicted these results by documenting that increased leverage positively impacts the profitability of firms in the US banking sector.

Odusanya et al. (2018) applied the system GMM on 114 non-financial firms in Nigeria from 1998–2012.The report revealed a positive effect between size and profitability coupled with a negative impact between leverage on profitability.

Furthermore, (Ibhagui & Olokoyo, 2018) added that, for small businesses, the adverse effect of debt on firm performance is most significant and paramount, and the proof of a negative impact declines as the company expands, gradually disappearing as firm size increases. This was realised after conducting research on sample of 101 listed companies in Nigeria within 2003 and 2007. Other related literatures have also duly addressed the areas of firm performance and their effect in the stock market (Chen & Ibhagui, 2019; Ibhagui, 2019). Results from Chen and Ibhagui (2019) indicated that, R&D exerts positive influence on firm performance. After employing the Ordinary least square (OLS), Fixed and Random Effects Model on 476 firms listed on Nasdaq to evaluate the relationship between research and development (R&D) and firm performance between the period 2002 to 2017. Since corporations that depend on internet and digital new technologies seem to be the driving forces of the global stock market, thus, R&D is becoming attractive to companies and appears to be crucial to many businesses' sustainability and success.

Other studies from Ghana reported on a negative influence of debt on firms' performance by applying the random and fixed effect method on five (5) manufacturing companies listed on the Ghana Stock Exchange (GSE) between the period 2005 to 2015 (Prempeh et al., 2016). This does not confirm the outcome of Obeng-Krampah (2018) employing the random and fixed effect method on 30 firms listed on the Ghana Stock Exchange (GSE) from 2007 to 2015. The study finds that, debt affects firm performance (ROA) positively. Boadi et al. (2013) adds up by showing that debt positively determines firm performance using Ordinary least square regression on a sample of 16 insurance firms.

The diagram below shows the conceptual framework of the study. The central focus of this study is to examine the factors that drives firm performance. The figure clearly shows a direct effect of the determinants utilised in this study, which is firm size (SIZE), Growth (GR), Debt to Equity ratio (DE) and Cash Flow ratio (CFR) on firm performance (FP). Based on theories such as the resource-based view (RBV) Barney (1991) and market-based view (MBV) Tallman (1991) and many empirical literatures (Asimakopoulos et al., 2009; Chen & Ibhagui, 2019; Feeny, 2000), firm size (SIZE), Growth (GR) and Cash Flow ratio (CFR) determines firm performance positively, whereas Debt to Equity ratio (DE) inversely influences firm performance. Therefore, firm's ability to retain success is dictated by these firm specific resources.

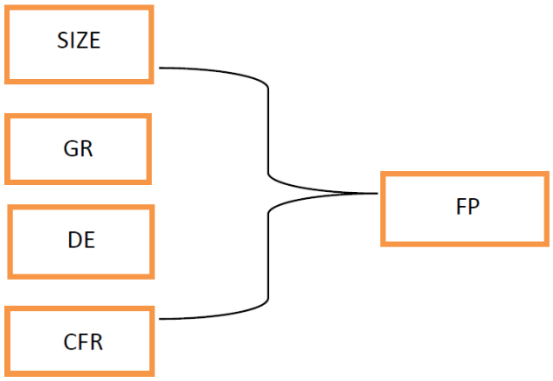

Figure 1. Conceptual framework.

3. Materials and methods

3.1. Sample data

The main source of the data is from the Ghana Stock Exchange (GSE). Information is wisely collected from the annual reports of 15 Non-financial firms listed on the Ghana Stock Exchange (GSE) from 2008 through to 2017. Out of the 42 listed firms in Ghana, 15 Non-financial firms fully met the criteria for the sample size. Thereafter, all other listed firms for which did not meet the requirement, were deleted. The criteria included; (1) all those companies who have been in existence during the period of analysis and; (2) firms who consistently made their annual reports available on the Ghana Stock Exchange (GSE) during the sample period.

The dependent variable used for the study is firm performance measured by an accounting-based measurement; Return on Assets (ROA). Return on assets (ROA) is defined as the Net Income divided by total assets. Return on Assets (ROA) is calculated as;

$$\text{ROA} = (\text{Net Income})/(\text{Total Assets}) \quad (1)$$

3.1.1. Independent variables

Earlier research proposes that firms size (SIZE), growth (GR), debt to equity ratio (DE) and cash flow ratio (CFR) may influence its performance; the size of firms, their growth rate and the availability of funds have a more prominent assortment of capabilities and can appreciate economies of scale, which may affect the results and the deductions (Abata & Migiro, 2016; Deloof, 2003; Frank & Goyal, 2003; Jermias, 2008; Ramaswamy, 2001; Salim & Yadav, 2012). These studies utilize firms' size (SIZE), growth (GR), debt to equity ratio (DE) and cash flow ratio (CFR) as independent variables. Table 1 gives a summary of variables and equivalent measurements.

Table 1. Definition of variables.

Variable	Measurement
Dependent Variable	
Return On Asset (ROA)	Net Income/total assets
Independent Variables	
Firm size (SIZE)	Natural logarithm of total assets
Growth (GR)	Percentage changes in sales growth
Debt-Equity Ratio (DE)	Total debt/total equity
Cash Flow Ratio (CFR)	Operating cash flows/current liabilities

Source: Authors Composition.

3.2. Model

To estimate the outcome of the impact of firm performance of Non-financial listed Ghanaian firms and its determinants, a regression model is developed. The model is as follows:

$$FP = f\ (SIZE, GR, DE, CFR) \tag{2}$$

An econometric equation is derived from the above into Equation (3)

$$FP_{it} = \alpha + \beta_1 SIZE_{it} + \beta_2 GR_{it} + \beta_3 DE_{it} + \beta_4 CFR_{it} + \varepsilon_{it} \tag{3}$$

In which FP stands for Firm performance, (SIZE) is Firms size, (GR) is sales growth, (DE) is Debt to equity ratio, (CFR) is cash flow ratio, α is the intercept, i and t represents firm and time individually, $\beta_1 \ldots \beta_4$ are the coefficients of the independent variables and ε is the error term.

3.3. Model specification

To capture the influence of firms size (SIZE), growth (GR), debt to equity ratio (DE), cash flow ratio (CFR), and firm performance, the study employed a popular statistical method; ordinary least square method (OLS) and a dynamic panel estimator; two-step system generalized method of moments (GMM).

The OLS is one of the commonly used analytical methods applied in social sciences. The study employed this method because it is relevant in estimating values of continuous response factor using one or more explanatory variables and can assess the significance of the relationship between those variables. Another reason for the application of this method was that, it can detect the strength of the relations between the prediction and explanatory variables. The approach of applying the OLS would give bias estimates of the model parameters. The biasness is as a result of these three major issues; to begin with, the likelihood of evaluating in a general multivariate setting, the course of omitted variable bias (OVB)-which is an enduring problem in econometrics. Another issue concerns the probability of decreasing the bias of OLS estimators by adding, some of the variables that were excluded; and finally, the issue of the potential correlation between the exclusion errors and the inclusion of OLS estimators in the bias determination (Deepankar, 2020).

The study as well employed the two-step system generalized method of moments (GMM) , as it is more capable of monitoring the poor instrument difficulties (Arellano & Bover, 1995). The two-step

system GMM was included to capture endogeneity issues, which when ignored can affect the magnitudes or the assessed co-efficient signs (Wintoki et al., 2012).

The issue of endogeneity exists when a variable, observed or unobserved, which is not incorporated in the model, is connected to a variable integrated in the model of the study. The unobservables could be in the form of omitted variable "bias", simultaneity, functional form misspecification and selection "bias". The endogeneity problem of unobservable variable the GMM solves in this study is the issue of omitted variables bias which is the problem identified in the OLS estimates. One probability of omitted bias may be that researchers assess a construct's validity without considering other significant variables. Dynamic panel data statistical methods (GMM) utilize lags of the dependent variables as explanatory variables to detect this issue. In order to regulate this endogenous connection, lagged values of the dependent variables are also used as instruments. These instruments are also referred to as "internal instruments" as utilized in current econometric model (Roodman, 2009).

According to Reed (2015), the lagged values of independent variables as tools in the framework are suitable when both requirements are met. That is the independent variables are poorly exogenous and when there is the absence of the autocorrelation of the error term. Additionally, it integrates a covariance matrix for the disturbance term determined by utilizing the remains of the one-step estimator. To add up, it incorporates equations both at level and first-difference as a method, utilizing huge cross-sectional data groups and few time-series measurement (huge N and few T). Besides the above factors, the lagged disparities of the regressors are the instruments for the level estimations. Moreover, additional time conditions are needed for the authenticity of the additional instruments. The regressors' first variations in the function are uncorrelated with the firm-specific impacts. Also, the GMM model is preferred because it is associated with diagnostic tests to check the validity and reliability of the instruments. This is to determine whether there is any relation with the residual. Regarding this, the Hansen J-statistic test is undertaken in the GMM model to achieve this. Furthermore, the Arellano-Bond test is performed to evaluate both the first and second order serial autocorrelation.

The dynamic model employed to analyse the performance of firms is as follows:

$$\Delta Y_{it} = \alpha + \delta Y_{i,t-1} + \beta_1 X_{it} + \gamma_t + \varepsilon_t \quad (4)$$

In which i=1,…N and t=1,…T, α_i is the unknown intercept for each entity, Y_{it} is the dependent variable and β is the coefficient for the independent variable ε is the error term, i is the entity and t is time.

Thereafter, the model is reformed to fit into the study in the equation below:

$$\Delta FP_{it} = \alpha + \delta FP_{i,t-1} + \beta_1 SIZE_{it} + \beta_2 GR_{it} + \beta_3 DE_{it} + \beta_4 CFR_{it} + \gamma_t + \varepsilon_t \ldots \quad (5)$$

In which FP stands for Firm performance, (SIZE) is Firms size, (GR) is sales growth, (DE) is Debt to equity ratio, (CFR) is cash flow ratio, α is the intercept, i and t represents firm and time individually, $_{t-1}$ is the lag variable, $\beta_1 \ldots \beta_4$ are the coefficients of the independent variables and γ_t and ε_t are the error terms.

4. Results and discussions

This section reveals the characteristics of the study variables by using the mean, standard deviation, minimum, maximum, skewness, and kurtosis. The mean, lowest and highest values of the dependent variable, Return of Assets (ROA), is 0.0053%, −5.6487 and 0.7656 respectively. The sample firm size (SIZE) average about 4.6006% of total assets with skewness and kurtosis of −0.4201 and 1.9953

individually. The mean growth (GR) of firms is 0.0175% reflecting low sales. The company uses about 2.7978% of shareholders equity and debt to run the company's asset on the average. It records a least minimum value of −64.6981 and highest value of 119.1720. It as well has a standard deviation of 11.7833, which is greater than the mean. Therefore, the volatility of debt to equity (DE) is excessive.

Table 2. Descriptive statistics.

	OBS	MEAN	STD. DEV.	MIN	MAX	SKEWNESS	KURTOSIS
ROA	150	0.0053	0.4850	−5.6487	0.7656	−10.6432	124.8778
SIZE	150	4.6006	0.8196	2.5093	5.9545	−0.4201	1.9953
GR	150	0.0175	0.0551	−0.2074	0.5214	4.3695	50.9801
DE	150	2.7978	11.7833	−64.6981	119.1720	5.3257	71.7982
CFR	150	0.3265	0.7158	−1.6939	4.4039	2.7880	15.2323

Source: Authors Composition.

Table 3. Correlation results on return on assets (ROA).

VARIABLE	ROA	SIZE	GR	DE	CFR
ROA	1.0000				
SIZE	0.2750	1.0000			
GR	0.3222	0.05397	1.0000		
DE	0.0258	0.1673	−0.0035	1.0000	
CFR	0.2000	0.1024	−0.0082	−0.0467	1.0000

Source: Authors Composition.

The relations of the explanatory variables are indicated in this section. In general, the relationship between the dependent variable Return of Assets (ROA) and independent variables (SIZE, GR, DE, and CFR) are positively related, while Debt to Equity (DE) and Growth (GR) are negatively related. Furthermore, a negative relationship is observed between Cash flow ratio (CFR), Growth (GR) and Debt to Equity (DE) with correlations coefficients of −0.0082 and 0.0467.

Table 4. Test for multicollinearity**.**

VARIABLE	VIF	1/VIF
SIZE	1.05	0.956750
GR	1.03	0.967707
DE	1.02	0.985097
CFR	1.00	0.996712
Mean VIF	1.02	

Source: Authors Composition.

Multicollinearity exists when two or more independent variables in the regression model are correlated. Using the VIF tool to measure and compute how much the variance is inflated, if VIF = 1, then there is no multicollinearity. Outcome from this table vividly reflects the absence of multicollinearity.

Table 5. Regression results.

	ROA	
	2 STEP SYSTEM GMM RESULTS	OLS RESULTS
L1	−0.3748 (0.0414)***	
SIZE	0.4509 (0.1941)**	0.1425 (0.0449)***
GR	3.3695 (0.6481)***	2.7349 (0.6543)***
DE	−0.00247 (0.0021)	−0.0002 (0.0031)
CFR	0.1176 (0.0650)*	0.1203(0.0506)**
CONS	−2.1157 (0.9245)	−0.7370 (0.2068)

Source: Authors Composition: Standard errors are reported in parentheses, ***, **;* means significance level at 1%, 5%, and 10% respectively.

The results reveal positive connection between firm size (SIZE), growth (GR), and cash flow ratio (CFR) with firm performance (ROA). Findings from both methods shows that the coefficients of these independent variables SIZE, GR, and CFR are statistically significant. Nonetheless, debt to equity (DE) ratio recorded negative results at no significance level for both methods with firm performance (ROA), illustrating that, the selected listed Ghanaian firms are not taking advantage of their non-operational debt.

The estimated coefficient of firm size (SIZE) came out to be positive and statistically significant at 5, 1% in the OLS and two step system GMM each. This reveals that firm size (SIZE) is an important determinant of firm performance. This can further be explained that a 1% increase in the size of a firm, leads to about 0.45 and 0.14% increase in firm performance (ROA) on the average in the two-step GMM and ordinary least square method (OLS) respectively. The results are in the same direction with (Bhatia & Srivastava, 2016; Mathuva, 2015; Odusanya et al., 2018; Pratheepan, 2014; Vătavu, 2014; Yazdanfar, 2013), documenting that firm size is positively connected to firm performance. It connotes that larger firms tends to have greater capital coupled with the advantage of economies of scale unlike smaller firms. Additionally, report from Asimakopoulos et al. (2009) by employing the OLS and fixed and random effects expatiate that larger firms have better cost advantage in terms of negotiating power over input prices compared to smaller firms, thus, improved performance. On the other hand, (Dhawan, 2001; Lazăr, 2016; Margaretha & Supartika, 2016; Ramasamy et al., 2005) observed negative results between firm size (SIZE) and firm performance. Seelanatha (2011) utilized a simple linear regression reported mixed results on 31 firms in China following the dependent variable measurement used on firm performance in that study.

The positive coefficient of growth (GR), which is a measure of the firm's sales, is premised on the point that a percentage increase in growth (GR) on the average, will enhance the firm performance (ROA) to about 3.36 and 2.73% at a significance level of 1% in both methods. Accordingly, when current year's sales records more than proportionate increase than the previous year's sales, revenue increases. The relationship reveals that, listed firms in Ghana are likely to engage in expensive strategies of increasing their customer base by publicising, upgrading, and innovating in order to achieve greater sales and dampen new competition (Goddard et al., 2005). The presence of growth (GR) attracts meaningful investment ventures which influences the firm's performance. Studies such as (Asimakopoulos et al., 2009; Claver et al., 2002; Davidsson et al., 2009; Durnev & Kim, 2005; Fitzsimmons et al., 2005; Gompers et al., 2003; Henry, 2008; Obeng-Krampah, 2018; Samiloglu & Demirgunes, 2008), also reports positive relation between growth (GR) and firm performance. The

result explains that, firms that experience increased growth in sales perform better than businesses with fewer sales. Additionally, Papadogonas (2005) established that growth in sales encourages profits for larger firms than smaller ones. Conversely, Kaen and Baumann (2003) find a significant and negative influence between growth and profitability. Nonetheless, the research executed by (Coad, 2007; Markman & Gartner, 2002) reports no relationship between the growth and firm performance.

The debt to equity (DE) ratio exercises adverse and no statistical significant impact on firm performance in both methods. Consequently, an increase of 1% in debt to equity ratio would cause a decrease of up to 0.24 and 0.0002% each in firm performance (ROA). The negative coefficient of debt to equity ratio (DE) is in similitude with studies by (Abata & Migiro, 2016; Akbar et al., 2016; Al-Jafari & Samman, 2015; Asimakopoulos et al., 2009; Lazăr, 2016; Pratheepan, 2014; Prempeh & Nsiah Asare, 2016; Seelanatha, 2011). Maximization of profits for firms with higher debt to equity (DE) ratio is unpredictable as more of the firm's assets are channelled to the settlement of debts thereby diminishing resources. Such firms are likely to suffer, as a percentage of its resources are directed into servicing debts reducing the portion that belongs to shareholders. The effect also denotes that, there is a higher risk of insolvency for firms with greater debt to equity (DE) ratio. Contradictory, (Burja, 2011; Stierwald, 2009), documented a significant positive impact of debt to equity (DE) ratio on the performance of Romanian and Large Australian firms respectively. Boadi et al. (2013) confirms this findings with positive affiliation between leverage and firm performance using Ordinary least square regression on a sample of 16 insurance firms in the Ghanaian setting.

Finally, a positive effect is realised between cash flow ratio (CFR) and firm performance (ROA) of listed firms in Ghana implying that the firms are more liquid, thus perform better. The direct relationship indicates that a 1% rise in liquidity, represented by cash flow ratio (CFR) leads to an increase of about 0.11 and 0.12% at 10% and 5% significance level separately in firm performance (ROA). The findings obtained signifies that listed Ghanaian firms with greater levels of cash flow ratio (CFR), have the tendency to be more profitable. The outcome of this study confirms the argument of Goddard et al. (2005) after investigating the impact of size, market share, liquidity and capital structure on firm performance in 5 European countries on a sample of 12,508 firms by utilizing the two-step system GMM method. The outcome expatiates that, that firms with higher liquidity, have the advantage of making use of projects that ensures growth and have better capacity to effectively deal with potential changes in competitive markets. From the perspective of Deloof (2003), the higher the company's liquidity level, the easier they can accomplish short-term obligations, adding to increased firm performance. Neither does the results from these studies allows corroboration with the conclusions of Delen et al. (2013) for obtaining a negative relationship between cash flow ratio (CFR) and firm performance (ROA). The assertion was that, managers with more cash for business operations face the issue of over-investment which affects firm's profitability negatively. Outcomes from (Adams & Buckle, 2003; Pratheepan, 2014) employed Ordinary Least Square (OLS) and Random and fixed effect model and adds up to the literature on negative influence between cash flow ratio (CFR) and the profitability of firms. Revelations from Nunes, Serrasqueiro, and Sequeira (2009) documented mixed results on liquidity and profitability by focusing on service industries in Portuguese.

The results explained above combines both findings from the two-step system generalized method of moments (GMM) and ordinary least square method (OLS). Both methods revealed similar outcomes concurrently. The results vividly depicts that, in spite of utilizing the two-step system generalized method of moments (GMM) and ordinary least square method (OLS) to analyse firm performance, the

findings are the same and clearly show that firms performance increases if a company develops its firm-specific resources.

Table 6. Diagnostic test.

Tests	Results	
AR (1)	0.436	
AR (2)	0.301	
Sargan Test	0.000	
Hansen Test	0.179	
No. Of Insts	13	
Prob > F	0.000	0.0000
No. Of Groups	15	
Obs/Group: Min	9	
Obs/Group: Avg	9.00	
Obs/Group: Max	9	
R-squared		0.2017

Source: Authors Composition: Standard errors are reported in parentheses, ***, **;* means significance level at 1%, 5%, and 10% respectively.

This study further adds some diagnostic test to the research to check the validity of the two-step system GMM method. From the report, AR (1) test rejects the null hypothesis of the non-appearance of 1st Order Serial Autocorrelation. To add to it, AR (2) test identifies no evidence of the 2nd Order Serial relationship. Nonetheless, as supported by Roodman (2009), the cross section of instruments stimulates unfairness of finite test bias and has the probability of reducing the validity of the Hansen J-test. In the same vein, the number of lags used in this study is restricted to one and employs the "collapsed option" approach represented by Roodman (2009) in Stata. The null hypothesis was discarded based on the Hansen test of over-identifying restraint showing that the instruments are important (for instance, no connection with the error term). In a nut shell, this study as well dismisses the erroneous assumption of the discrepancy in-Hansen heterogeneity test. Both regression methods record a Prob > F value of 0.0000, indicating model fitness. The results also recorded an R-Squared of 20%.

Table 7. Robustness test results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE	0.1525	0.0433	3.52	0.000
GR	2.7147	0.6432	4.22	0.000
DE	−7.950	0.0006	−0.01	0.989
CFR	0.0045	0.0097	0.47	0.639

Source: Authors Composition: Standard errors are reported in parentheses, ***, **;* means significance level at 1%, 5%, and 10% respectively.

The study continues to test for the robustness of the results above by employing the three-stage least-squares regression. The results reveal that firm size (SIZE) and growth (GR) have a significant

impact on return on assets (ROA) at 1% level each. Findings from the two-step system generalized method of moments (GMM) and ordinary least square method (OLS) are similar to the results above.

5. Conclusion

This paper utilized current development in panel data econometrics to explore the determinants of firm performance by applying the two-step system GMM and ordinary least square method (OLS) on a sample of 15 non-financial listed firms in Ghana from 2008–2017. The results realised by applying the two methods are similar, approving the outcome from the test for robustness. The empirical outcome suggests that firm size (SIZE), growth (GR), and cash flow ratio (CFR) has a positive impact and statistically significant in both methods. Whereas debt to equity ratio (DE) revealed negative effects on firm performance. The result was further tested with the three-stage least-squares regression and the findings were consistent with the main results of the study.

The implications from the study is that larger firms tend to have greater capital coupled with the advantage of economies of scale unlike smaller firms. Larger firms also have better cost advantage in terms of negotiating power over input prices. Again, in the presence of growth (GR), firms are probable to attract meaningful investment ventures to influence performance. Firms that experience increased growth in sales perform better than businesses with fewer sales. Accordingly, the higher the company's cash flow ratio (CFR), the easier they can realise short-term obligations, putting them in a better state to sustain increased firm performance. In a nut shell, firms with higher debt to equity ratio (DE) tends to utilize more of its profits in a bid to settle debts. These firms as well run at a higher risk of insolvency.

Regarding these results, firms who are not performing well can improve upon their operations under a more technological efficient condition to enable them perform better in a competitive market. It is also pertinent to decrease the cost of borrowing to the actual sector of the economy to ensure a reduction in cost price, to improve output and firm's performance. Furthermore, relevant macroeconomic programmes such as credit mechanisms (interest rate reduction) should be instituted by the government to regulate debt servicing and limit the influence of inflation on the economy in the long run. Firms should take advantage of debt financing rather than mismanage resources to increase performance. In all, they can also solicit for long-term monetary leverage other than short-term to give them enough room to operate and service their debt over the period.

The study is limited such that it was conducted on only 15 non-financial firms listed on the Ghana Stock Exchange in the period 2008–2017 representing a faction of firms in Ghana. Therefore, the outcome might not be the same if research is conducted on all firms and on financial firms listed on the Ghana Stock Exchange. Again, there was a problem of unavailability of data for some of the listed companies in the non-financial sector during the sample period. Thus, the relatively small sample size compared to other studies.

Conflict of interest

All authors declare no conflicts of interest in this paper.

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