Journal of Applied Sciences

ISSN 1812-5654

science alert

ANSInet
an open access publisher
http://ansinet.com

OPEN ACCESS Journal of Applied Sciences

ISSN 1812-5654
DOI: 10.3923/jas.2016.438.444

Research Article
Non-linearity in Debt and Return Relationship: Evidence from Dynamic Panel Threshold Method

Bolaji Tunde Matemilola, A.N. Bany-Ariffin, W.N.W. Azman-Saini and Annuar Md. Nassir

Faculty of Economics and Management, Universiti Putra Malaysia, 43400 Selangor, Malaysia

Abstract

Background and Objective: Moderate debt usage increases returns during economic boom, but high debt could decreases returns during economic recession. This study examines if there is a threshold debt level in the debt-returns relationship. **Methodology:** This study applies dynamic panel-threshold method to determine optimal debt level beyond which further increases in debt decreases returns. This study finds a threshold effect of 20.570% between debt ratio and return on equity. If the debt ratio is lower than 20.570%, a 1% increases in debt ratio increase return on equity by 0.128%. But, when the debt ratio is higher than 20.570%, a 1% increase in debt ratio decreases return on equity by 0.050%. **Results:** The results suggest that there is an optimal debt ratio of 20.570% at which point further increase in debt decreases return on equity. **Conclusion:** These results support the tradeoff theory, which suggests that there is an optimum debt level that maximizes returns.

Key words: Returns, debt, tradeoff theory, dynamic panel-threshold analysis

Received: February 15, 2016 Accepted: April 30, 2016 Published: August 15, 2016

Citation: Bolaji Tunde Matemilola, A.N. Bany-Ariffin, W.N.W. Azman-Saini and Annuar Md. Nassir, 2016. Non-linearity in debt and return relationship: Evidence from dynamic panel threshold method. J. Applied Sci., 16: 438-444.

Corresponding Author: Annuar Md. Nassir, Faculty of Economics and Management, Universiti Putra Malaysia, Malaysia

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Practitioners and researchers in areas of financial economics generally acknowledge that using moderate debt increases returns during economic boom, but high debt decreases returns during economic recession. Precisely, there are cases of firms using high debt which expose them to financial distress problem in South Africa[1]. As discussed by Visser[2], South Africa has developed similar legislation as the US and Europe to rescue firms facing financial distress problem, yet the level of success in South Africa remains limited. Firm's financial distress problem is explainable within the framework of tradeoff theory of capital structure. Therefore, testing the tradeoff theory in South Africa would provide more empirical evidence and add clarity to the ongoing capital structure debate from an African perspective.

Capital structure decisions are crucial for firms because it requires choosing the right combination of debt and equity that maximize returns to shareholders. Each component of capital structure has different costs to the firms and the issue that arises is to determine the appropriate amount of debt to finance firms operations[3]. The determination of the appropriate amount of debt to finance firms operation remains an unresolved issue[4]. Firms give more attention to debt component of capital structure because it is a double edge sword that increases returns during good economic period but decreases return during bad economic period. The capital structure (debt-equity mix) decisions have generated intense debate in the field of financial economics for over 50 years, however the empirical evidence remains inconclusive[5].

Additionally, previous empirical research assumes that the relationship between returns and debt is linear; but, the relationship between returns and debt is non-linear[5,6]. Present studies highlight the importance of non-linearity among finance variables[7,8]. Focusing on non-linear relationship, Ahmad and Abdullah[5] and Lin and Chang[6] apply Hansen[9] static panel threshold to investigate the effects of debt on return on equity and firm value, respectively. This study is different from previous studies because we apply Kremer *et al.*[10] dynamic panel approach which extends of Hansen[9] static panel threshold to endogenous regressors. We are unaware of prior studies that apply the dynamic panel threshold method to analyze the non-linear effect of debt on returns. The relationship between returns and debt is dynamic in nature[11]. Thus, the dynamic panel threshold method is more appropriate compare to the static panel threshold commonly applied to investigate non-linear relationship among finance variables.

Theoretical and empirical debate on debt-returns relationship remains inconclusive[5,12,13], suggesting that more studies need to be conducted in order to add clarity to the theoretical and empirical debate. Most of the theoretical and empirical debates on debt-returns relationship focus on developed countries, but very few contributions from Africa. Therefore, a study contributing to this debate using data for firms from South Africa is necessary. Moreover, most of the predictions about capital structure theories are testable in South Africa that has some degree of market imperfections (e.g., bankruptcy costs).

Following the capital structure irrelevance theory proposed by Modigliani and Miller[14], several empirical studies have been conducted to explain why capital structure or debt is important. Consequently, two competing theories (e.g., tradeoff theory and pecking order theory) emerge as the best possible explanation of how firms finance themselves in real world[4,15-17].

This study focuses on the tradeoff theory because it argues that there exists an optimal debt level that maximizes firm value or returns at a point where the tax-shield benefits of debt balances the costs of debt. Despite various criticisms of the tradeoff theory in the literature, it is supported by both theoretical and empirical studies[4,5,18,19]. Thus, tradeoff theory remains one of the main theories of capital structure. The tradeoff theory makes important predictions. Firstly, increase in financial distress costs reduces the optimal debt level. Secondly, an increase in corporate tax increases optimal debt level. Third, at the optimal debt level, an increase in the marginal bondholder tax rate decreases the optimal debt level.

However, the main challenge of the tradeoff theory is that the optimal debt level is unobservable and a proxy is needed[15-17]. Previous studies used historical mean of the actual debt ratio for a firm[20]. The use of historical mean of debt advantage is that it minimizes the effects of temporal variations in time due to business cycles and floatation costs. Subsequent studies use alternative specification such as rolling target debt for each firm, using only historical information and an adjustment process[16] with lags of more than 1 year. Recent studies improve on the limitation of subsequent measures of target debt by allowing for a time dependent target debt that is mean reverting[18,19,21]. However, the dynamic panel threshold regression applied in our study is able to estimate the optimal debt level that maximizes returns, which has received inadequate attention in the capital structure literature.

Modigliani and Miller[22] theoretical model with taxes establish positive relationship between debt and firm value or

returns. Extending the Modigliani and Miller[14,22] theoretical model, Bhandari[23] findings revealed that debt has positive effects on returns. The author argues that the debt-equity ratio is a natural proxy for financial risk and it should have positive effects on returns. Bhandari[23] empirical results confirmed debt has positive effects on returns, after controlling for firm size variable.

Empirical studies examining the effects of debt on returns report mixed results. Ahmad *et al.*[24] examined the effects of debt on returns. Ahmad *et al.*[24] findings revealed that debt has positive effects on returns for Malaysian listed firms. Likewise, Matemilola *et al.*[13] examined the effects of debt on shareholder's required returns. Matemilola *et al.*[13] empirical findings revealed that long-term debt and total debt have positive effects on shareholder's required returns for South African listed firms. Similarly, Ahmad *et al.*[5] investigated the co-determinants of debt and stock returns relationship. The author's findings reveal that debt and returns affect each other, but that debt has a dominant effect on stock returns. The findings indicate that, growth, liquidity and profits are significant determinants of returns and debt. Precisely, growth has positive effects on debt and returns while size has insignificant effects on both debt and stock returns. Moreover, profits have negative effect on debt but positive effect stock returns.

Conversely, Dawar[12] investigated the impact of debt on returns. His panel fixed effects regression reveal that debt has a negative effect on returns, after controlling for size and growth, among other variables. Dimitrov and Jain[25] hypothesized that changes in debt contain information about returns focusing on the relationship between debt changes and returns. Dimitrov and Jain[25] empirical findings indicated that debt has negative effects on current and future adjusted returns. Likewise, Penman *et al.*[26] investigated the effects of book-to-price ratio on returns after accounting for debt. They break down the book-to-price component into a debt component which reflects the financing risk and an enterprise book-to-price which reflects the operating risk. Penman *et al.*[26] findings showed that debt component has negative effects on returns, in firms with both high and low book-to-price ratio.

In summary, the empirical evidence revealed that the effects of debt on returns is either positive or negative which suggest that there should be an optimal debt level that maximizes returns. One issue has received inadequate attention in the capital structure literature. What is the optimal debt level that maximizes returns? This issue is resolved by applying Kremer *et al.*[10] dynamic panel threshold regression analysis to test whether there is a threshold effect at which point further increase in debt decreases returns. Kremer *et al.*[10] investigated inflation thresholds for long-term economic growth using macro data. Conversely, this study applies their dynamic panel threshold to examine if there is a threshold level of debt in the debt-returns relationship using firm-level data.

MATERIALS AND METHODS

Threshold model:

$$\text{Returns}_{it} = \mu_i + \text{Returns}_{it-1} + \acute{\beta}_1 Z_{it} I\,(D_{it} \le \gamma) + \delta_1 I\,(D_{it} \le \gamma) + \acute{\beta}_2 Z_{it} I\,(D_{it} > \gamma) + \varepsilon_{it}\ \text{Model} \quad (1)$$

This study adopts a dynamic panel threshold model of Kremer *et al.*[10]. Debt is the main independent variable as well as the threshold variable, where, γ is the threshold level, μ_i is the firm-specific effect, δ_1 is the regime intercept, ε_{it} is the error-term which is independently and identically distributed with zero mean and constant variance, 1 (.) is the indicator function that indicate the regime defined by the threshold variable (Debt) and Z_{it} is a vector of independent variables that may include lagged values of the dependent variable and other endogenous variables. This study partitions the independent variables into two namely, Z_{1it} exogenous variables which are uncorrelated with the error-term (ε_{it} and Z_{2it} endogenous variables which are correlated with the error-term (ε_{it}). The exogenous variables are growth opportunity, corporate taxes and size. The independent variables may also include lagged value of dependent variable and other endogenous variables. In addition to the structural Eq. 1, the model requires a suitable set of $k \ge m$ instrumental variables x_{it} and Z_{1it}[10]. Returns_{it-1} is the endogenous variables and the study implements the Generalized Method of Moments (GMM) type estimators to resolve endogenous problem.

Estimation: In dynamic model 1, the standard within transformation applied by Hansen[9] leads to inconsistent estimates because the lagged dependent variable is correlated with the individual error-term. Application of first differencing technique to remove the firm-specific effects implies negative serial-correlation of the error-term and it is impossible to apply the distributional theory for panel data developed by Hansen[9]. In order to solve this problem, we use the forward orthogonal deviations transformation[10] to eliminate the firm-specific effects. The advantage of the forward orthogonal deviations transformation is that it subtracts the average of all future observations of a variable and this technique avoids serial-correlation of the

transformed error-term. Thus, for the error-term, the forward orthogonal deviations transformation is specified as:

$$\varepsilon_{it}^{*} = \sqrt{\frac{T-t}{T-t+1}}\left[\varepsilon_{it} - \frac{1}{T-t}(\varepsilon_{i(t+1)} + ... + \varepsilon_{iT})\right]$$

This forward orthogonal deviations transformation ensures that the explanatory variables are not correlated with the error-term. Consequently, the estimation procedure allows for the application of Caner and Hansen[27] cross-sectional model to dynamic panel model[10].

Following Kremer *et al.*[10] estimated a reduced-form regression for the endogenous variable (Z_{2it}), as a function of the instruments x_{it}. Then, the endogenous variables are substituted in the structural equation by their predicted values (Z_{2it}). In the second step, this study estimated the model 1 via ordinary least squares for a fixed threshold γ, where the endogenous variables are replaced by their predicted values from the first-step regression. The sum of squared residuals obtained from the second-step regression is symbolized by S (γ). The step is repeated for a strict subset of the threshold variable (debt). In the third step, this study selects estimator of the threshold value of γ that has the smallest residuals (i.e., γ = argmin S_n (γ)).

The critical values to determine the 95% confidence interval of the threshold variable is specified as:

$$T = \{\gamma: LR(\gamma) \leq C(\alpha)\}$$

where, C (α) is the 95% percentile of the asymptotic distribution of the likelihood ratio statistics, LR (γ). The underlying likelihood ratio was adjusted to account for the number of time period for each cross section. After the threshold value (γ) is estimated, the slope coefficients is estimated by the generalized method of moments for the previously used instruments and previous estimated threshold (γ).

Data: Data are obtained from Bloomberg. Specifically, the study use top 100 (based on market capitalization) listed firms on the Johannesburg Stock Exchange from 2004-2011. The article focuses on 2004-2011 because South Africa enjoys average gross domestic product growth rate of 4% over this sample period. Financial firms were excluded because their financial statement is different from that of non-financial listed firms. Regulated firms were also excluded because their debt ratio is usually higher than other non-financial listed firms. Similar to Ahmad and Abdullah[5], returns as return on equity (the ratio of net income to average total equity) was measured. Return on equity is used because it shows whether management is growing the shareholder's invested capital. Return on equity is one of the most widely used overall measures of firm performance[3,28].

Total Debt (TD) is the ratio of total debt to total assets. Total debt is a broader measure and it encompasses the total of all liabilities and ownership claims on a firm[29]. Debt is either measured in book-value debt or market-value debt[15,29,30]. This study focuses on book-value debt (total debt to total assets ratio) measure because it is not affected by stock price changes[31]. Turning to the direction of debt-returns relationship, debt has positive effects on returns in[13,23,24]. Conversely, debt has negative effects on returns in[12,25]. Given that the effect of debt on returns could be either positive or negative; this study expects a non-linear effect of debt on returns. As the usage of more debt initially increase returns due to interest tax-shield benefits of debt, but the costs of financial distress later decrease returns.

Similar to Ahmad and Abdullah[5], size is log of total assets. Acheampong *et al.*[32] and Matemilola *et al.*[13] found that size has a positive effect on returns. Conversely, Amihud[33] found that size has a negative effect on returns. This study expects a positive effect of size on returns because bigger firms are more stable and less likely to go bankrupt. Growth opportunity is the ratio of book-equity to market-equity. Gomes and Schmid[34] documented the positive effects of growth opportunity on returns. Chan and Chen[35] noted that earning prospects of the firms are associated with risk factor in returns and firms with high book-equity to market-equity ratio have high returns. In this study, we expect growth opportunity (book-equity to market-equity ratio) to have positive effects on returns because it is related to earning prospects that should increase return. Tax (effective tax rate) is the ratio of tax liability to taxable income. Matemilola *et al.*[13] and Schmidt[36] empirical results revealed that tax has negative effects on returns. Our expectation is that tax should have negative effects on returns because as more taxes are paid, return should decrease. Moreover, the traditional variables use as independent variables are proxy commonly use in the literature and they are good predictor of returns[5,13,23].

RESULTS AND DISCUSSION

Table 1 and 2 show the descriptive statistics and correlation results, respectively. Correlations between the variables affect the efficiency of the estimated coefficients. The correlation coefficients between the independent variables are generally less than 0.4 suggesting that there is little risk of multicollinearity problem in the data. The study specifies one model using returns (return on equity as

Table 1: Descriptive statistics

Parameters	Returns	Debt	Size	GO	Tax
Mean	24.54	20.04	7.06	0.19	23.73
Maximum	92.93	84.79	72.09	2.26	86.98
Minimum	0.28	0.41	1.06	0.02	1.10
Standard deviation	15.01	14.20	12.20	4.84	13.42
Observation	800	800	800	800	800

Descriptive statistics are expressed in percentages

Table 2: Correlation results

Variables	Returns	Debt	Size	GO	Tax
Returns	1.000				
Debt	0.134**	1.000			
Size	0.256***	0.058**	1.000		
GO	0.152**	-0.030*	-0.120**	1.000	
Tax	-0.130**	-0.075**	-0.389***	-0.129**	1.000

Return is the ratio of net income to average total equity. Debt is the ratio of total debt to total assets. Size is log of total assets. Growth opportunity (GO) is the ratio of book-equity to market-equity. Tax is the ratio of tax liability to taxable income. ***,**,*Indicate coefficients are significant at 1, 5 and 10% levels, respectively, N = 100, T = 8

Table 3: Debt threshold and returns results

Parameters	Return model
Threshold estimates	
γ	20.970
95% confidence interval	8.37-28.32
Impact of Debt	
β_1	0.128**
	[0.063]
β_2	0.050**
	[0.020]
Impact of independent variables	
Size	0.106*** (4.609)
	[0.023]
Growth Opportunity (GO)	0.016 (0.063)
	[0.252]
Tax	-0.123*** (-3.618)
	[0.034]
δ_1 (Constant)	1.536*** (2.116)
	[0.726]
Observation (N×T)	800

Return is the ratio of net income to average total equity. Debt is the ratio of total debt to total assets. Size is log of total assets. Growth opportunity (GO) is the ratio of book-equity to market-equity. Tax is the ratio of tax liability to taxable income. Industry dummy is a dummy variable equal to 1 if a firm belongs to a particular industry and zero otherwise. The numbers in parentheses are test statistics. The numbers in brackets are standard errors. ***,**Indicate coefficients are significant at 1% level. Estimation code source: http://www.public.asu.edu/~abick/. N = 100, T = 8

Table 4: Number (percentage) of firms in each regime by year for the return model

Firm class	2004	2005	2006	2007	2008	2009	2010	2011
Debt <20.970	64	50	56	62	52	56	53	58
Debt ≥20.970	36	50	44	38	48	44	47	42

the dependent variable). The panel threshold estimation results are presented in Table 3.

The parameter (γ) splits the observation into two regimes based on whether the threshold variable (debt) is smaller or greater than the threshold value (γ). The regime one and regime two are separated by different slope estimate which are β_1 and β_2 respectively.

In regime one where the debt ratio is less or equal to 20.970%, the estimated coefficient of β_1 is 0.128 and it is significant at 1% level. This result shows that returns increase by 0.128% as debt ratio increases by 1%. In regime two where the debt ratio is greater than 20.970%, the estimated coefficient of β_2 is 0.050 and it is significant at 1% level. The slope coefficient of the panel threshold does not have a fixed value in the two regimes. The estimated coefficient of debt ratio (0.128) in regime one is larger than the estimated coefficient of debt ratio (0.050) in regime two. Thus, the results reveal that the relationship between debt and returns vary according to different debt level and a decreasing trend is detected. The results suggest that there is an optimal debt ratio of 20.970% at which point further increase in debt ratio decreases returns.

These results support the tradeoff theory which suggests that optimum debt exist that maximizes returns or firm value. The results are consistent with Ahmad and Abdullah[5] and Lin and Chang[6] that found threshold debt that maximizes returns and firm value in Malaysia and Taiwan, respectively using Hansen[9] static panel threshold method. Table 4 presents the percentage of firms that fall within each of the two regimes, every year. As control variable, size coefficient is statistically significant and positively related to returns while growth opportunity coefficient is positive but statistically insignificant. The positive relationship between returns and size are consistent with Acheampong *et al.*[32] and Matemilola *et al.*[13] findings that size have a positive effect on returns. Conversely, the results are inconsistent with Amihud[33] findings that size has a negative effect on returns. Consistent with Matemilola *et al.*[13] and Schmidt[36], tax coefficient is statistically significant and negatively related to returns. Growth opportunity has insignificant effects on returns. These results are consistent with Matemilola *et al.*[13] findings that growth opportunity has insignificant effects on returns. However, the results are inconsistent with Gomes and Schmid[34] findings that growth opportunity has positive effects on returns.

As a robustness tests, the article uses the dynamic system generalized method of moments (GMM) estimators developed by Arellano and Bover[37] and Blundell and Bond[38]. This study includes the square term of debt in the model specification. Although, adding squared term has limitation, we estimated the results to confirm the non-linear effect of debt on returns. Table 5 shows that both the coefficients of the debt and squared debt are statistically significant with positive and negative signs respectively. Our results suggest that debt and

Table 5: Dynamic panel generalize method of moment (Two-step) results

Independent variables	Return model
$Returns_{it-1}$	0.589*** (54.68)
Debt	0.311*** (27.05)
$Debt^2$	-0.001** (-9.16)
Size	0.243*** (25.16)
Growth opportunity	0.245*** (23.77)
Tax	-0.27*** (-30.74)
2nd order serial correlation (p-value)	0.719
Difference Sargan test (p-values)	0.780

Return is the ratio of net income to average total equity. Debt is the ratio of total debt to total assets. Size is log of total assets. Growth opportunity (GO) is the ratio of book-equity to market-equity. Tax is the ratio of tax liability to taxable income. Industry dummy is a dummy variable equal to 1 if a firm belongs to a particular industry and zero otherwise. The numbers in parentheses are test statistics. The model estimated using dynamic panel program by Blundell and Bond[38]. **,***Indicate coefficients are significant at 5 and 1% levels, respectively. Second order correlation that has N (0, 1) distribution, but null uncorrelated with errors. Standard errors are robust system GMM results. Differenced Sargan[39] over identification test and null that instruments are valid, but it runs if the errors are GMM type, N = 100, T = 8. Number of instruments are 68. TD_{it-2}, $size_{it-2}$, growth $opportunity_{it-2}$ are used as instruments

returns have inverted U-shape relationships. The results of this dynamic system generalized method of moments are similar to the results reported in Table 3 that uses dynamic panel threshold analysis. The results of the post estimation tests which are Differenced Sargan test and second order serial correlation test reveal that the instruments are valid and there is no second order serial correlation problem. Therefore, the model is correctly specified.

CONCLUSION AND FUTURE RECOMMENDATIONS

Prior studies have documented either positive or negative effects of debt on returns suggesting that an optimal debt level should exist in the debt-returns relationship. Our study reconciles these conflicting results in the literature by applying a refined approach to identify the threshold or optimal debt level. Unlike prior studies that mostly apply static panel threshold method to investigate asymmetric relationship between debt and returns in areas of financial economics, this study applies dynamic panel threshold method using firm-level data. Our results reveal that there is a non-linear relationship between debt and returns, which suggest that debt initially increases returns up to a threshold debt level, but debt lowers returns after exceeding a threshold debt level. These results support the tradeoff theory that there is an optimum debt that maximizes returns, where the marginal benefits of debt equate the marginal costs of debt. There are some recommendations which are as follows:

- Firstly, the results imply that financial managers should take step to increase firm debt level, if they are below the threshold debt level in order to maximize shareholder's returns. Moreover, financial managers should take step to reduce firm debt level, if they are above the threshold debt level in order to avoid financial distress that lower returns
- Secondly, investors should investigate the firm's debt level by computing relevant debt ratios in order to avoid investing in firms with higher debt ratio that exceed the threshold debt level
- Third, policymakers should encourage firms to maintain sustainable debt level (the threshold debt level) to prevent the firms from financial distress or bankruptcy problem. Bankruptcy at firm level reduces investment and output and it contributes to unemployment problem, leading to problem at macro level

This study focuses on top 100 listed firms in South Africa, but future research could estimate the threshold debt-level for each industry. This is because the threshold debt level may vary according to the industry where the firms operate. Moreover, future researchers are encouraged to apply non-linear dynamic panel model to examine non-linear relationship among finance variables, especially where existing theory predicts non-linear relationship.

ACKNOWLEDGMENT

The authors acknowledge Prof. Annuar Md Nassir for his research grant that support this research.

REFERENCES

1. Ezeoha, A. and F. Botha, 2012. Firm age, collateral value and access to debt financing in an emerging economy: Evidence from South Africa. South Afr. J. Econ. Manage. Sci., 15: 55-71.
2. Visser, A., 2015. Business rescue in SA fails to deliver: Focus on liquidation rather than restructuring is undermining the process. http://www.moneyweb.co.za/moneyweb-opinion/soapbox/business-rescue-in-sa-fails-to-deliver/.
3. Ross, W. and J. Jaffe, 2013. Corporate Finance. 10th Edn., McGraw Hill, USA.
4. Islam, S.Z. and S. Khandaker, 2015. Firm leverage decisions: Does industry matter? North Am. J. Econ. Finance, 31: 94-107.
5. Ahmad, A.H. and N.A.H. Abdullah, 2013. Investigation of optimal capital structure in Malaysia: A panel threshold estimation. Stud. Econ. Finance, 30: 108-117.
6. Lin, F.L. and T. Chang, 2011. Does debt affect firm value in Taiwan? A panel threshold regression analysis. Applied Econ., 43: 117-128.

7. Chang, K.C., C.C. Yuan, C.L. Lin and W. Zhou, 2014. Nonlinear effect of technological diversification on the corporate patent performance. J. Applied Sci., 14: 273-278.
8. Tiantian, G., T. Yezhuang and Y. Qianqian, 2014. Impact of manufacturing dynamic capabilities on enterprise performance-the nonlinear moderating effect of environmental dynamism. J. Applied Sci., 14: 2067-2072.
9. Hansen, B.E., 1999. Threshold effects in non-dynamic panels: Estimation, testing and inference. J. Econometrics, 93: 345-368.
10. Kremer, S., A. Bick and D. Nautz, 2013. Inflation and growth: New evidence from a dynamic panel threshold analysis. Empirical Econ., 44: 861-878.
11. Johnson, T.C., T. Chebonenko, I. Cunha, F. D'Almeida and X. Spencer, 2011. Endogenous leverage and expected stock returns. Finance Res. Lett., 8: 132-145.
12. Dawar, V., 2014. Agency theory, capital structure and firm performance: Some Indian evidence. Managerial Finance, 40: 1190-1206.
13. Matemilola, B.T., A.N. Bany-Ariffin and W.N.W. Azman-Saini, 2012. Financial leverage and shareholder's required returns: Evidence from South Africa corporate sector. Transition Stud. Rev., 18: 601-612.
14. Modigliani, F. and M.H. Miller, 1958. The cost of capital, corporation finance and the theory of investment. Am. Econ. Rev., 48: 261-297.
15. Matemilola, B.T., B.A.A. Noordin, W.A.S.W. Ngah and A.M. Nassir, 2015. Unobservable effects and speed of adjustment to target capital structure. Int. J. Bus. Soc., 16: 470-479.
16. Frank, M.Z. and V.K. Goyal, 2008. Trade-OFF and Pecking Order Theories of Debt. In: Handbook of Corporate Finance: Empirical Corporate Finance, Eckbo, E. (Ed.). Vol. 2, Elsevier BV., Publishing Co., Amsterdam, Netherlands, pp: 1-82.
17. Myers, S.C., 1984. The capital structure puzzle. J. Finance, 39: 574-592.
18. Oztekin, O. and M.J. Flannery, 2012. Institutional determinants of capital structure adjustment speeds. J. Financial Econ., 103: 88-112.
19. Nunkoo, P.K. and A. Boateng, 2010. The empirical determinants of target capital structure and adjustment to long-run target: Evidence from Canadian firms. Applied Econ. Lett., 17: 983-990.
20. Shyam-Sunder, L. and S.C. Myers, 1999. Testing static trade-off against pecking order models of capital structure. J. Financial Econ., 51: 219-244.
21. Graham, J.R., M.T. Leary and M.R. Roberts, 2015. A century of capital structure: The leveraging of corporate America. J. Financial Econ., 118: 658-683.
22. Modigliani, F. and M.H. Miller, 1963. Corporate income taxes and the cost of capital: A correction. Am. Econ. Rev., 53: 433-443.
23. Bhandari, L.C., 1988. Debt/equity ratio and expected common stock returns: Empirical evidence. J. Finance, 43: 507-528.
24. Ahmad, Z., N.M.H. Abdullah and S. Roslan, 2012. Capital structure effect on firms performance: Focusing on consumers and industrials sectors on Malaysian firms. Int. Rev. Bus. Res. Pap., 8: 137-155.
25. Dimitrov, V. and P.C. Jain, 2008. The value-relevance of changes in financial leverage beyond growth in assets and GAAP earnings. J. Account. Auditing Finance, 23: 191-222.
26. Penman, S.H., S.A. Richardson and I. Tuna, 2007. The book-to-price effect in stock returns: Accounting for leverage. J. Account. Res., 45: 427-467.
27. Caner, M. and B.E. Hansen, 2004. Instrumental variable estimation of a threshold model. Econ. Theory, 20: 813-843.
28. Monteiro, A., 2006. A quick guide to financial ratios. The Citizen, Moneyweb Business Insert, May 8, 2006. http://www.moneyweb.co.za/archive/a-quick-guide-to-financial-ratios/.
29. Tchuigoua, H.T., 2014. Institutional framework and capital structure of microfinance institutions. J. Bus. Res., 67: 2185-2197.
30. Bany-Ariffin, A.N., 2010. Disentangling the driving force of pyramidal firm's capital structure: A new perspective. Stud. Econ. Finance, 27: 195-210.
31. Graham, J.R. and C.R. Harvey, 2001. The theory and practice of corporate finance: Evidence from the field. J. Financial Econ., 60: 187-243.
32. Acheampong, P., E. Agalega and A.K. Shibu, 2014. The effect of financial leverage and market size on stock returns on the Ghana stock exchange: Evidence from selected stocks in the manufacturing sector. Int. J. Financial Res., 5: 125-134.
33. Amihud, Y., 2002. Illiquidity and stock returns: Cross-section and time-series effects. J. Financial Markets, 5: 31-56.
34. Gomes, J.F. and L. Schmid, 2010. Levered returns. J. Finance, 65: 467-494.
35. Chan, K.C. and N.F. Chen, 1991. Structural and return characteristics of small and large firms. J. Finance, 46: 1467-1484.
36. Schmidt, A.P., 2006. The persistence, forecasting and valuation implications of the tax change component of earnings. Account. Rev., 81: 589-616.
37. Arellano, M. and O. Bover, 1995. Another look at the instrumental variable estimation of error-components models. J. Econ., 68: 29-51.
38. Blundell, R. and S. Bond, 1998. Initial conditions and moment restrictions in dynamic panel data models. J. Econ., 87: 115-143.
39. Sargan, J.D., 1958. The estimation of economic relationships using instrumental variables. Econometrica, 26: 393-415.