

Dynamic Relationship between Debt and Cash flow in Pecking Order Theory: Evidence from Panel GMM

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Abstract
The paper investigates the relationship between cash flow and debt for South African firms. The difference generalized method of moment results show cash flow has significance and negative relationship with debt. Similarly, the system generalized method of moment results show negative relationship between cash with debt. The results affirmed pecking order theory of corporate financing and it reveals the incidence of asymmetric information problem between the firm and its financiers. Besides, the results imply a need to further develop South African capital market in order to reduce information asymmetry costs associated with raising external finance. Moreover, evidence of trade-off theory is also presented in the results which suggest that the dynamic nature of firms' capital structure decision deserves attention.
Keywords: Capital structure; debt ratio; cash flow; pecking order theory; panel GMM; South Africa

1. INTRODUCTION

Growth theory tells us the drivers of economic growth is investment, but most firms in South Africa do not have easy access to debt capital to finance profitable investment projects despite the state of development of her financial market. Thus, South African firms may prefer internal finance (cash flow) which is explainable within the framework of the pecking order theory of corporate financing. This raises the issue of what theory explains the capital structure behavior of South African firms. Do South Africa firms follow pecking order theory of capital structure or not?

Myers and Majluf (1984) develop pecking order theory of capital structure. In this theory, internal finance (cash flow) is the primary source of capital that is reinvested into the business to finance profitable investment project. If internal finance is insufficient to finance profitable investment project, firms issue debt or equity capital (Myers and Majluf, 1984). This reasoning explains why pecking order theory emerges as one of the theories of capital structure that explains how firms finance themselves in the real business world. Theories of capital structure emphasize different issues which make an effort to develop unify theory of how firms finance themselves difficult.

The pecking order theory argues referable to an information asymmetry problem between firms and its financiers, firms' use internal finance (cash flow) with lower costs of information asymmetry, follow by debt, and equity issue is the very last resort because it has the highest costs of information asymmetry. An equity issue is perceived as bad news by investors and this bad news has a negative effect on stock price. So, firms' avoid the equity issue or issue it when cash and debt finance are insufficient.

Information asymmetry drives pecking order theory and information asymmetry problem is common in Africa. Therefore, South Africa with a relatively developed capital market and money market compare to other countries in Africa will be a better place to empirically investigate the relationship between cash flow and debt predicted in pecking order theory.

Past studies on the pecking order theory of capital structure are based on firms in developed countries (Shyam-Sunder and Myers, 1999 and Frank and Goyal, 2009), but little is known about South Africa. Little research conducted in Africa to examine capital structure theory usually specify static model, and focus on determinant of firms' capital structure from a static point of view (e.g. Eldomiaty and Ismail, 2009). However, using a dynamic model to investigate the link between cash flow and debt predicted in pecking order theory which improves on a static model commonly found in the literature on Africa. The possibility of reverse causality between debt and cash flow suggest the need for a dynamic model and better method. The studies that specified dynamic model to investigate the relationship between cash flow and debt for South African firms are hard to find. Thus, this paper uses difference Generalized Method of Moment (GMM) to study dynamic relationship between cash flow and debt in South Africa.

South Africa economic and business environments have changed rapidly over the years and there are business cycle phases that cause capital structure decision of firms to change with up and down movements of business cycles (Akinboade and Makina, 2009). Since the economic and business environments that South African firms operate in is dynamic, capital structure decision of firms in South Africa would be dynamic as well.

The purpose of this paper is to investigate the relationship between cash flow and debt for South African

firms. The remainder of the paper is organized as follows: section two presents literature review and hypotheses. Section three describes data and method. Section four discusses results and highlights robustness of the results while section five concludes.

2. LITERATURE REVIEW

Over the years, many theories emerge to explain how firms determine their capital structure. However, researchers report mixed results. The debate on capital structure started 50 years ago after Modigliani and Miller (1958) publish their capital structure irrelevance theory. But capital structure debate is unending and open for further research. Modigliani and Miller (1958) argue capital structure is inappropriate under the postulation of a perfect capital market. If capital market is perfect, then, the capital structure decision is truly irrelevant.

However, perfect capital market assumption is unrealistic because there is imperfection in most capital markets. In practice, capital structure decision is important. Besides, other competing theories explain why capital structure decisions are important. Capital structure decisions are important if there are information asymmetry costs, agency costs, transaction costs, bankruptcy costs, and tax. Capital structure debate leads to the development of five major theories of capital structures such as Modigliani and Miller theory, trade-off theory, pecking order theory, agency theory and market timing theory. Pecking order theory emerges as a better theory that explains how financial managers determine their capital structure in practice (Frank and Goyal, 2009).

The trade-off theory competes with pecking order theory and states there exists an optimal debt level that equates marginal costs and benefits of debt and if there is a deviation from optimal debt level, firms make an attempt to adjust to optimal debt level. Similarly, agency theory argues that an increasing proportion of debt on one hand and increasing proportion of equity on the other hand leads to optimal capital structure that minimizes total agency costs (Frank and Goyal, 2008). Thus, while trade-off theory emphasizes the benefits and costs of debt, agency theory emphasizes agency costs of equity and debt.

Unlike the trade-off theory and agency theory that argues for optimal debt ratio, there is no clearly defined optimal debt ratio in pecking order theory. Instead, firms' make capital structure decisions based on source of capital that has smallest cost. That is a source of capital that is least affected by an information asymmetry problem such as internal finance (profit or cash flow); follow by debt and equity issue is the last option (Frank and Goyal, 2003).

Pecking order theory predicts a negative relationship between cash flow and debt ratio. Furthermore, pecking order theory suggests capital structure of firms is based on the cumulative requirement for external capital. Profitable firms with slower growth prospects use low debt ratio compare to the industry average. Conversely, unprofitable firms in the same industry use relatively high debt ratio compare to industry averages (Iquiapaza, 2007). Thus, the level of internal finance (profit or cash flow) determines if firms require external capital.

2.1 Empirical Evidence that Support Pecking Order Theory

Empirical evidence supports pecking-order theory that internal finance (profit or cash flow) is negatively related to debt (Fama and French, 2002). Hall et al. (2004) argue firm that can generate more profit will borrow less, all things being equal. Similarly, Sen and Eda (2008) argue pecking order model clearly suggest a negative relationship between profit and debt ratio.

Most research on pecking order theory study debt changes (Shyam-Sunder and Myers, 1999 and Frank and Goya, 2003). Some researchers examine changes in equity (Fama and French, 2005 and Leary and Roberts, 2005). Frank and Goyal (2004) analyze changes in both debt and equity. Debt changes because of active decision of firm and when stock price changes. Frank and Goyal (2008) note changes in debt brings an imperative role in evaluating pecking order theory because financing deficits drive debt according to this theory. Panel generalized method of moment uses differencing technique that allow model changes in debt emphasize in pecking order theory.

Taggart (1985) examines how the US firms choose capital structure and find debt financing varies with capital expenditure compare with internal finance (profit or cash flow). The result suggests debt is used to achieve desired investment level. Besides, he finds firms' capital structure changes based on need to finance new investment projects with internal finance. Taggart (1985) concludes comparative costs of different sources of finance making firms use internal finance first, debt finance second, and equity issue as the last option. Taggart (1985) argues pecking order behavior is caused by transaction costs and information asymmetry costs that firm face when they raise external finance. In addition, his conclusion is consistent with pecking order theory that profit is negatively related to debt.

Similarly, Baskin (1989) results support pecking order theory because he finds profit has negative effects on debt. Baskin (1989) attributes reasons for pecking order behavior in the United States to transaction costs and information cost. Allen (1993) tests the relationship between profit and debt. Allen (1993) finds profit is negatively related to debt. Allen (1993) interprets the result as a firms' desire to build up debt capacity so that they can borrow easily in the future to finance profitable investment projects. He argues information asymmetry

and market undervaluation of equity make firms avoid issuing equity and prefer debt which has lowest information asymmetry costs. Tong and Green (2005) use the same method in Allen (1993) and Adedeji (1998). Tong and Green (2005) test pecking order theory using data for Chinese firms. They find profit is negatively related to debt. Tong and Green (2005) results support pecking order theory over trade-off theory. Thus, they resolve that pecking order theory explicate the capital structure behavior of Chinese firms.

Autore and Kovacs (2006) extend the basic pecking order theory by looking at dynamic pecking order theory. They argue different findings can be reconciled in favor of pecking order theory when specified model explicitly allows information asymmetry costs to vary overtime. Since, information asymmetry plays a key role in equity issue, tests of pecking order theory could consider a dynamic version of pecking order theory in which time-varying information asymmetry costs play an important role (Autore and Kovacs, 2006). Autore and Kovacs (2006) overall findings support pecking order theory that information asymmetry costs affect firm's financing choices. Their study suggests pecking order as a theory of corporate financing lives.

Recently, Besslery et al. (2011) study link between time-variation in information asymmetry costs and pecking order theory. They use the link to reconcile inconsistent results in favor of the dynamic version of pecking order theory. They show firms are raising equity capital through methods that has lowest information asymmetry costs. In general, Besslery et al. (2011) results are reliable with pecking order theory that information asymmetry costs create a hierarchy of corporate financing.

2.2 Empirical Evidence against Pecking Order Theory

Conversely, trade-off theory predicts a positive relationship between profit and debt which contradict prediction of pecking order theory. Shyam-Sunder and Myers (1999) find support for pecking order theory because firm use debt first when internal finance is insufficient. Furthermore, they find power of trade-off theory explains new debt issues better than pecking order theory because when the pecking order model and trade-off model are nested in same regression, all cases of pecking order model are rejected. They use net financing deficit as an additional explanatory variable in their trade-off theory model. But, subsequent researchers criticize their work based on assumption and sample selection criteria. In this study, we use cash flow because it is a better measure of internal finance compare to retained profits.

Frank and Goyal (2003) explain the differences in costs associated with asymmetric information across groups of firms. Frank and Goyal (2003) argue firms with greatest potential for asymmetric information follow pecking order theory. Frank and Goyal (2003) conclude finding large and bigger firms, but not small and high-growth firms perform best in the Shyam-Sunder and Myers (1999) test contradict pecking order theory. Conversely, announcement effects of new equity issues show small firms with high-growth face lower information asymmetry costs than bigger firms when issuing equity (Adedeji, 2002). Therefore, finding small and high-growth firms are main issuers of equity does not contradict pecking order theory.

Empirical tests center on strict interpretation of the pecking order theory. Shyam-Sunder and Myers (1999) argue pecking order theory explicates how firms choose their capital structure better than trade-off theory. Fama and French (2005) argue against Sunder and Myers (1999) conclusion. Firstly, firms issue equity regularly. Secondly, firms do not issue equity under compulsion. Fama and French (2005) conclude pecking order theory partly explain how firms choose their capital structure. Similarly, Chirinko and Singha (2000) argue power of test in Shyam-Sunder and Myers (1999) has unresolved econometric issue. Also, Frank and Goyal (2003) question if the pecking order theory explains firms' finance behavior. Frank and Goyal (2003) document net equity issues track financing deficit better than net debt issues which against pecking order theory prediction.

Cull and Xu (2005) argue government intercession through monetary policy during financial crisis make the cost of borrowing lower compare with cost of internal finance (profit or cash flow). Consequently, firms use debt before internal finance. Furthermore, Myers and Majulf (1984) and Myers (1984) argument that information costs induce firms to follow pecking order behavior is contradicted by Baskin (1989), Allen (1993) and Adedeji (2002). They argue transaction and information costs are not the only factors that discourage use of debt or equity. They conclude managers may be reluctant to issue equity because of a desire to maintain control of the firm. Besides, managers are reluctant to issue debt that may require them to comply with capital market regulation. This argument is supported in Jensen and Meckling (1976) that separation of ownerships and control make managers reluctant to raise external capital to avoid capital market discipline. Recently, Nunkoo and Boateng (2010) study determinants of firms' capital structure and adjustment to long-run target. They find profit (internal finance) positively related to debt. The affirmative relationship between profit and debt contradicts pecking order theory.

Unlike previous studies, especially Frank and Goyal (2003) that use ordinary least squares run in first difference and add financing deficit variable to nest pecking order and trade-off theory in a single equation. We use the difference generalized method of moment (GMM) to investigate the relationship between cash flow and debt for South African firms. Cash flow variable is used because financing deficit (dividend + net investment + Δ working capital – cash flow + current portion of long term debt) commonly use in the literature includes many

variables, such as dividend, net investment and cash flow that are endogenous. Difference generalized method of moment (GMM) control for endogeneity and improves efficiency. Specifically, this study departs from past studies in the following ways: Firstly, unlike previous studies that examine the relationship between profit and debt, the study investigates the relationship between cash flow and debt for South African firms. Cash flow is a better measure of internal finance than profit because it excludes non-cash items such as depreciation. Secondly, the study uses better estimation techniques which are a difference generalized method of moment and system generalized method of moment (as robustness tests). GMM effectively control for unobservable firm specific-effects and possibility of reverse causality between cash flow and debt.

2.3 Hypotheses

We hypothesized in H_1 form that:
H_A: There is a significant relation between cash flow and long term-debt ratio.
H_B: There is a significant relation between cash flow and total debt ratio.

3. DATA AND METHODOLOGY

We obtained our data from Bloomberg. We use top 100 listed firms on the Johannesburg Stock exchange from 2004 to 2009. Financial firms are excluded because their financial statement differs significantly from non-financial listed firms. Regulated firms are also excluded because their debt ratio is usually higher than other non-financial firms.

Shyam-Sunder and Myers (1999) use fund flow statement to test pecking order theory. Conversely, Frank and Goyal, (2003) use balance sheet and income statement data to test pecking order theory. Similarly, we use balance sheet and income statement data to investigate the relationship between cash flow and debt. In addition, as a robustness check, we use two measures of debt ratio namely long-term debt ratio and total debt ratio. We use book value of debt because it is less subjected to price fluctuation compare with a market value of debt. The period of 2004 to 2009 is chosen because there is no noticeable systemic shock that could significantly bias the results. All the top 100 listed firms do not have any missing values for all the years (see Table 1 below). Thus, the data are balanced panel. One of the added advantages of balanced panel data is that they give better results.

Table 1 Sample Characteristics

Year	Number of Firms
2004	100
2005	100
2006	100
2007	100
2008	100
2009	100
Total	600

3.1 Empirical Model

We apply Panel Generalized Method of Moments (GMM) that controls for unobserved firm-specific effects. GMM removes unobserved effects and uses instruments uncorrelated with the error term. Panel GMM is appropriate because it improves efficiency and it corrects the endogeneity bias (Baltagi 2005). GMM uses moments, which make instruments uncorrelated with the error term (Nunkoo and Boateng, 2010).

Specifically, the study uses two-step difference GMM (Arellano and Bond 1991) which give better results. In addition, we use two-step systems GMM, which improve efficiency. Blundell and Bond (1998) add moments, which make correlation between unobservable effects and difference instrument, equal zero. Recent researchers (see Matemilola et al 2012; Flannery and Rangan 2006 and Ozkan 2001) use GMM estimation technique to conduct capital structure research.

In order to investigate relationship between cash flow and debt for South African firms, we follow framework of Frank and Goyal (2003) with modification. Frank and Goyal (2003) use ordinary least squares run in first difference and add financing deficit variable. Conversely, we use difference generalized method of moments that control for endogeneity and improves efficiency. Cash flow variable is used because financing deficit (dividend + net investment + Δ working capital – cash flow + current portion of long term debt) commonly use in the literature includes many variables, such as dividend and net investment that are endogenous. Cash flow is the main independent variable. We specify dynamic panel model below:

$$LD_{it} = \lambda_i LD_{it\_1} + \beta_1 + \beta_2 CF_{it} + \beta_3 FA_{it} + \beta_4 Size_{it} + \beta_5 Growth_{it} + \eta_i + \mu_{it} \quad (1)$$

$$TD_{it} = \lambda_i TD_{it\_1} + \beta_1 + \beta_2 CF_{it} + \beta_3 FA_{it} + \beta_4 Size_{it} + \beta_5 Growth_{it} + \eta_i + \mu_{it} \quad (2)$$

Where the subscript 'i' and’t’ represent firm and time period respectively. Equation 1 and 2 is estimated using

difference GMM estimation that controls for unobservable firm-specific effects and endogenous problem and better able to give consistent estimators that are robust to heteroskedasticity and serial correlation problem. We proxy debt ratio with two measures namely: ratio of long term debt to total assets, and ratio of total debt to total assets. Cash flow is measured as ratio of profit before interest and tax plus depreciation to total assets. Fixed asset is measured as ratio of fixed assets to total assets. Size is measured as log of total assets and Growth is measured as change in total assets. The main independent variable and control variables in both equations are proxies commonly used in the literature. Specifically, the main independent variable is cash flow, while the control variables are fixed assets, size and growth.

After taking first difference, we remove all variables that are time-invariant, such as unobservable firm-specific effects from the model. In difference model, error term correlated with lagged dependent variable. Hence, we use higher lags of the lagged dependent variable as instruments. In addition, we use higher lag of explanatory variables as instruments. However, difference GMM estimation gives unbiased and consistent estimators if the following moment conditions hold:

$$E[\Delta\mu_{it} TD_{t\_k}] = E[\Delta\mu_{it} X_{t\_k}] = 0 \forall k > 1 \quad (3)$$

$$E[\Delta\mu_{it} LD_{t\_k}] = E[\Delta\mu_{it} X_{t\_k}] = 0 \forall k > 1 \quad (4)$$

Where X is set of explanatory variables in the model use as instruments and μ_{it} is the error term. Blundell and Bond (1998) add moments, which make correlation between unobservable effects (η_i) and difference instruments equal zero.

4. FINDINGS AND DISCUSSION

TABLE 2 DESCRIPTIVE STATISTICS

Panel A: Mean and standard deviation

	LD	TD	FA	Size	Growth	CF
Mean	13.00	20.14	59.66	7.06	18.52	26.23
Std. Dev.	12.66	14.21	25.35	12.19	14.82	25.27

Notes: [a] *Long- term debt (LD) is the ratio of long-term debt to total assets. Total debt (TD) is the ratio of total debt to total assets. Fixed assets (FA) is the ratio of fixed assets to total assets. Size is the log of total assets. Growth is changed in total assets. Cash flow is the ratio of profit before interest and tax plus depreciation to total assets.*

PANEL B: CORRELATION RESULTS

	LD	TD	FA	Size	Growth	CF
LD	1.00					
TD	0.75***	1.00				
FA	0.02	0.03	1.00			
Size	-0.05**	0.07**	-0.02	1.00		
Growth	0.46***	-0.30***	-0.06**	-0.50***	1.00	
CF	-0.20***	-0.27***	0.01*	0.09**	0.19***	1.00

Notes: [a] *Long- term debt (LD) is the ratio of long-term debt to total assets. Total debt (TD) is the ratio of total debt to total assets. Fixed assets (FA) is the ratio of fixed assets to total assets. Size is the log of total assets. Growth is changed in total assets. Cash flow is the ratio of profit before interest and tax plus depreciation to total assets*

[b] *, **, *** indicate that correlation coefficients are significant at 10, 5 and 1 percent levels respectively.

We report descriptive statistics and correlation in Table 2. The mean value of long-term debt is 13.00 compare to the mean value of total debt that is 20.14. We deduce on average, South African firms use less amount of long-term debt in their capital structure. The low correlation between variables shows little risk of multicollinearity problem in the data. We specify two models. Long-term debt ratio is the dependent variable in the model one, while the total debt ratio is the dependent variable in model two We use two-step GMM estimates because it gives better results if base on two-step estimates.

Furthermore, second order serial correlation test and the difference Sargan test reveals that instruments are valid. Thus, we can apply the generalized method of moments. The results show there is an absence of second order serial correlation in both models. Moreover, the Sargan test and difference Sargan test show valid instruments for both models. Therefore, we continue with interpretation of GMM results.

TABLE 3: DIFFERENCE GENERALIZED METHOD OF MOMENT (TWO-STEP)

Dependent Variable	Long T. Debt (LD)		Total-Debt (TD)	
LD_{it-1} / TD_{it-1}	0.65***	(19.63)	0.62***	(15.18)
Cash flow	-0.01**	(-3.54)	-0.19***	(-6.11)
F. Assets	0.08**	(-3.54)	0.09***	(3.69)
Size	0.30***	(5.41)	-0.71***	(-16.59)
Growth	0.05	(0.87)	0.05	(0.32)
2nd-order-Serial Correl.(P value).	0.15		0.14	
Sargan-Test (P-value)	0.49		0.20	

Notes: *[a] Table 2 defines variables. [b] The numbers in parentheses are test statistics. [c] The model estimated using Dynamic Panel program used by Are-llano and Bond (1991). [d] ** and *** indicate coefficient is significant at 5 and 1 percent levels respectively. [e] Second order correlation that has N (0, 1) distribution, but null uncorrelated with errors. [f] Standard errors are robust for difference GMM results. [e] Sargan (1958) over identification test and null that instruments are valid. Sargan (1958) test run if the error are GMM type. (Stata xtabond command). N = 100, T = 6. Number of instruments are 16.*

Table 3 presents the difference GMM results. The estimated coefficients are significant and have the expected sign. Cash flow is negatively related to long-term debt ratio. Similarly, cash flow is negatively related to total debt ratio. The results support pecking order theory predictions. Furthermore, the presence of information asymmetry between managers and investors suggest external capital would be costly for South African firms. Consequently, when firms are in need of cash to finance profitable investment projects, they use internal finance (cash flow) first, follow by debt (if cash flow is insufficient), and equity issue is the last resort. The reason is because investors perceived equity issue as bad news and this bad news has negative effects on stock prices.

Also, debt holders perceived the debt issue as bad news and demand higher returns. Thus, the results suggest South Africa firms, whose managers has more information than investors use hierarchy of financing strategy because of information asymmetry costs associated with raising external capital. As a robustness test (see Table 4) we report system GMM which gives similar results because cash flow is significantly and negatively related to both long-term debt and total debt ratios. In addition, the results imply South African firms retain a large portion of their cash flow and reduce use of external finance. Our study is consistent with findings of Fama and French (2002) and Sen and Eda (2008) who find evidence in support of pecking order theory. Conversely, our results are inconsistent with the findings of Tong and Green (2005) and Nunkoo and Boateng (2010) who found opposite results.

Furthermore, the study indicates tradeoff theory is present in the results because of the significance of lagged dependent variables in both difference GMM and system GMM results. Moreover, the results reveal fixed assets are positively related to both long-term debt and total debt which suggests fixed assets serves as collateral to secure long-term debt capital in South Africa. Fixed assets (as collateral) retain value when firm face bankruptcy problem, so, lenders could sell fixed assets to recover debt. Thus the trade-off theory could be relevant for South African firms as well. However, results for growth and size variables are inconsistent which suggest growth and size may not be consistent determinants of debt in South Africa. The results are not surprising because past studies report inconsistent sign for size and growth variables.

4.1 Robustness of the results

We conducted a number of tests to examine the robustness of the findings. Firstly, we use a system generalized method of moments (System GMM) which is believed to improve efficiency. All models specified use two step estimators with robust standard error. Secondly, we perform second order serial correlation tests because Generalized Method of Moments (GMM) gives consistent estimates if there is an absence of second order serial correlation in the error terms. The test results show absence of second order serial correlation in the error terms. Thus, GMM is suitable for estimating the parameters of interest. Third, we perform Sargan test and difference Sargan test of instruments validity because GMM gives consistent estimates for valid instruments. The Sargan test indicates the instruments are valid – uncorrelated with the error term.

Fourth, the number of instruments for difference GMM (16) and system GMM (20) are less than a sample size of 100 firms. So, there is no over fitting of endogenous variable problem raised by Roodman (2009). Absence of over fitting of endogenous variables improves the validity of the results. Besides, we specify dynamic panel models and use two different proxies as the dependent variable to see if the results are similar. Indeed, we find similar results. Cash flow is negatively related to long-term debt. Similarly, cash flow is negatively related to total debt. Moreover, evidence of trade-off theory is present in the results which suggest

dynamic nature of firms' capital structure deserves attention.

TABLE 4: SYSTEM GENERALIZED METHOD OF MOMENT (TWO-STEP ESTIMATES)

Dependent Variable	**Long T. Debt**		**Total Debt**	
LD_{it-1} / TD_{it-1}	0.74***	(21.28)	0.53***	(17.92)
Cash flow	-0.01**	(-4.37)	-0.16**	(-6.12)
F. Assets	0.07***	(2.92)	0.05**	(2.65)
Size	-0.03	(-1.36)	0.05	(1.25)
Growth	0.15***	(16.00)	0.10***	(4.11)
2nd-order-Serial-Correl. (P-value)	0.36		0.30	
Difference-Sargan-Test (P-value)	0.12		0.24	

Notes: *[a] Table 2 defines variables. [b] The numbers in parentheses are test statistics. [c] The model estimated using Dynamic Panel program used by Blundell and Bond (1998). [d] ** and *** indicate coefficient is significant at 5 and 1percent levels respectively. [e] Second order correlation that has N (0, 1) distribution, but null uncorrelated with errors. [f] Standard errors are robust for system GMM results. Difference Sargan (1958) over identification test and null that instruments are valid. Difference Sargan (1958) test run if the error are GMM type (Stata xtdpdsys command). N = 100, T = 6. Number of instruments are 20.*

5. CONCLUSION

The paper investigates the relationship between cash flow and debt for South African firms. We find cash flow is significant and negatively related to long term debt. Similarly, cash flow is significant and negatively related to total debt. This suggests firms with higher cash flow have less debt in their capital structure. Furthermore, the results suggest firms in South Africa prefer internal finance (cash flow) to external finance when there is need to fund profitable investment project**.** This could be that there is high information asymmetry costs associated with raising external finance compare with internal finance**.** Consequently, when firms are in need of cash to finance profitable investment projects, they use internal finance first, follow by debt, and equity issue is the last resort.

Internal finance (cash flow) is preferred to equity because investors perceive the equity issue as bad news and this bad news has negative effects on stock prices. Also, debt holders perceive the debt issue as bad news and demand higher returns. It is implied in pecking order theory that the capital market is efficient in semi-strong form, but it is not efficient in the strong form. The results reveal the presence of asymmetric information problem between the firm and its financiers**.** Besides, the study implies need to further develop the South African capital market in order to reduce information asymmetry costs preventing firms from raising external capital.

Furthermore, as a control variable, fixed assets are significant and positively related to debt which suggests fixed assets are required as collateral to obtain long-term debt in South Africa. The size and growth variables give inconsistent sign which suggest size and growth may not be consistent determinants of capital structure for South Africa firms. Moreover, the study reveals the relevance of dynamic models in capital structure research. The study reveals trade off theory is present in the results which suggest the dynamic nature of firms' capital structure deserves attention. In general, this study shows empirical evidence on the pecking order theory and the trade-off theory found in developed countries is applicable to South Africa, despite institutional differences that exist between them.

We contribute to empirical research on capital structure in two ways. Firstly, unlike previous studies that examine the relationship between profit and debt, we investigate the relationship between cash flow and debt in South Africa. Cash flow is a better measure of internal finance compared with profit because it excludes non-cash items such as depreciation. Secondly, the study uses better estimation technique which is difference GMM and system GMM (as robustness tests). GMM effectively controls for unobservable firm specific-effects and possibility of reverse causality between cash flow and debt, as well as potential endogeneity of explanatory variables. Unobservable firm-specific effects are eliminated through first differencing while endogenous problem is addressed by using more efficient instrumental variable technique. In addition, GMM allows us model changes in debt which pecking order theory emphasize because it uses the first differencing technique.

We investigate the relationship between cash flow and debt predicted by pecking order theory, but evidence of the dynamic trade-off theory appears in the results. There is evidence that firm adjust to long-run target debt level. Hence, research that investigates differences in firms' speed of adjustment to target debt level is encouraged. Also, we use cash flow as the main independent variable because it is a better measure of internal finance compare to accounting profit. However, studies that examine the relationship between economic profit and debt will be informative. Economic profit is the difference between revenue earned and opportunity costs and it reveals vital information about the liquidity position of firms.

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