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Firm-Level Determinants of Capital Structure Decisions of Construction Companies in Ethiopia

Yitbarek Takele Bayiley[1] and Fikru Teka Siweya [2]

Abstract

The study aimed to identify firm-level determinants of capital structure decisions of Grade I construction companies in Ethiopia. We analyzed audited financial statements of 5 of the 24 Grade I construction companies that met the selection criteria and showed their willingness to participate in the study. The study period covered from 2007 to 2012. We employed a fixed effect panel regression model to analyze study results. Fixed effect is a preferred model when one cannot consider the observations to be random draws of a large population. Of the nine firm-level antecedent variables, only non-debt tax shield, firm age, and earnings volatility explained the financing decisions of Grade I construction companies. The three variables explained 54% of the variance in the outcome variable during the study period. The results also signpost these variables can predict 41% of the future variation in capital structure decisions. Further, though both trade-off and pecking order theories explain the capital structure decision of the firms under study, the trade-off theory appears to be more competent. Moreover, we found SUR Construction PLC to be less leveraged than the other four Grade I construction companies. We, thus, recommend SUR Construction PLC make use of its underutilized debt capacity to finance profitable projects and achieve better growth. Finally, given the limited participation by Grade I construction companies, the conclusions of the study need to be carefully considered.

Keywords: firm-level, capital structure decision, construction industry, Ethiopia

[1] *Associate Professor of Business Administration, Email: yitbarek.takele@aau.edu.et, Department of Management, Addis Ababa University, Ethiopia*
[2] *Email: fikruteka@gmail.com.Department of Management, Addis Ababa University, Ethiopia*

Introduction

Construction is a large bona fide sector that has a major contribution to global socio-economic development through the building of infrastructure and productive facilities (Hillebrandt, 2000; Wells, 1986). It also creates significant employment opportunities, encourages entrepreneurship, and facilitates the transfer of technologies (Ofori, 2007; Turin, 1973).

The concept of construction includes the erection and repair of immobile structures and facilities (Nam & Tatum, 1988) as well as the creation of physical infrastructure, superstructure, and related facilities (Wells, 1985). It also includes activities such as blasting, test drilling, landfill, leveling, earthmoving, excavating, land drainage, and other land preparation (Ibrahim, Roy, Ahmed, & Imtiaz, 2010).

A plethora of factors affect firm capital structure decisions. Extant literature indicates shareholders' control rights, and ownership structure (Amin & Liu, 2020), firm- and country-specific factors (Zafar, Wongsurawat, & Camino, 2019), national culture (Wang & Esqueda, 2014), macro-economic factors (Kędzior, 2012; Bokpin, 2009; Korajczyk & Levy, 2003), bank/market dominated nature of country's financial system (Antoniou, Guney, & Paudyal, 2008), time, firm, industry and country (Kayo & Kimura, 2011), institutional factors (Jõeveer, 2013; Lemma & Negash, 2013), industry factors (Islam & Khandaker, 2015), listed and unlisted nature of companies (Akinyomi & Olagunju, 2013, Deari, 2009) and firm size and life cycle (JS Ramalho & da Silva, 2009; La Rocca, La Rocca, & Cariola, 2011), among others, affect firm capital structure decisions.

The numerous natures of factors affecting capital structure decisions have led to contradicting, inconsistent, and often conflicting claims among scholars aggravating the lack of consensus on the determinants of capital structure decisions at the universal level (Frank & Goyal, 2009). Capital structure is one of the most contentious issues that grabbed the attention of finance practitioners and researchers alike (Wasia, 2020; Thies & Klock, 1992; Zewdie, 2017). This is an indication that statistical conclusion validity is compromised (García-Pérez, 2012). Achieving statistical conclusion validity among others requires controlling factors that are responsible for multiple and contradictory claims (Lipsey, 2000; Austin, Boyle, & Lualhati, 1998).

Simply put in such conditions, context matters (Pritchett & Sandefur, 2015; Marks, Clarke, O'Sullivan, & Barry, 2010; Boettke & Coyne, 2009). The construction industry has an evolving growth pattern based on the economic development stage of a country (Lopes, 2010; Bon, 1992).

Researchers shall thus study one country at a time or countries that achieved similar economic levels (Kędzior, 2012; Bokpin, 2009; Antoniou et al., 2008; Korajczyk & Levy, 2003) and share similar cultures (Wang & Esqueda, 2014). For example, debt ratios in developing countries seem to be affected in the same way and by the same types of variables that are significant in developed countries. However, there are systematic differences in the way these ratios are affected by country factors, such as GDP growth rates, inflation rates, and the development of capital markets (Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001).

Controlling industry variations (Islam & Khandaker, 2015) as well as firm size and life cycle improves internal validity (JS Ramalho & da Silva, 2009; La Rocca et al., 2011). Regardless of these controlling measures, a plethora of extant literature claimed inconsistent firm-specific determents of capital structure including tangibility, tax shield benefit, firm size, profitability, growth opportunities, future expected growth, earning volatility, and liquidity, among others (Sahudin, Ismail, Sulaiman, Rahman, & Jaafar, 2019; Zewdie, 2017; Baharuddin, Khamis, Wan Mahmood, and Dollah, 2011; Sahudin et al, 2011; Bas, Muradoglu, & Phylaktis, 2009; Frank & Goyal, 2009; Harris & Raviv, 1991). Moreover, despite the vast literature on the capital structure of the firm there still is a big gap between theory and practice (Schauten & Spronk, 2006). Thus, more needs to be studied and known about determinants of capital structure decisions controlling for country, sector, and firm size.

In Ethiopia, most capital structure research focused on the manufacturing sector (Mekonnen, 2011; Ashenafi, 2005; Kebede, 2011; Fisseha & Lavanya, 2012). Some are on insurance companies (Takele & Beshir, 2017; Kinde, 2013), a few on construction companies (Wasia, 2020; Zewdie, 2017; Netsanet, 2012), limited on commercial banks (Weldemikael, 2012), and large taxpayer share companies (Umer, 2014). Though Netsanet (2012), Wasia (2020), and Zewdie (2017) studied firm-specific determinants of capital structure decisions they did not control for firm size which undermines the internal validity of their findings.

The current research attempted to enhance the internal validity problem of existing studies by controlling the firm size of the construction industries and studying only Grade I construction companies. Our study, therefore, analyzed the influence of firm-specific determinants of capital structure decisions in the Ethiopian construction industry and aims to identify the capital structure theory or theories that best explain the capital structure choice of Ethiopian Grade I construction companies.

The rest of the chapters are structured as follows. Chapter Two reviews extant literature. Chapter three presents theoretical underpinnings and develops research hypotheses. Chapter four details the research methodology the study employed. Chapter five discusses the results. Finally, chapter six captures the conclusion and limitations of the study as well as imparts reflection on the implications.

Review of Related Extant Literature

Overview of the Ethiopian construction sector

According to the guidelines issued by the then Ministry of Works and Urban Development (MoWUD) and the incumbent Ministry of Urban Development, Housing, and Construction, there are four categories of contractors: general, building, road, and specialized. A general contractor is a company qualified to undertake a variety of construction works such as buildings, roads, bridges, airports, dams, railways, etc. As per the regulation of MoWUD, all types of contractors are organized into ten grades (categories). The assigned grade determines the type and size of work contractors are allowed to engage in. As a result, the assigned grade can be considered as a proxy indicator of size and capacity to implement. The MoWUD guideline allows grade I general contractors to undertake one or a combination of the construction works mentioned above with no limitation set on contractual value.

The construction industry in Ethiopia has witnessed phenomenal growth from 2008 - 2012. It has grown from Br 15.27 billion to Br 31.11 billion during the specified period. Its contribution to the country's gross domestic product was also remarkable. On average, it accounted for 4.48% of the country's GDP during the study period (MoFED, 2012). However, what remains to be explored is whether firm growth complements the shareholder value maximization objective of construction firms (Priem, 2007).

Function as a contractor and engage in construction in Ethiopia; all must have a building license from the Ethiopian Ministry of Construction. The Ethiopian Ministry of Construction places contractors in various categories: General Contractors (GC 1-10) that can undertake any civil construction works except waterworks; Building Contractor (BC 1-10) that can engage in the construction of buildings; Road Construction (RC 1-10) that participate in road construction; and Special contractors (SC 1-4) specialized in a single area of construction like foundation drilling.

For foreign investors only GC-1, BC-1, RC-1, or SC-1 registration is allowed (Ethiopian Contractors registration requirements, 2018).

Capital structure and firm value

Firm value creation is a function of the investment capital required to realize the project, the volume of a stream of expected cash flows it generates, its opportunity cost (discounting factor), and the length of period the product enjoys the required market demand, among other things (Fernández, Fernández, Fernandez, & López, 2002; Narayanan & Nanda, 2006). The probability of creating future values is also correlated with profitability, industry patterns, firm size, ownership structure, and time (Naceur & Goaied, 2002). Besides, firm value creation complements the value capture orientations of a firm's positioning, transaction cost, and resource-based decisions and actions (Priem, 2007).

Firms can create the maximum value when they choose an optimal capital structure wherein the weighted average cost of capital (WACC) is minimum and earnings are maximum (Ross, 2005). However, choosing optimal capital structures depends on analyzing the contribution of firm-specific, industry-specific, and macro-specific determinants of capital structure decisions.

Managing projects and operations

We manage through projects and operations to maximize shareholder value. However, theeffective management of projects requires minimizing the required rate of return of the project through efficient capital structure management, risk management, and payout decisions. The capital structure of a firm describes not only the way a firm raises needed capital to establish and expand its business but also maximizes shareholder value. Firms create or destroy value in their corporate financing decisions, at the center of which is a capital structure decision.

The management of operations, on the other hand, aims to improve the stream of cash flows using efficient internal resource allocation and growth decisions. This can be done by increasing the return on existing capital, raising investment in positive spread units, divesting assets from negative spread units for more productive use, and extending the investment planning horizon (Narayanan & Nanda, 2006).

Debates in capital structure decisions

The issues of firm value maximization and the factors that determine the capital structure have become a point of discussion among scholars in the last few decades. Capital structure decision is one of the most debated issues in the field of corporate finance (Feidakisa & Rovolis, 2007). Some claim capital structure decision matters (DeAngelo & Masulis, 1980; Ross, 1977; Myers, 1984; Jensen & Meckling, 1976) while some claim otherwise (Modigliani & Miller, 1958). The position of the different authorities stems from the assumption that capital markets are either perfect or imperfect. Some claim capital markets are perfect and thus firm capital structure decision doesn't matter. Others argue capital markets are imperfect and thus capital structure decision matters.

However, there is no perfect capital market owing to information asymmetry (Ross, 1977; Myers, 1984), agency costs (Jensen & Meckling, 1976), and bankruptcy costs (DeAngelo & Masulis, 1980). The imperfect nature of capital markets was documented in the 2007/2008 financial and economic crises. Thus, fair to argue that capital structure decisions matter and thus affect firm value creation. Moreover, firm value creation would be at its maximum if a firm chooses an optimal capital structure where the weighted average cost of capital (WACC) is minimum and the value of the firm is maximum (Ross, 2005).

Extant literature indicates macro-level (economy, culture, country financial structure), industry-specific (industry type, life cycle, competition, a priority by the government, etc.), and firm-specific (size, age, life cycle, shareholders' control rights, ownership structure, etc.) influence optimal capital structure choice. The different factors influencing decisions on the capital structure have led to contrary, ambiguous, and frequently competing arguments among scholars, exacerbating the lack of agreement on the determinants of decisions on the capital structure at the universal level (Frank & Goyal, 2009).

Optimal capital structure, shareholder value, and stakeholder value

The value created for the firm shall also be used to maximize shareholder value while paying a fair value to other stakeholders. Other stakeholders are customers, creditors, employees, the government, the community, and the general public. Putting shareholder value maximization at the center of the objective of the firm recognizes not only the residual claimant nature of shareholders, and the idea and resources they contribute during establishment but also their willingness to reinvest profits than consume, unlike other stakeholders. Such commitments help

to generate more and better employment opportunities that keep the investment cycle moving forward and continue to benefit generations to come.

Mid-level strategy and financial decisions

Competitive/business-level strategy is the mid-level strategy in the three-tier strategy of firms. It is designed to shape the operating and financial decisions of firms at the strategic business unit (SBU) level and outline how to compete in the chosen business(es). Effective business-level strategies are those that integrate finance with strategy asserting their interdependence and complementarity. As a result, successful competitive strategies require operation decisions to boost expected cash flows, improve corporate performance, create firm value, and ultimately maximize shareholder value. Put differently, the increase in cash flow as a result of operating decisions, and the decrease in the cost of capital as a result of financing decisions shall interdependently create firm value.

To sustain growth and maximize shareholder value, construction companies need to raise capital that supports their operations and finance the capital investment. While deciding the composition of equity and debt in their capital structure decisions, the construction companies naturally create, or maintain the status quo, or destroy value. Firms broadly indicate the desired composition of equity and debt in their business strategy. The business-level strategy shapes the operating and financial decisions of firms at the strategic business unit (SBU) level and signposts how to compete in a given business(es).

A multi-perspective approach to capital structure decisions

Capital structure and shareholders

Putting shareholder value maximization at the center of the objective of the firm recognizes not only the residual claimant nature of shareholders, and the idea and resources they contribute during establishment but also their willingness to reinvest profits than consume, unlike other stakeholders. Such commitments help to generate more and better employment opportunities that keep the investment cycle moving forward and continue to benefit generations to come.

Capital structure and non-financial stakeholders

Firm stakeholders can be categorized as financial and non-financial stakeholders. The non-financial stakeholders are those parties other than the debt and equity holders including the firm's

customers, employees, suppliers, and the overall community in which the firm operates (Hillier, Grinblatt, & Titman, 2011). Hillier et al., (2011) posit the interaction of a firm and its non-financial stakeholders (customers, employees, suppliers, and the overall community) is an important determinant of a firm's optimal capital structure.

This unwillingness of non-financial stakeholders to do business with a troubled company generates a cost that can deter a firm from accessing debt promised to be offered in favorable terms. It is these concerns that make non-financial stakeholders important in capital structure decisions. The concerns may include inferior products (customers), loss of business (suppliers), loss of jobs (employees), pollution (community), and economic crisis (society).

As non-stakeholders influence the indirect costs of financial distress, they could be regarded as part of the trade-off theory (Brealey, Myers, & Allen 2006). Similar to the trade-off theory (excluding agency costs between managers and shareholders) and the pecking order theory, the stakeholder theory assumes shareholder wealth maximization as the single corporate objective. (Hillier et al., 2011)

Capital structure and Managerial Incentive

Management incentives to bear risk play an especially pivotal role in determining leverage and thus financial structure. For example, entrenched management prefers to avoid debt. If management is not subjected to active monitoring and doesn't face incentive pressure both by owners and employees, they prefer low-level leverage in their capital structure choice (Berger, Ofek, & Yermack, 1997).

The manager-owner dispute creates a trade-off between low-state inefficiency and high-state rents, and the shareholder-bondholder conflict generates under-investment (Douglas, 2002). Optimistic managers choose higher debt levels. They issue new debt quite often without following a pecking order. Higher debt levels restrain managers from diverting funds. This increases firm value by reducing manager-shareholder conflict (Hackbarth, 2008).

There is no shareholder–bondholder agency costs with risk-less levels of debt but managerial control over the incentive-setting process produces excessive rents. However, with risky debt, shareholders focus more on returns in the high state increasing shareholder–bondholder agency costs while decreasing managerial rents. Besides, a decrease in manager-owner agency costs that

outweigh shareholder-bondholder agency costs is encouraged by efficient levels of debt-holder security. However, this may to lower firm performance (Douglas, 2002).

Agrawal & Mandelker (1987) discovered a strong correlation between managers' security portfolios and shifts in company variance and financial leverage. The vulnerability of the stock option portfolios of managers to stock return fluctuations raises the preference for higher leverage in capital structure decisions. These results are even stronger in a subsample of firms with relatively low outside monitoring (Nam, Ottoo, & Thornton, 2003).

Capital structure and corporate governance

Governance practices have a significant impact on capital structure decisions (Kajananthan, 2012). There are conflicting findings on the relationship between corporate governance and capital structure. Managers tend to use a lower level of debt when they face strong corporate governance from the board (Wen, Rwegasira, & Bilderbeek, 2002). Refuting this some claim that board size, board committee, outside directors, and ownership concentration are positively related to leverage choice (Sheikh & Wang, 2012; Bokpin & Arko, 2009).

Firm-level determinants of capital structure

There are various measures for the capital structure of firms including total-debt ratio, long-term book-debt ratio (Booth et al., 2001), long-term, short-term, and convertible debt divided by market and by book values of equity (Titman & Wessels, 1988), total-liabilities-to-assets (Welch, 2011; Rajan & Zingales, 1995). The current study adopted the measure of Welch (2011) and Rajan & Zingales (1995) as such measure captures trade credits which are common in construction financing. Also, the absence of a capital market in the country made it necessary to measure debt and equity in terms of book values rather than market values.

Profitability, expected growth (capital expenditure/total asset), long-term bank loan shield (deferred revenue/ fixed asset), liquidity (current asset/current liability), tangibility, size, age, non-debt tax shield, earning volatility were also considered as potential firm-level determinants of capital structure of grade I construction firms in Ethiopia.

Theoretical Underpinnings and Hypothesis Development:

Liquidity and leverage

According to the pecking order theory, firms prefer internal financing to external financing. Following this, firms are likely to create liquid reserves from retained earnings. If the liquid assets are sufficient to finance the investments, firms will not need to raise external funds. If a company generates cash flows above expenditures, one may observe an increase in the volume of liquid assets in the absence of debt issues. Such a relationship potentially leads to a negative statistical relationship (Anifowose, 2011; Mazur, 2007; Nijenhuis, 2013). Hence, liquidity is expected to be negatively related to leverage.

However, firms with higher liquidity can support relatively higher leverage as lenders have greater reassurance that obligations will be met when they fall due (Ozkan, 2001) implying a positive relationship. Also, sustained high issues of non-current debt allow for a reduction in current liabilities and an increase of liquidity for a given level of current assets (Galizia & O'Brien, 2001; Guha-Khasnobis & Bhaduri, 2002; Kinde, 2013).

Following the lines argument by Anifowose (2011), Mazur (2007), and Nijenhuis (2013), the current study hypothesizes a negative relationship between liquidity and leverage.

Hypothesis 1: There is a negative relationship between liquidity and leverage.

Profit and leverage

There are no consistent theoretical and empirical predictions on the relationship between profitability and capital structure. Theoretical predictions yield contradictory conclusions for the correlation between profitability and leverage. The trade-off model argues that profitable firms have greater needs to shield income from corporate tax and should borrow more than less profitable firms. refuting this argument, the pecking order theory assumes firms prefer internal financing to external financing which leads firms to use retained earnings first and then move to external financing only when retained earnings are insufficient, entailing an inverse relationship.

There is also an anomaly among empirical studies that examined the relationship between profitability and leverage. Assuming dividends and investments are fixed in the short run, debt financing is the dominant mode of external financing (Anifowose, 2011; Baharuddin et al., 2011; Fan, Titman, & Twite, 2012; Mazur, 2007; Md-Rus & Samiran, 2011; Usman, 2013). The negative influence of profitability on leverage is stronger as the firm size increases (Netsanet, 2012; Rajan

& Zingales, 1995). Contradicting some found positive relationships (Nijenhuis, 2013; Rajan & Zingales, 1995).

The stage of economic development and financial structure of countries matter in the study of firm capital structure decisions. Rajan and Zingales (1995) found negating, positive, and no relationships between profitability and leverage in the US, UK, and Germany & France, respectively.

Hypothesis 2: There is a negative relationship between profitability and leverage.

Firm size and leverage

Firm size is negatively related to financial leverage (Anifowose, 2010; Ezeoha, 2008), small firms build up cash holdings to preserve financial leverage (Byoun, 2007) and thus leverage ratio is positively affected by firm size (Choi, Yoo, Kim, & Kim, 2014; Nijenhuis,2013; Sahudin et al, 2011; Baharuddin et al., 2011; Antoniou et al., 2008). Firm size has a mixed effect on leverage ratio (Kurshev & Strebulaev, 2015) and firms in bank-oriented financial systems are more leveraged than firms in market-oriented financial systems regardless of size (Acedo-Ramírez & Ruiz-Cabestre, 2014; Antoniou et al., 2008).

Given that Ethiopia has a bank-dominated financial system as do most developing countries we hypothesize a positive relationship between firm size and leverage in the capital structure of construction companies in Ethiopia. We used the natural logarithm of total firm sales to measure size (Size=Ln [revenue]).

Hypothesis 3: There is a positive relationship between firm size and leverage.

Tangibility and leverage

Theories generally state that tangibility is positively related to leverage. Since tangible assets can be used as collateral in external borrowing, the presence of a large fraction of the tangible assets of a firm helps to get bank loans at a lower interest rate. Tangibility also reduces the agency cost of debt, a risk that lenders suffer from. The value of tangible assets is associated with higher debt capacity. Myers (1984) suggests that issuing debt secured by collateral reduces asymmetric information-related costs. Hence, debt secured by collateral helps to mitigate asymmetric information-related costs in financing (Rajan & Zingales, 1995).

However, empirical results are mixed: positive relationship (Rajan and Zingales, 1995), negative relationship (Booth et al., 2001), and no significant relationship (MD-Rus & Samiran, 2012).

Accordingly, we hypothesized a positive relationship in support of the dominant view. We used the ratio of fixed assets to total assets to measure the value of a firm's tangible assets.

Hypothesis 4: There is a positive relationship between tangibility and leverage.

Expected growth and leverage

The trade-off theory predicts a positive relationship between investments and debt. Higher investments increase the value of tangible assets and enhance debt capacity (Frank & Goyal, 2003). In support of such a priori expectation, Malitz and Long (1983) documented a positive relationship between capital expenditure and leverage. However, the existence of corporate debt can reduce the present market value of the firm by weakening the corporation's incentive to undertake good future investments through the induction of a suboptimal investment strategy, leading to a firm with valuable growth opportunities but struggling to maximize shareholder value (Myers, 1977).

If a firm plans to cover part of its investment with new borrowing, it restrains itself enough to keep the debt safe to avoid any material cost of financial distress and maintain financial slack in the form of reserve borrowing power to issue safe debt if the firm needs to (Myers, 1984). Therefore, the relationship might be negative due to the higher cost of financial distress and the need for financial slack. The negative relationship between leverage and growth opportunity as measured by market-to-book equity value ratio, the relation stemming from equity issuing, is documented by Rajan and Zingales (1995), Fan et al. (2012), Ramlall (2009), and Booth et al., (2001).

The growth of total assets (GTA) and capital expenditures over total assets were the two indicators of expected future growth employed by Titman and Wessel (1988). Following this, we used the ratio of capital expenditures over total assets (CAPEX=capital expenditure/total asset) to capture expected growth. We hypothesize a positive relationship between expected growth and leverage due to higher demand for external funds in the construction industry caused by insufficiency of internally generated cash.

Hypothesis 5: There is a positive relationship between expected growth and leverage.

Long-term bank loan shield and leverage

The construction companies in the country are favored to have advance payment without any interest payment but through the provision of a guarantee bond for which they pay only a premium to the insurer. This advance payment, provided by the project owners (customers), will be repaid by the contractor from interim payments as deductibles during the project construction duration.

As there is no obligation to pay principal & interest at regular time intervals, construction companies operating in Ethiopia prefer to get long-term advance payments with little or no interest payments causing minimal financial distress. Such a positive relationship between long-term advance payments and leverage is supported by static trade-off theory.

We believe if a company gets a long-term bank loan, it shall present collateral in the amount equivalent to the loan. The leftover of the fixed asset can be used to seek an advance payment guarantee bond. Long-term bank loan shield as a result of the advance payment (deferred revenue) is measured as the ratio of deferred revenue divided by fixed asset book value. The pecking order theory expounds, that if the company wants to invest, it seeks external financing provided internal financing is not adequate. The cheapest source of external financing is getting advance payment (short-term) from the clients rather than borrowing from banks (long-term). This deferred revenue is considered to be a substitute for a long-term bank loan. Following this argument, we hypothesize a positive relationship between long-term bank loan shields and leverage. We measured long-term bank loan shields using the ratio of deferred revenue to fixed assets.

Hypothesis 6: There is a positive relationship between long-term bank loan shields and leverage.

Firm age and leverage

As firms age, their long years of track record and expertise in finding alternative credit sources help them to easily convince creditors and thus access debt in favorable terms. The trade-off theory explains as a firm operates for a long period, it establishes a reputation and thus increases its capacity to take more debt from lenders. Anifowose (2011), Kinde (2013), Sahudin et al. (2011), and Usman (2013) documented in support of the tradeoff theory.

As the company needs to keep the going concern, it should not pass up positive-NPV investments. Therefore, from the pecking order point of view, the older companies are expected to accumulate internally generated cash to cover positive-NPV investments leads to a negative relationship between firm age and leverage. Firm age exerts a negative impact on debt ratios, indicating that older firms are relying less on debt than younger ones (Fisseha & Lavanya, 2012; Pfaffermayr, Stöckl, & Winner, 2013; Shiferaw, 2013; Netsanet, 2012). Nonetheless, given the fast-growing nature of the construction industry in Ethiopia, we hypothesize a positive relationship between firm age and leverage. We also used the age of the company in years measured as the difference of years since its establishment in Ethiopia and the year of each observation.

Hypothesis 7: There is a positive relationship between firm age and leverage.

Non-debt tax shield and leverage

Depreciation, investment tax benefit, and loss carried forward apart from interest expenses that contribute to a decrease in tax payments are labeled as non-debt tax shields (NDTS). The trade-off theory assumes companies have an incentive to take debt because they can benefit from, the tax shield due to tax deductibility; however, they refrain from debt if they have other tax shields such as depreciation. Following this, the trade-off theory predicts an inverse relationship between non-debt tax shields and leverage.

However, there is mixed empirical evidence for the relationship between NDTS and leverage. Some found a negative relationship (DeAngelo & Masulis, 1980; Jairo, 2008; Nijenhuis, 2013) while others documented a positive association (Choi et al., 2014; Md-Rus & Samiran, 2012; Tongkong, 2012; Usman, 2013; Fisseha & Lavanya, 2012; Netsanet, 2012).

As Ethiopia's tax proclamation provides such a shield, it is valid to use NDTS as one of the factors that can affect the capital structure of the company. We used the ratio of depreciation expense to total assets to measure NDTS.

Hypothesis 8: There is a positive relationship between non-debt tax shields and leverage.

Earning volatility and leverage

Firms with higher earnings volatility shall be conservative in the use of leverage to prevent potential financial distress. The pecking order theory asserts firms with high earnings volatility preserve spare debt capacity to avoid issuing more costly debt instruments at a later stage. Firms characterized by volatile earnings prefer to use internally generated funds first. With this, the trade-off theory suggests earnings volatility as a proxy for the probability of financial distress. Both the pecking order and trade-off theories suggest a negative relationship between earnings volatility and leverage. However, there is mixed empirical evidence. Some researchers claim a negative relationship (Usman, 2013; Netsanet, 2012), others a positive relationship (Kinde, 2013), and still others no relationship (Anifowose, 2011; Mazur, 2007; Nijenhuis, 2013; Tongkong, 2012).

Several measures of volatility have been used in empirical studies such as the standard deviation of the return on sales, the standard deviation of the first difference in operating cash flow scaled by total assets, or the standard deviation of the percentage change in operating income (Titman & Wessel, 1988).

Following both the pecking order and trade-off theories, we hypothesize a negative relationship between earning volatility and leverage in the Ethiopian construction sector. We employed the standard deviation of returns on assets as suggested by Booth et al. (2001) to measure earnings volatility.

Hypothesis 9: There is a negative relationship between earning volatility and leverage.

Research Methods

Research approach and design

The research followed a positivist paradigm, a quantitative approach, and a longitudinal explanatory design. The audited annual financial report of five grade-I construction companies, covering the period from 2007 to 2012 was used as the source of study data.

Target population and sampling design

The target population of the study was the construction in Ethiopia. We employed multistage sampling to select sampling units. The sampling unit is construction companies. First, we limited our sample to grade I construction companies operating in Ethiopia. The reason we selected Grade I construction companies is their capacity and resourcefulness to undertake big projects. Second, we decided to exclude government-owned Grade I construction companies assuming they can get quick government support when needed regarding their financial resource difficulties. The fact that they get quick government support makes their capital structure decision quite different from privately owned Grade I construction companies. Third, we decided to exclude Grade I construction companies that are subsidiaries of foreign companies. Our reason is similar to the previous argument that they can get quick support from their mother companies and thus have different capital structure issues than locally owned private companies. Finally, we set five years of active operation as a final requirement given the panel nature of the study design.

There were 33 companies in the year 2012 registered by the Ministry of Works & Urban Development as Grade I companies. The 33 companies are used as our sampling frame. We found only 24 construction companies meet our criteria. However, only five companies were willing to provide their audited financial statements. Following this, the study analyzed the financial statements of the five companies that were willing to participate in the study.

Model specification and data analysis plan

Ordinary least squares multiple regressions were run using the Minitab 16 statistical software package to estimate the parameters and test hypotheses for statistical inference. In the selection of the best models for Grade I construction companies, the best subsets (for OLS) regressions procedure was applied. The model selection mainly focuses on the predictive ability of the model in addition to the explanatory power of the variables for past decisions. The explanatory & predictive ability was used to identify important independent variables. The model with the highest R^2 (adjusted) and highest predicted R^2 has been selected.

We used panel data that combine the features of both time-series and cross-sectional data. By combining cross-sectional and time-series data, we can increase the number of degrees of freedom. Panel data has also the fundamental advantage of allowing the researcher greater flexibility in modeling behavioral differences across individual firms.

Wooldridge (2002, 2010) suggests that when we cannot consider the observations to be random draws of a large population similar to our case, it often makes sense to think of the α_i (firm fixed effect constant over time) as parameters to estimate. In this case, we use a fixed-effect model. Using fixed effects is the same as allowing a different intercept for each observation, and we can estimate these intercepts by including dummy variables (Gujarati & Porter, 2009; Wooldridge, 2002).

Booth et al. (2001) and Nijenhuis (2013) used the fixed-effect model to conduct comparisons between developed and developing countries and capture industry differences in capital structure decisions. Ensuing this, we used a fixed-effect regression model to compare the effects of the determinants of capital structure decisions among Grade I construction companies in Ethiopia.

We have conducted all the necessary diagnostic tests for assumptions of linear regression. We also checked for adequacy of the model through fitness (adjusted $R^2 = 0.54$) and predictive ability (predicted $R^2 = 0.41$). Statistical test results having VIF values between 1.21 & 1.45 indicated no multicollinearity problem. The Anderson-Darling normality test ($0.985 > 0.5$) indicated data normally distributed around its mean of zero and thus inferences made about the population parameter from the sample statistic are fairly applicable. White's test for heteroscedasticity with a p-value of the joint hypothesis test = $0.114 > 0.05$ indicated no problem of heteroscedasticity. Finally, we used Durbin's two-step method to fix the positive autocorrelation result (0.784) and achieve the required statistical result ($1.038 <= \alpha <= 1.767$).

The fixed-effect model defining the research variables for Grade I construction companies is presented as follows:

$$LEV_{it} = \beta_0 + \beta_1 LIQD_{it} + \beta_2 PROF_{it} + \beta_3 SIZE_{it} + \beta_4 TANG_{it} + \beta_5 CAPEX_{it} + \beta_6 LTBS_{it} + \beta_7 AGE_{it} + \beta_8 NDTS_{it} + \beta_9 EV_{it} + \gamma_{sur} SUR + \gamma_{GC1} GC1 + \varepsilon_{it} \quad \text{(Eq.1)}$$

Where:

LEV_{it}: Leverage of firm as measured by total liability to total assets, for firm i in time t

α : Constant

$\beta_1, \ldots, \beta_9$: Coefficients for respective independent variables

u_{it} : Between companies error term

ε_{it} : Within a company error term

$LIQD_{it}$: Liquidity for firm i, in time t

$PROF_{it}$: Profitability of company i, in time t

$SIZE_{it}$: Size of the firm, as measured by Logarithm of total sales, for firm i in time t

$TANG_{it}$: Asset tangibility as measured by the ratio of fixed assets to total assets, for firm i, in time t

$CAPEX_{it}$: expected growth of the firm as measured by the investment in fixed assets to total assets ratio, for firm i, in time t

$LTBS_{it}$: Long-term bank loan shield as measured by deferred revenue to fixed asset ratio, for firm i, in time t

AGE_{it}: Age of the firm since its establishment, for firm i, in time t

$NDTS_{it}$: Non-debt tax shields as measured by annual depreciation expense to total assets, for firm i, in time t

EV_{it}: Earnings Volatility as measured by the standard deviation of the ratio of the value of percentage change of EBIT to total assets, for firm i, in time t

SUR and $GC1$ are dummies for SUR Construction PLC and GC-1 construction companies.

γ_n is the coefficient for the binary repressors (entities) 'n' representing SUR and GC1

Results and Discussion

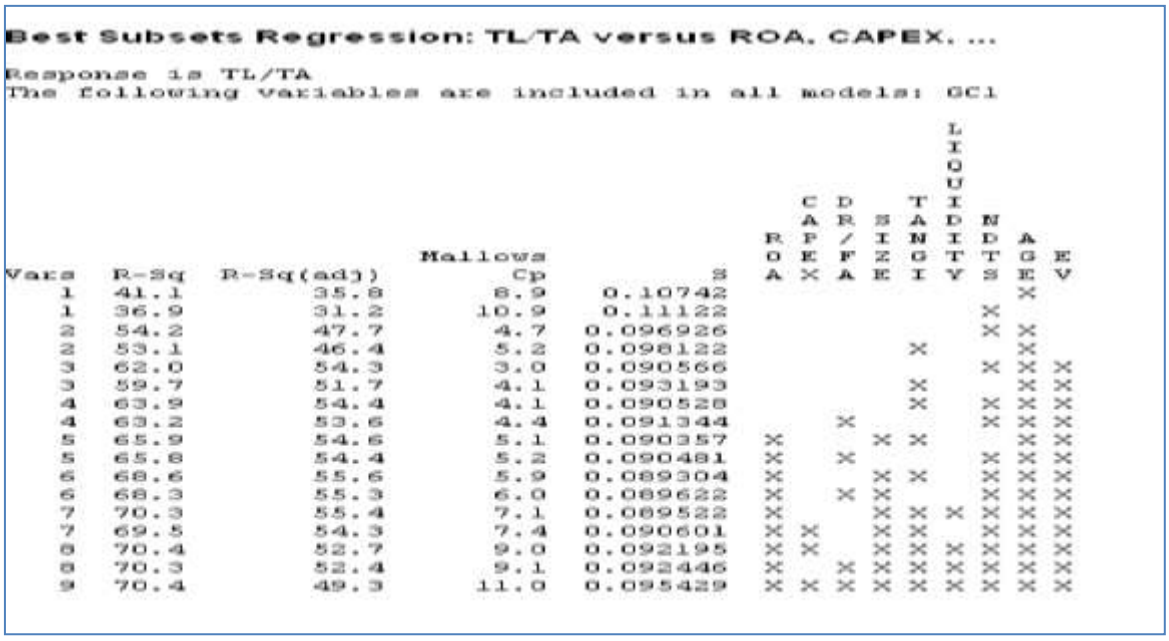
Best subset regression was run to choose explanatory variables that jointly yield the best model having better predictive ability. To maintain parsimony, we selected the smallest subset regression that fulfills the required statistical criteria. Such an approach helps to estimate regression coefficients and predict future responses with smaller variance than the full model using all predictors (Hocking, 1976). We used R^2, adjusted R^2, Mallows' C_P, and S (square root of MSE), to compare models. We also used the PRESS (predicted sum of squares) and predicted R^2 to refine the model selection.

We used adjusted R^2 and C_p to compare models with different numbers of predictors. Choosing the model with the highest adjusted R^2 helps to select a model with the smallest mean square error (MSE). Besides, choosing the model with the smallest C_p boosts the model's relative precision in estimating the true regression coefficient & predicting future responses (Minitab Inc., 2000).

The best subset regression was carried out with a listing of the best two models having one to nine predictor variables (Table 1). The fixed-effect model constituting NDTS, age, and earningvolatility was found to be the best model with the least C_p value of 3 and adjusted R^2 of 54.3%. The model well captured past decisions given the small (1.3%) adjusted R^2 difference between models having six independent variables and three independent variables. Therefore, the multiplelinear regression for the fixed effect was done for this selected best model. The fixed-effect regression for Grade I construction companies was conducted using SUR construction as a base for comparison given its leading position in the industry.

The independent variables in the model explained 54 % of the variation in the outcome variable (adjusted $R^2 = 0.54$). Also, results indicated the model predicts 41% of all future variations in capital structure of Grade I construction companies (predicted $R^2 = 0.41$). Both findings implicate the model not only fits past data but also predicts future financing decisions for Grade I construction companies.

Table 1. Best subsets regression for Grade I Construction Companies: Fixed Effect



Best Subsets Regression: TL/TA versus ROA, CAPEX, ...

Response is TL/TA

The following variables are included in all models: GC1

Vars	R-Sq	R-Sq(adj)	Mallows Cp	S	ROA	CAPEX	DR/FA	SIZE	TANGI	LIQUIDITY	NDTS	AGE	EV
1	41.1	35.8	8.9	0.10742								X	
1	36.9	31.2	10.9	0.11122							X		
2	54.2	47.7	4.7	0.096926							X	X	
2	53.1	46.4	5.2	0.098122					X			X	
3	62.0	54.3	3.0	0.090566							X	X	X
3	59.7	51.7	4.1	0.093193					X			X	X
4	63.9	54.4	4.1	0.090528					X		X	X	X
4	63.2	53.6	4.4	0.091344			X				X	X	X
5	65.9	54.6	5.1	0.090357	X			X	X			X	X
5	65.8	54.4	5.2	0.090481	X		X				X	X	X
6	68.6	55.6	5.9	0.089304	X			X	X		X	X	X
6	68.3	55.3	6.0	0.089622	X		X	X			X	X	X
7	70.3	55.4	7.1	0.089522	X			X	X	X	X	X	X
7	69.5	54.3	7.4	0.090601	X	X		X	X		X	X	X
8	70.4	52.7	9.0	0.092195	X	X		X	X	X	X	X	X
8	70.3	52.4	9.1	0.092446	X		X	X	X	X	X	X	X
9	70.4	49.3	11.0	0.095429	X	X	X	X	X	X	X	X	X

NDTS ($p < 0.05$), firm age ($p < 0.01$), and earning volatility ($p < 0.1$), are the three factors that determine the capital structure decisions of construction firms (Table 2). Together, the three predictors account for 54.3% of the variance in leverage. Though the dummy variable GC I is statistically not significant ($p > 0.1$), it is practically or economically significant. It accounts for about 9% (Br 61 million) of the average yearly total assets amount as debt. This is more than the average annual capital expenditure of a firm in the construction industry (Br 55 million).

Our result for NDTS is consistent with DeAngelo & Masulis (1980), Jairo (2008), and Nijenhuis (2013). However, it contradicts the findings of Choi et al. (2014), Md-Rus & Samiran (2012), Tongkong (2012), Usman (2013), Fisseha & Lavanya (2012), and Netsanet (2012). Likewise, the finding related to firm age corroborates with Anifowose (2011), Kinde (2013), Sahudin et al. (2011), and Usman (2013). It, however, contradicted the findings of Fisseha & Lavanya, (2012), Pfaffermayr, Stöckl, & Winner (2013), Shiferaw (2013), and Netsanet (2012). Finally, our finding regarding earning volatility agrees with the results of (Usman (2013) and Netsanet (2012)while it disagrees with Kinde (2013).

The models before the removal of autocorrelation

$$LEVERAGE = 0.586 - 1.53NDTS + 0.015AGE - 0.380EV + 0.0929GC1 \quad \text{..... (Eq.2)}$$

$$LEVERAGE_{GC-1} = 0.6789 - 1.53NDTS + 0.015AGE - 0.380EV \quad \text{..... (Eq.3)}$$

$$LEVERAGE_{SUR} = 0.586 - 1.53NDTS + 0.015AGE - 0.380EV \quad \text{..... (Eq.4)}$$

The models after the transformation of variables to correct autocorrelation

$$LEVERAGE = 0.507 - 1.614NDTS + 0.016AGE - 0.374EV + 0.093GC1 \quad \text{..... (Eq.5)}$$

$$LEVERAGE_{GC-1} = 0.600 - 1.614NDTS + 0.016AGE - 0.374EV \quad \text{..... (Eq.6)}$$

$$LEVERAGE_{SUR} = 0.507 - 1.614NDTS + 0.016AGE - 0.374EV \quad \text{.....(Eq.7)}$$

Table 2. Regression Analysis for GC-1 Construction Companies: Fixed Effect

```
The regression equation is
TL/TA = 0.586 - 1.53 NDTS + 0.0151 AGE - 0.380 EV + 0.0929 GC-1

Predictor       Coef    SE Coef       T       P     VIF
Constant      0.5858     0.1139    5.14   0.000
NDTS         -1.5279     0.6426   -2.38   0.028   1.325
AGE         0.015146   0.004822    3.14   0.005   1.208
EV           -0.3803     0.1889   -2.01   0.058   1.304
GC-1         0.09290    0.05444    1.71   0.103   1.445

S = 0.0905662   R-Sq = 62.0%   R-Sq(adj) = 54.3%

PRESS = 0.255849   R-Sq(pred) = 40.67%

Analysis of Variance
Source           DF         SS         MS      F       P
Regression        4   0.267172   0.066793   8.14   0.000
Residual Error   20   0.164045   0.008202
Total            24   0.431217

Source  DF     Seq SS
NDTS     1   0.090222
AGE      1   0.068797
EV       1   0.084268
GC-1     1   0.023884

Unusual Observations

Obs    NDTS    TL/TA      Fit   SE Fit  Residual  St Resid
 24   0.070   0.7083   0.8913   0.0297   -0.1830     -2.14R

R denotes an observation with a large standardized residual.

Durbin-Watson statistic = 0.783925

No evidence of lack of fit (P >= 0.1).
```

Table 3 indicates both pecking order and trade-off theories explain the capital structure decision of Grade I construction companies in Ethiopia. While trade-off theory maintained similar signs with all three of the significant explanatory variables and four insignificant variables, the pecking order maintained similar signs only with two of the significant explanatory variables and four insignificant variables. This suggests the trade-off theory has superiority in shaping the financing decisions of Grade I construction companies in Ethiopia.

Table 3. ***Summary of hypothesized and actual relations between input and outcome variables***

No.	Variable	Measures	Theoretical Relationship		Hypothesized relationship	Statistical (Actual) Relationship	Decision
			Pecking order	Trade-off			
	Dependent						
1	Leverage	Total liabilities/ Total assets	NOT APPLICABLE				
	Independent						
1	Liquidity	Current asset/ current liability	Negative	Positive	Negative	*NSR	Not supported
2	Profitability	EBIT/Total assets	Negative	Positive	Negative	*NSR	Not supported
3	Firm Size	Natural logarithm of total sales	Negative	Positive	Positive	*NSR	Not supported
4	Tangibility	Fixed asset/ Total assets	Positive	Positive	Positive	*NSR	Not supported
5	Expected growth	Capital expenditure/ Total assets	Positive	Positive	Positive	*NSR	Not supported
6	Long-term bank loan shield	Deferred Revenue/ Fixed asset	Negative	Positive	Positive	*NSR	Not supported
7	Age	Years since establishment	Negative	Positive	Positive	Positive	Supported
8	NDTS	Depreciation/ Total Asset	Negative	Negative	Negative	Negative	Supported
9	Earning volatility	The standard deviation of profitability	Negative	Negative	Negative	Negative	Supported

*NSR: No Significant Relationship as a result of the best subset regression procedure

Results also indicated that (see equations 5, 6, and 7), SUR- construction company is less leveraged than the average of the other four Grade I construction companies. However, SUR- construction company has similar leverage with the average of all Grade I construction companies included in the study.

Besides, the findings consistent with the trade-off theory showed as age increases the leverage of Grade I construction companies increases. It can be seen that this finding contradicts the pecking order theory. Further, consistent with both the trade-off and pecking order theories the analysis showed a negative relationship between non-debt tax shield and the leverage of Grade I construction companies. Finally, again consistent with both the trade-off and pecking order theories, the analysis showed a negative relationship between earnings volatility and the leverage of Grade I construction companies in Ethiopia.

Conclusion, Implication, and Limitations

Conclusion

The study aimed to analyze firm-specific determinants of capital structure decisions of Grade I construction companies in Ethiopia. Nine potential firm-specific variables and one outcome variable were analyzed. The three variables in combination explained 54% of the variations in leverage of the Grade I construction companies. They can also predict 41% of future variations in the leverage of these firms.

Based on the key findings of the study we conclude both the trade-off and the pecking order theories explain the capital structure decisions of Grade I construction companies in Ethiopia. However, the trade-off theory is relatively superior to the pecking order theory in capital structure decisions of Grade I construction companies in Ethiopia. Second, only three firm-specific independent variables (non-debt tax shield, firm age, and earnings volatility) shape the capital structure decisions of Grade I construction companies in Ethiopia.

Implication

The implication for the significant effect of a non-debt tax shield over a long-term loan tax shield is that Grade I construction companies have gained a relatively adequate free cash flow from depreciation expense. Besides, the fact that the long-term loan tax shield is an insignificant signpost the tax shield from depreciation expense is enough to discourage these firms from seeking a tax shield from long-term loans. This is reflected in the mean higher depreciation expense ratio which is greater than the mean return on assets of all the Grade I construction companies.

The findings according to earning volatility are consistent with the hypothesis set for the study and the arguments of both trade-off and pecking order theories. Earnings volatility is a significant factor and is negatively related to leverage. The roots for this would be both the weak demand and supply for credit when earnings are volatile. The first implication would be that construction companies tend to refrain from debt to avoid bankruptcy when earnings are volatile and potentially drop below the debt-servicing commitment. From the supply side, it could also implicate that lending institutions (banks or clients that provide advance payment or supplies) lack the confidence to provide credit when the client's earning fluctuates from year to year.

Age is positively related to leverage confirms the research hypothesis. It is consistent with the trade-off theory that suggests leverage increases as age increases. The implication is that Grade I construction companies tend to absorb more debt as they get older which enhances their

established reputation. Enhanced reputation increases the probability of finding alternative cost-effective credit sources such as advance payments from clients or favorable trade credits from suppliers.

The fixed effect estimation as a matter of practical significance shows a 9% increase in debt for all four Grade I construction companies compared to SUR Construction PLC. The implication is increasing competition and growth through debt financing. The result also implies that SUR Construction PLC has a relatively higher debt-absorbing capacity than others in future financing decisions.

Limitation

Given the PLC nature of privately-owned construction companies in Ethiopia, financial data is not publicly available. This forced us only to study a limited number of construction companies that were voluntary to participate. Following this, only five of the twenty-four Grade I construction companies that fulfilled the sample selection criteria agreed to participate in the study. However, we employed a fixed-effect model to mitigate the limitation of not considering all observations to be random draws of a large population. Therefore, the conclusions derived from this study may not fully apply to all Grade I construction companies.

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