Firm's capital structure decisions, asset structure, and firm's performance: application of the generalized method of moments approach

P.K. Priyan

Post-Graduate Department of Business Management, Sardar Patel University, Anand, India

Wakara Ibrahimu Nyabakora

Post-Graduate Department of Business Management, Sardar Patel University, Anand, India and
Department of Local Government Accounting and Finance, Local Government Training Institute, Dodoma, United Republic of Tanzania, and

Geofrey Rwezimula

Department of Local Government Accounting and Finance, Local Government Training Institute, Dodoma, United Republic of Tanzania

Abstract

Purpose – The study aims to evaluate the influence of capital structure decisions and asset structure on firms' performance for East African listed nonfinancial firms.

Design/methodology/approach – The research is descriptive and employs secondary data from the East African capital markets' websites. The generalized method of moments approach is used to estimate the relationship due to its ability to account for endogeneity problems.

Findings – The result shows that capital structure decisions and asset structure strongly influence the firms' performance. When long-term debts, short-term debts and tangible fixed assets increase, the return on total assets increases. An increase in the total debt ratio raises the return on equity (ROE). However, the increase in long-term debt lowers the ROE.

Practical implications – The results will help investors and potential investors decide on a financing policy that maximizes performance. Likewise, governments and other policymakers review the capital markets' frameworks to attract institutional and individual investors to the markets for financial availability and to increase profitability.

Originality/value – The research provides evidence on the influence of capital structure decisions and asset structure on firms' performance. Furthermore, its results contribute to firms' financing policy formulation and the corporate finance literature.

Keywords Asset structure, Capital structure, GMM, Performance

Paper type Research paper

1. Introduction

Performance is the key indicator for determining how efficiently and effectively invested resources are managed. It is the result of resource employment, allocation and assessment for control purposes by the firm's management (Omondi and Muturi, 2013). To measure performance, the majority of the literature employs return on equity (ROE) and return on assets (ROA). ROA, as a performance measure, means how effectively the employed assets can be used to earn a profit. On the other hand, ROE assesses how the shareholders' fund is used by the management to produce a profit. Profit is the function of all assets in a business, regardless of whether they belong to equity holders or debt holders. In this case, investors and potential investors use the two proxies (ROE and ROA) to measure the investment health of the firms.

However, there are many other factors that can determine the firms' performance. The factors may be macroeconomic factors, firms' specific characteristics or corporate governance, among others (Cohn *et al.*, 2014). Our study deals with some specific firms' factors that we think may represent other factors due to the fact that they are the results of all factors.

Regardless of the traditional theories (Durand, 1952) and MM I and II theories (Franco and Miller, 1963; Modigliani and Miller, 1958) of capital structure and its effect on firms' value, there is still no optimal capital structure that maximizes firms' value. MM II (Franco and Miller, 1963) gives room for research when it states that the results depend on the specific environment of the study. From that point, how leverage can affect performance is researched by many authors from developed, emerging and developing economies, in a nutshell, using different methodologies, different time periods included in the research and different variables tested as proxies for the independent and dependent variables. This study is the result of the area under study being reported by Mwambuli (2018). the African Development Bank (AFDB, 2019) and IMF (2020) to have had the fastest economic growth in sub-Saharan African countries for about 15 years continuously (Table 1).

Therefore, our study's uniqueness is that it uses the population of six East African countries as a unit because it has a related economic status (infant capital markets). We use the panel generalized method of moment approach to take care of endogeneity problems, employing total debt ratio, long-term debt ratio and short-term debt ratios as proxies for firms' capital structure decisions, studying the variables for 15 years from 2005 to 2019. The results of all the above considerations can provide new knowledge and a new contribution to the literature.

2. Literature review and hypothesis development

According to the literature, there is a strong association between the source of funds and firms' performance (Cui *et al.*, 2011; Doan, 2020). In this case, financing decisions are among the crucial ones made by firms that lead to either good performance or bankruptcy. Cautionary utilization of debt financing leads to a capital structure that has a trade-off between the cost of capital and expected return and contributes to maximizing firms' financial performance (Detthamrong *et al.*, 2017; Jaisinghani and Kanjilal, 2017).

2.1 The association between financial leverage and firms' performance (return on asset)
Decisions about capital structures are crucial for every corporate organization. This is due to the necessity to optimize revenue and the impact that the choice will have on the company's

Partners	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Burundi	0.9	5.5	3.6	4.5	3.5	3.9	4.2	4.2	4.6	5.2	6.7	2.8	0.5	1.6	1.8
Kenya	5.7	6.1	7.0	1.5	2.7	5.8	4.4	4.6	4.9	5.7	5.9	6.0	4.8	6.3	5.4
Rwanda	9.4	9.2	7.6	11.2	6.3	7.3	7.9	8.8	5.6	7.0	6.5	7.4	4.0	8.6	9.4
S. Sudan						−6.8	−6.8	−6.8	−6.8	−6.8	−6.8	−6.8	−5.8	−1.9	0.9
Tanzania	7.4	6.7	7.1	7.4	6.0	7.0	6.4	6.9	7.0	7.2	7.0	6.6	6.8	7.0	7.0
Uganda	10.0	7.0	8.1	10.4	4.1	6.2	6.4	2.8	5.2	6.6	7.0	4.9	7.3	6.1	6.7
EAC						7.1	6.0	5.1	5.6	6.0	6.2	5.9	5.7	6.5	6.2

Source(s): Data for 2005–2019 is adopted from Mwambuli (2018) and regional economic outlook 2020 International Monetary Fund (IMF) (2020)

capacity to succeed in its cutthroat industry. A company's financial structure is, in fact, a mix of several different sources of funding. A firm can generally select from a wide range of alternative financing structures that can maximize profit (Susilo *et al.*, 2020). Doan (2020) conducted empirical research on the impact of financing decisions on the performance of nonfinancial listed firms in Vietnam from 2008 to 2018, employing a generalized method of moment approach, and found that the increase in debt financing lowers firms' financial performance. The result contradicts the study result by Le and Phan (2017), who conducted empirical research on capital structure and firm performance for a small transition country and found that a unit increase in leverage increases firms' performance.

Jaisinghani and Kanjilal (2017) studied the relationship between leverage ratio and the performance of listed manufacturing firms in India and came up with interesting results. They found highly leveraged firms had a positive relationship, while low-leveraged firms had a negative association between leverage ratio and firms' performance. The results contradict the finding by Sakr and Bedeir (2019) when studying the impact of capital structure on a firm's performance on nonfinancial listed firms in Egypt, which found that a unit increase in leverage ratio decreases the firms' performance. The same result was found by Odusanya *et al.* (2018) when they studied the effects of capital structure on the performance of listed firms in Nigeria from 2008 to 2012.

The literature (Ardalan, 2017; Hamid *et al.*, 2015) reports that when debt levels increase, it lowers firms' performance. However, Detthamrong *et al.* (2017), when studying the impact of capital structure decisions on firms' performance in Thailand, found that debt ratios positively influence the firms' performance. The finding was in line with that of Franco and Miller (1963).

Nevertheless, Odusanya *et al.* (2018), studying the effects of capital structure on the performance of listed firms in Nigeria from 2008 to 2012, found insignificant effects of the long-term debt ratio on firms' performance. The capital structure has a negative correlation with the firm's performance as measured by ROA (Le *et al.*, 2020; Nguyen, 2020). Therefore, the following is the developed hypothesis:

H1a. Increasing the leverage ratio increases the return on total assets.

2.2 The association between financial leverage and firms' performance (return on equity)

According to research on Vietnamese pharmaceutical companies, the ROE is positively correlated with the debt ratio, advising the firms to raise the leverage ratio for better performance (Dinh and Pham, 2020). On the contrary, firms' leverage is inversely associated with financial performance for Jordanian listed enterprises (Alzubi and Bani-Hani, 2021). The finding suggests that the lower the debt ratio the company has, the more efficient the business is in managing its resources (Alzubi and Bani-Hani, 2021). However, the leverage ratio for all nonfinancial firms listed on the Vietnamese capital market is inversely related to ROE (Nguyen and Nguyen, 2019). The finding is in line with Le *et al.* (2020), who report a negative association between debt-to-equity ratio and ROE, though the research period was 2008–2015, including the financial crisis period. Nevertheless, there is no connection between the capital structure and a company's performance as indicated by ROE as reported by Nguyen (2020), though the research period was 2009–2019, including the financial crisis period. Therefore, the following is the developed hypothesis:

H1b. Increasing the leverage ratio reduces the ROE.

2.3 The association between tangible assets and firms' performance

The literature reports the association between assets and firm performance. However, there is a debate about whether the relationship prevailing is direct, inverse or none, as a few researchers found. For manufacturing firms, the relationship between asset structure

and financial performance was significant and positive (Dong *et al.*, 2011). The financial performance of pharmaceutical organizations improves when long-term assets grow or when businesses pay for long-term assets with steady capital resources (Dinh and Pham, 2020). Nevertheless, financial performance and asset structure have an inverse correlation for Jordanian listed enterprises (Alzubi and Bani-Hani, 2021). This suggests that good performers are typically organizations with a lower tangible asset ratio because they manage their resources more effectively (Alzubi and Bani-Hani, 2021). Furthermore, asset tangibility negatively affects ROE (Nguyen, 2020; Nguyen and Nguyen, 2019). The finding is in line with Le *et al.* (2020), who report a negative association between asset tangibility and performance, though the research period was 2008–2015, including the financial crisis period.

The profitability of construction enterprises listed on Vietnam's stock exchange is positively impacted by the asset structure (Nguyen, 2020). This can be explained by the fact that businesses that invest in machinery are efficient and effective during the construction process, finishing the task on time or earlier than the due date. Furthermore, tangible assets may turn into collateral assets when businesses require bank loans when in need of funds. According to Odusanya *et al.* (2018), businesses that have a lot of tangible assets receive favorable interest rates from banks when borrowing money, which will boost corporate productivity. Therefore, the following is the developed hypothesis:

H1c. An increase in the tangible asset ratio raises the firms' financial performance

2.4 The association between firm size and firms' performance

The literature has given evidence on the association between profitability and firm size in such a way that we can use size as a controlling variable between capital structure, asset structure and firm performance. The literature (Lee, 2009) examines the role that firm size plays in the profitability of US public firms; employing a fixed-effects approach, it finds a significant positive relationship between firm size and profit rates.

The size of firms negatively influences the firms' financial performance for Jordan's listed enterprises (Alzubi and Bani-Hani, 2021). In explaining their findings, they suggest that most small businesses tend to manage their resources more successfully (Alzubi and Bani-Hani, 2021).

However, a study on Vietnamese pharmaceutical companies found that company size has a positive effect on ROE (Dinh and Pham, 2020). Businesses' performance was found to be positively correlated with their size, indicating that larger businesses perform better (Le *et al.*, 2020; Nguyen and Nguyen, 2019; Raed, 2020; Tudose *et al.*, 2022). It was reported that the size of the business has no influence on profitability (Endri *et al.*, 2020; Vu *et al.*, 2020).

Firm size is positively correlated to the performance of construction enterprises listed on the Vietnam Stock Exchange (Nguyen, 2020). Additionally, the trade-off theory states that large businesses are given more favorable treatment when seeking funding. Also, when taking out large loans, they are eligible to have their corporate income tax reduced because interest expenses are tax deductible, which contributes to profitability growth (Nguyen, 2020).

Businesses are fiercely competitive in the marketplace. It will be simple for large companies to implement and benefit from the economic advantages (Nguyen, 2020). Furthermore, access to resources is frequently simpler for large businesses because of the benefits of capital and the ability to mortgage assets, allowing for adequate resources to support and grow the organization (Nguyen, 2020). Therefore, the following is the developed hypothesis:

H1d. The larger the firm size, the lower the possibility of high performance.

3. Research methodology

3.1 Methodology

The research uses panel data analysis that combines time series and cross-sectional data. Data from the different entities over multiple periods is called panel data (Blundell and Mátyás, 1992; Hsiao, 2007). Panel data can be used to analyze nonstationary time series data in some instances (Hsiao, 2007). According to the literature, the relationship between a firm's capital structure decisions, asset structure and performance is studied using a variety of methodologies. To obtain more robust results, the generalized method of moments (GMM) was employed.

When the data set is heteroskedastic, the GMM model outperforms traditional methods such as the pooled least squares method (POLS) and two-stage least squares. If the data set has autocorrelation or heteroskedasticity, GMM is more efficient than the fixed effects estimator (Wooldridge, 2001). Therefore, the GMM was used to analyze the data with the goal of addressing the explanatory factors' potential endogeneity.

To choose whether to use the GMM or the system generalized method of moments (SGMM) model, one needs to follow three essential stages: (1) Pooled ordinary least squares (OLS) and fixed effects models should be used to estimate the model. (2) The upper bound estimate for the coefficient should be the pooled OLS, while the lower bound estimate should be the comparable estimate. (3), the GMM coefficient must be obtained and compared to the pooled OLS and fixed effects models. When the GMM coefficient is near or lower than the fixed effects model, it means the former estimate is downward biased due to poor instrumentation and calls for the SGMM model instead (Bond, 2002). After completing the processes outlined above, the SGMM model could be used. However, none of the factors were significant after testing the model using the SGMM model. This could be due to the panel having fewer entities and insufficient data (Shanthirathna, 2019). Our data set is comprised of 31 listed firms in the East African stock market. Due to the infancy of the capital markets, there are few participants qualified for our study. Therefore, the generalized method of the moment model was used to estimate the relationship (Shanthirathna, 2019).

3.2 Sample selection

The research establishes the influence of firms' capital structure decisions and asset structure on firms' performance for East African listed nonfinancial firms from 2005 to 2019. We use secondary data from the East African capital markets' websites. The selection of firms in the population was due to data availability. So, some of the firms were excluded due to their data being unavailable. The capital markets have 108 firms in total, but those that met selection criteria were 31 firms. The criteria were: delisted and listed firms during the period were excluded due to the unavailability of their data for some of the years. Financial firms have unique capital structures, and their guidelines and regulations differ from those of nonfinancial firms, so their repositories are at the central banks.

3.3 Model specification

To avoid endogeneity problems, the panel GMM approach is used to estimate the effect of capital structure decisions and asset structure on firms' performance. In situations where the number of moment conditions exceeds the number of model parameters, GMM works better. Also, the method allows testing for model misspecification and overidentification limitations using J-statistics. According to Arellano and Bond (1991), the method enables the use of lag variables as regressors to deal with dynamic parameters and unobserved specific effects. This is where the lagged dependent variables become part of explanatory variables that are associated with the model's random disturbance terms to explain the dynamic effects (Altaf, 2020). Based on Wooldridge (2009), we use one-year lag dependent variables ($LNROA_{(-1)}$ and

LNROE$_{(-1)}$) to account for the dynamic effects and unobserved specific effects. Therefore, Anderson and Hsiao (1982) and Bhargava and Sargan (1983) suggest the employment of instrumental variables to estimate the dynamic panel data models.

To test for overidentification of the employed instruments' validity, the Sargan (1958) test is used, while Arellano-Bond is used to test for serial correlation. Autoregressive (AR) (1) stands for first-order serial correlation and AR (2) for second-order serial correlation. The Wald χ^2 test is used to determine the collective significance of models.

3.4 Regression equations
The study employs the regression equation as used by Basant and Mishra (2013).

$$FP_{it} = \beta_0 + \beta_1(FP_{it-1}) + \beta_2(FP_{it-2}) + \beta_3(LEV_{it}) + \beta_4(ASS_{it}) + \beta_5(SIZE_{it}) + \alpha_i + \varepsilon_{it}$$

Where;

FP denotes firms' performance, proxied by the natural logarithm of ROA (LNROA) and the natural logarithm of ROE (LNROE); FP_{it-1} denotes the first-lag value of firms' performance; FP_{it-2} denotes the second-lag value of firms' performance; the natural logarithm of the long-term debt ratio (LNLTDR); the natural logarithm of the short-term debt ratio (LNSTDR); and the natural logarithm of the total debt ratio (LNTDR) are used to calculate leverage (LEV). ASS denotes the asset structure proxied by the natural logarithm of the tangible assets ratio (LNTANGIBILITY), controlled by firms' size, $i = 1, 2, 3, \ldots, n$ (number of firms), t denotes the years 2005–2019, β = coefficients of independent variables, β_0 denotes the intercept, ε_{it} denotes an error term, and α_i denotes unobserved firms' specific effects for firm i.

Our models' regression equations are as follows:

$$LNROA_{it} = \beta_0 + \beta_1(LNROA_{it-1}) + \beta_2(LNROA_{it-2}) + \beta_3(LNLTDR_{it}) + \beta_4(LNSTDR_{it})$$
$$+ \beta_5(LNTDR_{it}) + \beta_6(LNTANGIBILITY_{it}) + \beta_7(SIZE_{it}) + \alpha_i + \varepsilon_{it}$$

Model (1)

$$LNROE_{it} = \beta_0 + \beta_1(LNROE_{it-1}) + \beta_2(LNROE_{it-2}) + \beta_3(LNLTDR_{it}) + \beta_4(LNSTDR_{it})$$
$$+ \beta_5(LNTDR_{it}) + \beta_6(LNTANGIBILITY_{it}) + \beta_7(SIZE_{it}) + \alpha_i + \varepsilon_{it}$$

Model (2)

Our models have year-one and year-two lagged dependent variables to account for the dynamic effects. To estimate equations, only a one-year lag variable is considered, something that has no effect on the models' results (Basant and Mishra, 2013). Therefore, the overall research design can be seen in Figure 1.

3.5 Variables' definition, description and measurement
Table 2 provides a summary of the measurements for the research variables derived from the study framework (Figure 1) created from empirical and theoretical literature. Therefore, variables' illustrations, descriptions, measurements and sources can be seen in Table 2.

4. Results
4.1 Descriptive statistics
Table 3 exhibits descriptive statistics for the variables under this study. It explains that firms in East Africa on average earn a profit of around 10.78% when calculating performance using
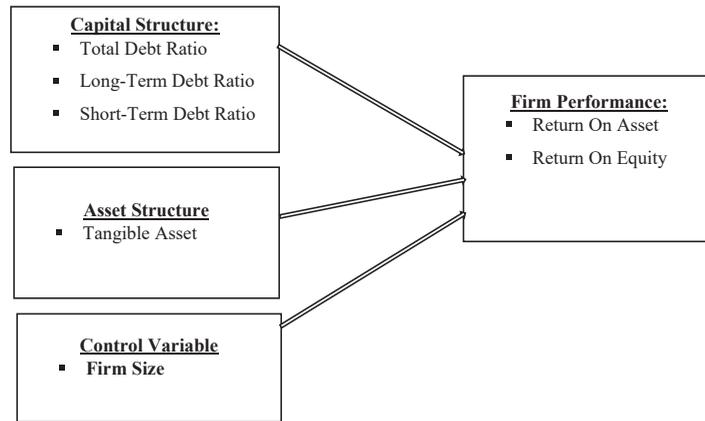
Figure 1.
Conceptual framework

Source(s): Developed by authors

Variables	Description	Sources
Performance	It is dependent variable that measures how efficiency the firm uses its assets LN $ROA = LN\left(\frac{ProfitBeforeTax}{TotalAssets}\right)$	Simon *et al.* (2017)
Performance	It is dependent variable that measures how efficiency the firm uses shareholders' fund LN $ROE = LN\left(\frac{ProfitBeforeTax}{TotalAssets}\right)$	Simon *et al.* (2017)
Capital structure (LNTDR$_{it}$)	It is independent variable defined as the natural logarithm of short-term debt ratio. Log of total debt ratio = LN$\left(\frac{TotalLiabilities}{TotalAssets}\right)$	Akoto *et al.* (2013)
Capital structure (LNLTDR$_{it}$)	It is independent variable defined as the natural logarithm of short-term debt ratio. Log of long-term debt ratio = $LN\left(\frac{LongtermlLiabilities}{TotalAssets}\right)$	Akoto *et al.* (2013)
Capital structure (LNSTDR$_{it}$)	It is independent variable defined as the natural logarithm of short-term debt ratio. Log of short-term debt ratio = $LN\left(\frac{Short-termLiabilities}{TotalAssets}\right)$	Akoto *et al.* (2013)
Assets' structure	It is independent variable defined as the natural logarithm of the ratio between tangible assets to total assets. LNTANGIBILITY = Natural Logarithm of (tangible assets divided by total assets)	Kayani *et al.* (2019)
SIZE	It is a controlling variable defined as the natural logarithm of total assets Natural Logarithm of (total assets)	Kayani *et al.* (2019)

Table 2.
Variables' description and measurements

Source(s): Authors own

Descriptions	Mean	Standard deviation	Minimum	Maximum	Observations
LNROA	0.1078	0.1487	−0.5616	0.5263	451
LNROE	0.1722	0.3482	−3.6019	1.7889	451
LNLTDR	−2.0429	1.0251	−7.7093	0.0457	451
LNSTDR	−1.6063	0.7688	−3.7554	0.0597	451
LNTDR	−0.9116	0.4882	−2.3330	0.4401	451
SIZE	9.3786	3.2355	2.8449	19.7585	451
LNTANGIBILITY	−0.0353	0.1145	−1.1585	0.0000	451

Table 3.
Descriptive statistics for model 1, and 2

Source(s): Authors own

LNROA and 17.22% when using LNROE. The LNROA ranges from −56.16 to 52.63%, while
the LNROE ranges from −360.19 to 178.89%. Not only that the mean values for long-term,
short-term and total debt ratios are negative.

4.2 Testing for multicollinearity

Checking for multicollinearity before analyzing panel data is more imperative. It can lead not
only to reliable results but also to reliable interpretations. We present the paired correlation
matrix (Table 4) to check for multicollinearity effects. The result shows the absence of
multicollinearity effects among explanatory variables. Kyere and Ausloos (2020) denote that
correlations among explanatory variables should be less than 0.80 for better results;
otherwise, multicollinearity problems exist. The problem leads to a violation of the basic
classical linear regression model (CLRM) assumptions. In our case (Table 4), the highest
correlation coefficient is 0.68 between LNSTDR and LNTDR, which is less than 0.80. So far,
the series has not suffered from multicollinearity problems.

4.3 Generalized method of moment analysis

When using panel data, Arellano and Bond (1991) suggest the use of the panel generalized
method of moment approach due to its ability to account for potential endogeneity
regressors. Table 4 exhibits estimations and the results of standard diagnostic tests. These
tests include Wald χ^2 tests for the overall significance of the series, the F-test (lambda) for
the joint implication of the coefficients, Arellano-Bond AR (1) and AR (2) tests for serial
correlation and Hansen J-Statistics for the validity of the instrumental variables used (Al-
ahdal *et al.*, 2020).

The results in Table 5 exhibit lambda for LNROA$_{(−1)}$ having a coefficient of −0.1523 and a
p-value of 0.0000, and lambda for LNROE$_{(−1)}$ having a coefficient of −0.1942 and a *p*-value of
0.0000. The *p*-value for the J-statistic for LNROA is 0.24, and for LNROE it is 0.23. Tests for
serial correlation show AR (1) is 0.04 for LNROA and 0.19 for LNROE. Furthermore, AR (2) is
0.35 for LNROA and 0.10 for LNROE. Insignificant results lead us to fail to reject the null
hypothesis that there is no serial correlation. Furthermore, Wald–Chi^2 statistics test models 1
and 2 yield statistically significant results for the overall series, indicating that our series is
statistically significant (Basant and Mishra, 2013).

The LNLTDR is found to be significant and positively affects the LNROA while
negatively affecting the LNROE. Also, LNSTDR is significant and positive on the LNROA,
while it is insignificant on the LNROE. However, LNTDR is found to be significant and
negatively affects the LNROA while positively affecting the LNROE. LNTANGIBILITY
shows positive and significant results on both models, while SIZE shows a significant and
negative effect on LNROA and LNROE.

Independent variables	1	2	3	4	5
1. LNLTDR	1				
2. LNSTDR	−0.2286	1			
3. LNTDR	0.4001	0.6856	1		
4. SIZE	0.1334	−0.0475	−0.2218	1	
5. LNTANGIBILITY	0.0837	−0.1381	−0.0363	−0.0711	1
Source(s): Authors own					

Table 4.
Paired correlation
matrix

Independent variables	Model 1			Model 2		
	Coefficients	p-value		Coefficients	p-value	
Lag of dependent variables	−0.1523	0.0000		−0.1942	0.0000	
LNLTDR	0.0985	0.0000		−0.1353	0.0099	
LNSTDR	0.3418	0.0000		−0.0711	0.6107	
LNTDR	−0.7259	0.0000		0.4468	0.0085	
SIZE	−0.0604	0.0003		−0.2424	0.0000	
LNTANGIBILITY	0.6698	0.0028		2.3193	0.0009	
Wald χ^2	121.1391	0.0000		2337.912	0.0000	
AR (1)	−0.7600	0.04472		−1.3053	0.1918	
AR (2)	−0.9266	0.3541		−1.6149	0.1063	
Hansen J-statistics	27.3695	0.2406		25.4070	0.2300	
Observations	396			352		

Table 5.
GMM analysis for
model 1 and 2

Note(s): Instrument specification for model 1: @DYN(LNROA,−1,−2) LNTDR(−1) SIZE(−1) LNTANGIBILITY(−1). For model 2: @DYN(LNROE,−1,−2) LNSTDR(−2) LNLTDR(−1) LNTDR(−1)
Source(s): Authors own

5. Discussion of findings

Capital structure decisions (short-term debt ratio and long-term debt ratio) have positive effects on financial performance (return on total assets). On the other hand, the total debt ratio positively affects the ROE. This means the increase in short-term debt ratio and long-term debt ratio raises the firms' financial performance. Short-term debts can be in the form of credit purchases that increase the inventory level, which makes the inventory level meet the required level in such a way that no production stoppage caused by stock-outs can occur. When production runs smoothly, it boosts sales and increases profit. Furthermore, an increase in the long-term debt ratio allows firms to invest in non-current assets, which boosts production and sales, resulting in more profit. Also, an increase in debt reduces the cost of capital and maximizes the firms' returns. So, the null hypothesis that increasing the leverage ratio lowers the return on total assets is rejected. Also, the null hypothesis that increasing the leverage ratio lowers the ROE is rejected. That supports Franco and Miller's (1963) capital structure theory and findings by Detthamrong *et al.* (2017) and Le and Phan (2017).

Using debt financing to invest in assets enables firms to benefit from a nondebt tax shield that reduces operating costs and increases profit. It should be known that debt interest is tax-free, reducing taxable revenue and increasing profit. This is proved by our results on the effects of asset structure on firms' financial performance (Table 5), which found positive effects for both models. This means the increase in tangible assets raises financial performance. The result is in line with findings by Dinh and Pham (2020) and Nguyen (2020).

In this case, firms are advised to employ more noncurrent tangible assets to increase their financial performance. The increase in fixed assets depends on the sources of funds. So, when debt financing increases, it leads to an increase in fixed assets, which raises firms' performance. This means debt financing should be used to finance tangible fixed assets. So, the null hypothesis that the increase in tangible assets lowers firms' financial performance is rejected. This supports the Franco and Miller (1963) capital structure theory.

However, the total debt ratio shows funny results as it shows a negative influence on the return on total assets (the proxy for firm performance). Due to East Africa being reported as a high-growth economy, its firms experience a negative relationship between debt financing and financial performance because an increase in debt financing forces firms' managers to be reluctant to invest in profitable projects, and they find themselves in underinvestment (Le and Phan, 2017). So, we cannot reject the null hypothesis that increasing the leverage ratio *(total debt ratio)* lowers the return on total assets (Doan, 2020; Le *et al.*, 2020; Nguyen, 2020).

Consequently, model 2 shows the negative influence of the long-term debt ratio (the proxy for capital structure decisions) on firms' performance. This means that the increase in long-term leverage decreases the ROE. The reduction in long-term leverage means increasing the equity share of ownership and the share of profit. It implies that increasing long-term leverage means increasing beneficiaries for the stake. The portion of profit that could be enjoyed by only equity shareholders can be shared by equity shareholders and long-term debt holders. This decreases the equity shareholders' profit compared to what it could be without long-term debt financing. According to the trade-off theory, the increase in debt financing beyond the trade-off between the cost of capital and the expected return affects profitability negatively. In this case, the null hypothesis that *increasing the leverage ratio increases the ROE* is rejected. The results support the trade-off theory. Therefore, it is recommended that firms be cautious when employing long-term debt financing for their internal projects due to the fact that it can negatively affect their ROE (the proxy for firms' financial performance).

The relationship between the short-term debt ratio and the ROE is found to be insignificant.

Firm size has a negative influence on firms' financial performance. This means that the larger the firms, the lower the possibility of high financial performance, and the smaller the firms, the higher the possibility of high performance. It explains that firms under this study do not benefit from economies of scale, something considered to be enjoyed by large firms. Therefore, we cannot reject the null hypothesis that the larger the firm, the lower the possibility of high financial performance. The result is in line with findings by Alzubi and Bani-Hani (2021).

The research provides evidence on the influence of capital structure decisions and asset structure on firms' performance in the East African context. Furthermore, because the study is new in the study area, its results contribute to firms' financing policy formulation and the extension of corporate finance theoretical literature. Reviewing the capital markets' frameworks by governments will attract investors to use the markets, which are the cheapest financing sources and increase profitability. However, the firms' management has to employ appropriate financing decisions for performance improvement. For instance, the employment of reasonable debt financing to invest in fixed assets.

6. Conclusion, limitations and future research

The paper examines the effects of firms' capital structure decisions and asset structure on the financial performance of non-financial listed East African firms for the years 2005–2019, employing the GMM approach. Firms' financial performance is measured using a return on total assets and a ROE. A financing decision is proxied by the total debt ratio, the long-term debt ratio and the short-term debt ratio.

The increase in debt financing reduces the cost of capital, which raises the firms' profitability. Furthermore, an increase in debt financing enables firms to invest in non-current assets that boost production and increase sales, which leads to more profit.

Consequently, investment in assets enables firms to benefit from a non-debt tax shield that reduces operating costs and increases profit. This is evidenced by the results on the effects of asset structure on firms' financial performance, which report that the increase in tangible assets raises financial performance. When debt financing increases, it leads to an increase in fixed assets, which raises firms' performance. In this case, firms are advised to use debt financing to invest in noncurrent tangible assets to increase their financial performance. However, without strong sources of funds (especially given the infancy of capital markets in the study area), firms can hardly achieve their goals. Therefore, as the study explains this as one of the limitations, governments and other policymakers will use the findings to improve

the situation and attract institutions and individuals to join and use the market for financial availability.

Data availability from some of the firms was challenging due to the infancy of the capital markets, which became our limitation. This is due to the fact that data availability was one of the considerations for the firms' selection.

We suggest that governments have to improve their capital markets and conduct frequent reviews of their fiscal and monetary policies to adjust the banks' interest rates to widen the firms' financing sources for better firm performance and economic growth. Reviewing the capital markets' frameworks attracts investors to use the markets, which is the cheapest financing source and increases profitability. However, the firms' management has to employ appropriate financing decisions for performance improvement. This may require the use of reasonable debt financing to invest in fixed assets.

As the research was conducted for six East African countries as a unity, in the future, we suggest a comparative study of this area for the East African countries.

References

AFDB (2019), "East Africa economic outlook 2019", in *Africa Economic Outlook Report*, available at: http://www.fashionomicsafrica.org/_storage/95835a4e96ff28735574dc3fb1ad7df8a50 929041521017629.pdf%0Awww.africaneconomicoutlook.org/en/outlook

Akoto, R.K., Awunyo-Vitor, D. and Angmor, P.L. (2013), "Working capital management and profitability: evidence from Ghanaian listed manufacturing firms", *Journal of Economics and International Finance*, Vol. 5 No. 9, pp. 373-379, doi: 10.5897/jeif2013.0539.

Al-ahdal, W.M., Alsamhi, M.H., Tabash, M.I. and Farhan, N.H.S. (2020), "The impact of corporate governance on financial performance of Indian and GCC listed firms: an empirical investigation", *Research in International Business and Finance*, Vol. 51 No. September 2018, 101083, doi: 10.1016/j.ribaf.2019.101083.

Altaf, N. (2020), "Working capital financing, firm performance and financial flexibility: evidence from Indian hospitality firms", *Global Business Review*, pp. 1-12, doi: 10.1177/0972150920961371.

Alzubi, K. and Bani-Hani, A. (2021), "Determinants of debt-to-equity and its impact on the performance of industrial companies listed on amman stock exchange", *Journal of Governance and Regulation*, Vol. 10 No. 4 Special issue, pp. 353-364, doi: 10.22495/jgrv10i4siart15.

Anderson, T.W. and Hsiao, C. (1982), "Formulation and estimation of dynamic models using panel data", *Journal of Econometrics*, Vol. 18 No. 1, pp. 47-82, doi: 10.1016/0304-4076(82)90095-1.

Ardalan, K. (2017), "Capital structure theory: reconsidered", *Research in International Business and Finance*, Vol. 39, pp. 696-710, doi: 10.1016/j.ribaf.2015.11.010.

Arellano, M. and Bond, S. (1991), "Some tests of specification for panel data:monte carlo evidence and an application to employment equations", *Review of Economic Studies*, Vol. 58 No. 2, pp. 277-297, doi: 10.2307/2297968.

Basant, R. and Mishra, P. (2013), "Concentration and other determinants of innovative efforts in Indian manufacturing sector: a dynamic panel data analysis", in Working Paper (Issue W.P. No. 2013-02-01).

Bhargava, A. and Sargan, J.D. (1983), "Estimating dynamic random effects models from panel data covering short time periods", *Econometrics, Statistics, and Computational Approaches in Food and Health Sciences*, Vol. 51 No. 6, pp. 3-28, doi: 10.1142/9789812773319_0001.

Blundell, R. and Mátyás, L. (1992), "Panel data analysis: an introductory overview", *Structural Change and Economic Dynamics*, Vol. 3 No. 2, pp. 291-299, doi: 10.1016/0954-349X(92)90008-T.

Bond, S.R. (2002), "Dynamic panel data models: a guide to micro data methods and practice", available at: http://hdl.handle.net/10419/79398%0AStandard-Nutzungsbedingungen

Cohn, J.B., Mills, L.F. and Towery, E.M. (2014), "The evolution of capital structure and operating performance after leveraged buyouts: evidence from U.S. corporate tax returns", *Journal of Financial Economics*, Vol. 111 No. 2, doi: 10.1016/j.jfineco.2013.11.007.

Cui, J., De Jong, F. and Ponds, E. (2011), "Intergenerational risk sharing within funded pension schemes", *Journal of Pension Economics and Finance*, Vol. 10 No. 1, pp. 1-29, doi: 10.1017/S1474747210000065.

Detthamrong, U., Chancharat, N. and Vithessonthi, C. (2017), "Corporate governance, capital structure and firm performance: evidence from Thailand", *Research in International Business and Finance*, Vol. 42 No. September 2016, pp. 689-709, doi: 10.1016/j.ribaf.2017.07.011.

Dinh, H.T. and Pham, C.D. (2020), "The effect of capital structure on financial performance of Vietnamese listing parmaceutical enterprises", *Journal of Asian Finance, Economics and Business*, Vol. 7 No. 9, pp. 329-340.

Doan, T.T.T. (2020), "Financing decision and firm performance: evidence from an emerging country", *Management Science Letters*, Vol. 10 No. 4, pp. 849-854, doi: 10.5267/j.msl.2019.10.012.

Dong, Y., Leung, C.K.Y. and Cai, D. (2011), "What drives fixed asset holding and risk-adjusted performance of corporate in China ? An empirical analysis", No. 29128, available at: https://mpra.ub.uni-muenchen.de/29128/

Durand, D. (1952), *Costs of Debt and Equity Funds for Business: Trends and Problems of Measurement*, National Bureau of Economic Research, pp. 215-262, available at: http://www.nber.org/chapters/c4790

Endri, E., Sari, A.K., Budiasih, Y., Yuliantini, T. and Kasmir, K. (2020), "Determinants of profit growth in food and beverage companies in Indonesia", *Journal of Asian Finance, Economics and Business*, Vol. 7 No. 12, pp. 739-748, doi: 10.13106/JAFEB.2020.VOL7.NO12.739.

Franco, M. and Miller, M.H. (1963), "Corporate income taxes and the cost of capital: a correction", *The American Economic Review*, Vol. 53 No. 3, pp. 433-443.

Hamid, M.A., Abdullah, A. and Kamaruzzaman, N.A. (2015), "Capital structure and profitability in family and non-family firms: malaysian evidence", *Procedia Economics and Finance*, Vol. 31 No. 15, pp. 44-55, doi: 10.1016/s2212-5671(15)01130-2.

Hsiao, C. (2007), "Panel data analysis-advantages and challenges", *Test*, Vol. 16 No. 1, pp. 1-22, doi: 10.1007/s11749-007-0046-x.

IMF (2020), "Sub-Saharan Africa: a difficult road to recovery", *Regional Economic Outlook*, October, pp. 1-60.

Jaisinghani, D. and Kanjilal, K. (2017), "Non-linear dynamics of size, capital structure and profitability: empirical evidence from Indian manufacturing sector", *Asia Pacific Management Review*, Vol. 22 No. 3, pp. 159-165, doi: 10.1016/j.apmrv.2016.12.003.

Kayani, U.N., De Silver, T.-A. and Gan, C. (2019), "Working capital management and corporate governance: a new pathway for assessing firm performance", *Applied Economics Letters*, Vol. 26 No. 11, pp. 938-942, doi: 10.1080/13504851.2018.1524123.

Kyere, M. and Ausloos, M. (2020), "Corporate governance and firms financial performance in the United Kingdom", *International Journal of Finance and Economics*, Vol. 26 No. 2, pp. 1871-1885, doi: 10.1002/ijfe.1883.

Le, T.P.V. and Phan, T.B.N. (2017), "Capital structure and firm performance: empirical evidence from a small transition country", *Research in International Business and Finance*, Vol. 42, July, pp. 710-726, doi: 10.1016/j.ribaf.2017.07.012.

Le, T.N., Mai, V.A. and Nguyen, V.C. (2020), "Determinants of profitability: evidence from construction companies listed on Vietnam securities market", *Management Science Letters*, Vol. 10 No. 3, pp. 523-530, doi: 10.5267/j.msl.2019.9.028.

Lee, J. (2009), "Does size matter in firm performance? Evidence from US public firms", *International Journal of the Economics of Business*, Vol. 16 No. 2, pp. 189-203, doi: 10.1080/13571510902917400.

Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporation finance and the theory of investment", *Journal of Chemical Information and Modeling*, Vol. 48 No. 3, pp. 261-267.

Mwambuli, E.L. (2018), "How does board structure characteristics affect capital structure decisions? Evidence from East African stock markets", *Journal of Corporate Governance Research*, Vol. 2 No. 1, doi: 10.5296/jcgr.v2i1.12599.

Nguyen, D.T. (2020), "The effect of financial structure on business performance of industrial enterprises listed in Vietnam", *Accounting*, Vol. 6 No. 7, pp. 1297-1304, doi: 10.5267/j.ac.2020.8.021.

Nguyen, T.H. and Nguyen, H.A. (2019), "Capital structure and firm performance of non-financial listed companies: cross-sector empirical evidences from Vietnam", *Accounting*, Vol. 6 No. 2, pp. 137-150, doi: 10.5267/j.ac.2019.11.002.

Odusanya, I.A., Yinusa, O.G. and Ilo, B.M. (2018), "Determinants of firm Profitability in Nigeria: evidence from dynamic panel models", *SPOUDAI Journal of Economics and Business*, Vol. 68 No. 1, pp. 43-58.

Omondi, M.M. and Muturi, W. (2013), "Factors affecting the financial performance of listed companies at the Nairobi Securities Exchange in Kenya", *Research Journal of Finance and Accounting*, Vol. 4 No. 15, pp. 99-105.

Raed, K. (2020), "Dividend policy and companies" financial performance", *Journal of Asian Finance, Economics and Business*, Vol. 7 No. 10, pp. 531-542, doi: 10.13106/jafeb.2020.vol7.no10.531.

Sakr, A. and Bedeir, A. (2019), "Impact of capital structure on firm's performance: focusing on non-financial listed Egyptian firms", *International Journal of Financial Research*, Vol. 10 No. 6, pp. 78-87, doi: 10.5430/ijfr.v10n6p78.

Sargan, J.D. (1958), "The estimation of economic relationships using instrumental variables", Author (s): J.D. Sargan Reviewed work (s): Published by: The Econometric Society Stable URL:, *Econometrica*, Vol. 26 No. 3, pp. 393-415, available at: http://www.jstor.org/stable/1907619

Shanthirathna, M.H.T.N. (2019), "Impact of liquidity management and capital structure on company performance: evidence from New Zealand listed companies", in *Lincoln University Digital Thesis Copyright*, Lincoln University.

Simon, S., Sawandi, N. and Abdul-Hamid, M.A. (2017), "The quadratic relationship between working capital management and firm performance: evidence from the Nigerian economy", *Journal of Business and Retail Management Research*, Vol. 12 No. 1, pp. 94-108, doi: 10.24052/jbrmr/v12is01/tqrbwcmafpeftne.

Susilo, D., Wahyudi, S. and Pangestuti, I.R.D. (2020), "Profitability determinants of manufacturing firms in Indonesia", *International Journal of Economics and Business Administration*, Vol. 8 No. 2, pp. 53-64, doi: 10.35808/ijeba/443.

Tudose, M.B., Rusu, V.D. and Avasilcai, S. (2022), "Financial performance – determinants and interdependencies between measurement indicators", *Business, Management and Economics Engineering*, Vol. 20 No. 1, pp. 119-138, doi: 10.3846/bmee.2022.16732.

Vu, T.M.T., Tran, C.Q., Doan, D.T. and Le, T.N. (2020), "Determinants of capital structure: the case in Vietnam", *Journal of Asian Finance, Economics and Business*, Vol. 7 No. 9, pp. 159-168, doi: 10.13106/JAFEB.2020.VOL7.NO9.159.

Wooldridge, J.M. (2001), "Applications of generalized method of moments estimation", *Journal of Economic Perspectives*, Vol. 15 No. 4, pp. 87-100, doi: 10.1257/jep.15.4.87.

Wooldridge, J.M. (2009), "On estimating firm-level production functions using proxy variables to control for unobservables", *Economics Letters*, Vol. 104 No. 3, pp. 112-114, doi: 10.1016/j.econlet.2009.04.026.

About the authors

P.K. Priyan is a professor of finance and Director of Post-Graduate Department of Business Management of Sardar Patel University, Gujarat. He is University Grants Commission (UGC) recognized guide for post graduate and undergraduate levels, and has more than 30 years of experience in academic. He has published 36 papers in international and national peer reviewed journals, and 5 published books. His area of specialization is financial management, techno-entrepreneurship, management control system, investment management, strategic financial management.

Wakara Ibrahimu Nyabakora is an assistant lecturer at the Local Government Training Institute, Tanzania, a scholar for PhD in management at Sardar Patel University, a senior scholar in public finance at Dongbei university of finance and economics, Dalian, China (2017–2018). He has more than 20 years' experience in administrative and academic. He has published 7 papers in international peer reviewed journals. His area of specialization is financial accounting, financial management, corporate finance, public finance. Wakara Ibrahimu Nyabakora is the corresponding author and can be contacted at: nyabakora2019@spuvvn.edu

Geofrey Rwezimula has a Master degree in Business Administration (Finance and Banking). Currently he is a PhD scholar (China) and an assistant lecturer at the Local Government Training Institute, Tanzania, with experience of being an academician for more than 20 years. Published two books and more than five papers in the peer reviewed journals. His area of specialization is finance, banking, statistics and business mathematics.