

# Financial Leverage and Corporate Investment: Evidence from Cameroon

Marius Ayou Bene, Henri Daniel BELINGA MESSI  
*University of Douala - ENSET*

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**Abstract:** *This paper analyzes the relationship between financial leverage and investment in the Cameroonian context. To this end, using a sample of 1362 firms observed over the period 2015-2017, a fixed-effect panel data instrumental variable regression model is estimated using the G2SLS method. The results show that leverage positively influences investment. However, in the sample as a whole, and in the individual SMEs, this relationship is not linear. It takes the form of an inverted "U". Specifically, at a low level of debt, the relationship between financial leverage and corporate investment is positive. It becomes negative at higher levels of leverage. Moreover, in turn, financial leverage is positively and significantly determined by investment.*

**Keywords:** *leverage, investment.*

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## I. Introduction

Investment decisions are considered one of the main research objects in finance, as they determine the competitiveness and performance of firms (Sajid et al., 2016; Aivazian et al., 2005; Ahmad et al., 2021). The link between financial leverage and firm investment is one of the most invested fields of research in this literature (Modigliani and Miller, 1958; Firth, 2008). Some studies have generally attempted to analyze the impact of financial leverage on investment (Aivazian et al, 2005; Danso et al, 2019). Others explore the link between financial leverage and the nature of investment by distinguishing between investment in research and development, and investment in tangible assets (Visconti, 2015; Moeller et al, 2016; Neil, 2018). A few stylized facts nevertheless mark this literature on the relationship between these two concepts. Financial leverage is the extent to which a firm uses debt (Hillier et al, 2010).

It is often viewed as a source of additional financing that allows the firm to acquire certain assets. It also makes it possible, in a situation of asymmetric information, to discipline managers who tend to invest unnecessarily (De Jong, 2002). Moreover, financial leverage is more suitable for financing tangible investments than for investments in R&D, as the former offers more guarantees to lenders (Tjahjapranata, 2006; Neil, 2018).

A significant amount of work has been conducted on the relationship between leverage and firm investment (Lang et al., 1996; Aivazian et al., 2005; Ahn et al., 2006; Visconti, 2015; Danso et al., 2019). However, this literature has very little to do with the African context, but makes greater use of data from developed countries such as the United States, or even Canada. In these countries, debt financing of investments is provided by banks and bond markets. In both cases, lenders monitor and discipline the firms receiving such financing (Firth, 2008). However, the results of these studies are not necessarily generalizable to developing economies where the relationship between lenders and borrowers is driven by more acute informational asymmetries. The value of such an analysis is, however, evident in many African countries where firms face difficulties in accessing credit. To our knowledge, no study has yet analyzed this relationship in the Cameroonian context.

Yet, a few stylized facts<sup>1</sup> show that business investment expenditures in this context amounted to 680,432 billion Fcfa in 2017. They thus record an increase of 3.66% compared to 2016. This upward trend results from the acquisition of tangible assets and the amount allocated to research and development (R&D).

At the same time, the financial leverage in these companies has experienced an increase 3.87% from 14,655 billion in 2016 to about 15,223 billion in 2017. These figures denote a simultaneous growth in the leverage of companies, as well as in the investments made by them. This suggests a possible relationship between these two important aspects of business life, the exploration of which would contribute to enlightening

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<sup>1</sup> Facts from the National Institute of Statistics (NIS) 2016 and 2017 Economic and Fiscal Reviews.

managers and other stakeholders on the definition of policies to be adopted for the competitiveness of these major players in the Cameroonian economy.

The objective of this paper is therefore to empirically verify the existence of a relationship between leverage and firm investment in Cameroon. We use a sample of 1362 Cameroonian firms over the period 2015 to 2017. Using the two-stage generalized least squares (G2SLS) method, which takes into account a possible endogeneity relationship between the two variables capturing investment and leverage respectively, we estimate an instrumental variables regression model in panel data to determine the influence of leverage on firm investment, and vice versa.

In what follows, we first discuss the link between leverage and firm investment through a review of the existing literature. We then present the methodology adopted and the data used. Finally, we present and discuss the results of the research.

## **I. Financial leverage and investment: a review of the literature**

The relationship between leverage and investment has been discussed in the literature from multiple theoretical perspectives. The agency theory (Jensen and Meckling, 1976), the theory of information asymmetries (Myers and Majluf, 1984) and the theory of trade-offs (Kraus and Litzenberger, 1973) are the most widely used. Based on these theories and on empirical work, we attempt to highlight this relationship in firms in Cameroon.

The link between leverage and investment has been studied from the perspective of agency theory. Agency theory refers to the relational problems that exist when there is a defined relationship between the principal and the agent. Agency problems arise when conflicts of interest arise between the different partners involved in the operation of the firm, highlighting the fragility of their relationship (Jensen and Meckling, 1976). These conflicts can lead to two different behaviors: underinvestment and overinvestment. The conflict can be between shareholders and creditors. In this context, Myers (1977) analyzes the possible externalities generated by debt on the optimal investment strategy defined by managers, and shows that debt leads to situations of underinvestment.

Indeed, when a firm has excessive debt, managers tend to reduce investment even in profitable projects, since a portion of the profits remunerate creditors instead of going entirely to shareholders. Firms with high growth opportunities are most affected by the risk of underinvestment (Rajan and Zingales, 1995; Titman and Wessels, 1988).

Furthermore, the literature identifies a possible problem of overinvestment (Jensen, 1986; Stulz, 1990) in the case of conflict between the manager and the shareholders. The policy of overinvestment is to reinvest excess cash in investment projects with low or even negative net present value. Executives who do this expand the size of the firm beyond its optimal level in order to have greater resources and to increase their career opportunities.

Thus, managers can invest in specific assets that are a form of shield that allows them to become entrenched in order to make their replacement difficult or impossible (Shleifer and Vishny 1997). Management's ability to pursue such a policy is constrained by the availability of excess cash flow, and this constraint can be further reinforced by debt. When a firm takes on debt, it commits itself to servicing the debt. This forces management to honor these commitments with funds that could have been allocated to poor investment projects. Thus, leverage is a mechanism for overcoming the problem of overinvestment (De Jong; 2002), suggesting a negative relationship between debt and investment for firms with poor growth opportunities.

Several empirical studies have examined the relationship between firm leverage and investment. Lang, Ofek, and Stulz (1996) and Aivazian, Ge, and Qiu (2005) use data from U.S. industrial firms and data from Canadian firms, respectively. Their results show that leverage is significantly and negatively related to investment. Using Turkish firm data, Umulte (2010) studies the relationship between leverage and investment decisions in emerging countries. The results reveal that leverage has a negative and significant effect on investment only for firms with low growth opportunities. Using the Vietnamese case, Vo (2019) finds a significant and negative relationship between leverage and investment. Denis and Denis (1993) find that, an increasing use of financial leverage leads to a decrease in capital expenditure. Other authors (Ahn and Denis, 2006; Lang and Stulz, 1994; Ruland and Zhou; 2005) analyze the impact of financial leverage on investment in diversified firms. The results show that the use of financial leverage negatively influences investment in these entities. This link is more significant for firms operating in high value-added business segments.

Firth and Wong (2008) examine the relationship between leverage and investment in the Chinese context of state-owned banks. Their results show that there is a negative relationship between leverage and investment. This negative relationship is weaker in firms with low growth opportunities and poor operating performance compared to firms with high growth opportunities and good operating performance. The negative relationship between leverage and investment is weaker in firms with high levels of public ownership.

The relationship between financial leverage and investment is also highlighted through the prism of the theory of information asymmetries (Stiglitz and Weiss, 1981; Myers and Majluf, 1984). Information asymmetries refer to the informational disparity between firms resorting to debt, and creditors willing to, or having, granted such financing.

In an environment of asymmetric information, firms' investment decisions are affected by the behavior of capital providers (Morellec and Schürhoff, 2011; Danso et al., 2019). The latter may indeed demand a higher risk premium, or conversely ration credit. When access to credit becomes difficult and costly, firms abandon projects, leading to underinvestment (Myers and Majluf, 1984).

Fazzari and Athey, (1987) examine the impact of information asymmetry on the link between cash flow and investment in U.S. firms and observe that investment becomes more dependent on internal funds under information asymmetry. Baxamusa, Mohanty, and Rao (2015) show that U.S. firms tend to use internal resources to finance projects with high information asymmetry, research and development investments in particular. They also show that debt is used more for investments characterized by less asymmetric information, such as marketable securities. Ahmad et al (2021), using data from Pakistan, show that the presence of asymmetric information increases the negative effect of financial leverage on firm investment.

Furthermore, some studies have analyzed the relationship between financial leverage and investment in R&D and tangible assets. Neil (2018) shows that financial leverage allows US firms to acquire tangible and intangible assets. Indeed financial leverage helps firms to increase their production capacity and improve their productivity. García-Posada et al (2020) analyze the determinants of investment in tangible assets and R&D of Spanish firms. They find that cash flow is the most important source of financing for R&D, while long-term debt is used to finance tangible assets.

In Africa, several studies have attempted to analyze the link between financial leverage and investment decisions. Using data on listed firms in South Africa, Mondosha and Majoni, (2018) find a negative relationship between leverage and investment. Vengesai and Kwenda, (2018) study the impact of financial leverage on investment of African listed firms. The results reveal that financial leverage has a negative impact on investment. Nyale (2010), based on firms in Kenya, validates the hypothesis that leverage negatively influences investment decisions. Odit and Chitto, (2008) find a significant negative relationship between leverage and investment for Mauritian firms. This relationship is stronger in firms with low growth opportunity. From the above we formulate the following hypothesis:

*H1: Financial leverage (debt) negatively influences firm's investment in Cameroon*

Other research works have studied the relationship in the opposite direction (Koksal et al, 2013; Degryse et al, 2010), analyzing the influence of assets on leverage.

Indeed the asset structure plays an important role in determining the capital structure (Ellili and Farouk, 2011). The tradeoff theory (Stiglitz, 1969; Kraus and Litzenberger, 1973) provides a good perspective for analysis. This theory consists in setting a level of debt that allows the cost of debt to be equalized with the tax advantage that debt provides. In fact, excessive debt increases the risk of default by the company, which is accompanied by financial difficulties. These financial difficulties will worry the investors and may therefore renounce to grant new credits. However, a firm that has significant tangible assets reduces the costs of bankruptcy and can use these assets as collateral to issue new debt (Rajan and Zingales, 1995). Compared to intangible assets, tangible assets suffer less loss of value in distress. Thus, from a trade-off perspective, tangible assets have a significant effect on the costs of financial distress.

Harris and Raviv (1991) argue that tangible assets are the collateral for debt and increase the net asset value. Thus, in bankruptcy, tangible assets reduce exposure to default, and enhance the possibility of repaying creditors. Harc (2015), using Croatian SMEs as a case study, shows that tangible assets positively and significantly influence financial leverage. He further concludes that said SMEs use tangible assets as collateral to facilitate access to long-term credit. Butt et al. (2013) based on data from Pakistan find a positive relationship of tangible assets on debt. De Jong et al. (2008) study the determinants of leverage in 42 countries and find a positive relationship between leverage and tangible assets.

In addition, the contribution of investments to the acquisition of financial resources through debt depends on the type of fixed assets that are dominant. In some firms, tangible assets can support the desired leverage, while intangible assets have no impact on leverage. In contrast, in firms with limited tangible assets, intangible assets increase, and may influence leverage (Moeller et al, 2016). Indeed although some characteristics of intangible assets, such as high valuation risk and low ability to provide collateral, may discourage debt financing, they can also generate large cash flows, thus supporting leverage. Moreover, the information asymmetry and moral hazard inherent in intangible assets diminish when intangible assets are liquid and easily tradable (Sheleifer and Vishny, 1992; Loumioti, 2012). Using data from U.S. firms, Morellec (2001) analyzes the relationship between asset liquidity and capital structure. The results show that asset liquidity increases debt capacity. Nakamura (2001) estimates that one-third of the value of intangible assets of US firms is related to the value of its capital. Based on the above, we hypothesize that:

*H2: Firms' investment significantly increases their debt capacity in the Cameroonian context.*

However, the hypothesis of the non-linearity of the causal relationship between the financial leverage of firms and their investments arises with acuity.

Indeed, the agency cost theory (Jensen and Meckling, 1976) suggests that at a lower level, debt has a disciplining effect on company managers. On the other hand, when debt becomes high, the probability of bankruptcy increases, and a misallocation of resources becomes more possible.

The conclusions of previous studies are not consensual on the impact of financial leverage on investment. Indeed, some authors (Modigliani and Miller, 1963) show that the tax advantages provided by debt and the reduction of agency costs between shareholders and managers (Ross 1977) have positive effects on investment. On the other hand, excessive debt can lead to underinvestment. Indeed, when the conflict pits shareholders against creditors, managers tend to reduce investment, even in profitable projects. In this case, part of the profits remunerate the creditors instead of going entirely to the shareholders (Myers, 1977).

Yarba (2021) provides significant evidence of an inverted "U" relationship between leverage and investment based on firm data in Turkey. The findings of his investigations indicate that leverage increases investment up to a certain level. As leverage becomes higher, its impact on investment becomes negative. This non-monotonic relationship is evident for all groups of firms.

Cleary et al (2007) analyze the effect of equity on investment for US firms. The results reveal a U-shaped functional relationship. At low levels of equity, the relationship is negative; it becomes positive as equity becomes more important. Shukla and Shaw (2021) analyze data from Indian firms and find a non-linear relationship between debt and investment. Hernando and Martinez-Carrascal (2008) find a non-linear relationship between debt and investment in Spanish firms. According to these authors, this relationship has an "S" shape. Gebauer et al (2018) validate the hypothesis of the non-linearity of the relationship between debt and investment in a European context. From the above, we hypothesize that:

*H3: The relationship between leverage and investment assumes an inverted U shape. In this case, at a low level of leverage the relationship is positive; it becomes negative with increasing leverage.*

## **II. Data and model specification**

### **II.1. Data**

The data used in this work come from the National Institute of Statistics of Cameroon (INS). They are based on the year-end balance sheets and income statements of 1,500 firms in several sectors of activity over the period 2014-2017. They allowed us to assess the financial situation of the companies concerned. After the necessary cleaning operations of the initial data and other statistical processing, the final working sample retained 1362 companies.

The variables used in this study were identified to satisfy the objective of testing for a bidirectional causal relationship between leverage and investment.

Financial leverage refers to the propensity for a firm to resort to debt (Hillier et al. 2010). The literature indicates several ways to measure it. Aivazian et al (2005) use two alternative measures of leverage. One is the book value of total liabilities, excluding equity, divided by the book value of total assets. Another way to measure it is to divide long-term debt by total assets. The first measure does not distinguish between short-term and long-term debt, while the second emphasizes the dominant role of long-term debt as a source of investment financing. However, this work considers the former measure because, although the use of short-term debt exposes the firm to renewal constraints, it is often used to finance investment.

Investment refers to the acquisition of a durable good. Previous work (Onomo et al., 2018) has measured investment by calculating the change in investment from the previous year. Sall (2002), in studying the source of investment financing for Senegalese SMEs, captured investment by the investment rate, which is the ratio of the value of investment to sales. Tioumagneng (2012) measures investment by total capital expenditures on intangible assets. Other authors (Danso, Lartey, Fosu, Owusu-Agyei, and Uddin, 2019; Firth et al, 2008) measure investment by taking the change in property, plant, and equipment which is scaled by beginning of period property, plant, and equipment. The different variables used are summarized in the table 1 below.

<i>Table 1 : variables of the study</i>		
<b>Codes</b>	<b>Variable titles</b>	<b>Calculation method</b>
Tot_leverage	Financial leverage	Total debt/total assets
Inv_intensity	Investment	Delta gross assets/total assets(t-1)
Roa	Economic profitability ratio	Operating income/Total assets
Growth_opp	Opportunities for growth	( $\Delta$ sales)/sales (t-1)
Size	Company size	Log (Total assets)

Cash-flow	Cash-flow	Cash-flow/total assets(t-1)
Inv_caf	Capacity to finance investment	Investment / cash flow
Turnover	Asset turnover ratio	Sales/Total assets
Chargefi_caf	ability to bear financial burdens	Financial expenses/Caf
managmt_qlty	Management quality	Operating expenses/total assets
Liquidity	General liquidity	Current assets/current liabilities

## II.2. Specification of the empirical model

In this work, we use instrumental variable (IV) regression in panel data to test for a link between leverage and investment. The choice of this model is justified by the fact that linear regression models can suffer from simultaneous causality problems. If this is the case, the error term is correlated with the exogenous variables of interest, so the estimated parameters will be biased, and multiple regression cannot solve the problem.

A general technique for obtaining a consistent estimator of the parameter of interest is the two-stage generalized least squares (G2SLS) method<sup>2</sup>, applied that accounts for a possible endogeneity relationship. This model is, in general, specified as follows:

$$y_{it} = Y_{it}\gamma + X_{1it}\beta + \mu_i + v_{it}$$

Where  $y_{it}$  is the dependent variable.  $Y_{it}$  is a vector  $(1 \times k_1)$  of observations on  $k_1$  endogenous variables, and these variables can be correlated with the  $v_{it}$  which is the specific error term.  $X_{1it}$  is a vector  $(1 \times k_2)$  of observations on the exogenous variables.  $\gamma$  and  $\beta$  are vectors  $(k_1 \times 1)$  and  $(k_2 \times 1)$  of coefficients respectively. Finally,  $\mu_i$  can be considered as identically and independently distributed random variables in the panel.

Specifically, given that there is a single endogenous variable such as  $k_1 = 1$  but several exogenous variables such as  $k_2 > 1$ , the model is as follows:

$$Inv\_intensity_{it} = \gamma_{tot\_leverage_{it}} + \beta Ratio_{1it} + \mu_i + v_{it} \quad (1)$$

Where  $leverage_{it}$  and  $Inv\_intensity_{it}$  are the firm's leverage and investment, respectively. This work also explores the possibility of a non-linear relationship between investment and leverage. For Hernando and Martinez-Carrascal (2008), the method of establishing the nonlinear relationship requires the use of thresholds that are exogenously set and thus somewhat arbitrary. Therefore, we analyze a quadratic function to test for nonlinearity. The quadratic function is of the following form:

$$Inv\_intensity_{it} = \gamma_1 tot\_leverage_{it} + \gamma_2 tot\_leverage_{it}^2 + \beta Ratio_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

The sample is made up of 89.50% SMEs and 10.50% large enterprises. It includes 85.46%, 11.89% and 2.65% of companies in the tertiary, secondary, and primary sectors respectively. For all companies, the average annual growth of investments is 4.32%. It is 4.18% in SMEs and 5.55% in large companies. Moreover, according to the results of the mean-comparison test in *table 4a*, the difference in terms of the 2014-2017 average investment growth between small and medium-size enterprises and large companies is significant. In addition, *Figure 1* shows that about 60% of the firms in the sample has a 4-years average investment change comprised in the interval  $\pm 5\%$ . As for the sectors of activity, the annual investment change is, on average, 4.36%, 3.85% and 5.08% respectively in firms in the tertiary, secondary and primary sectors.

Also, the average leverage is 53.87 percent overall. It is 53.47 percent for SMEs and 57.35 percent for large firms. Furthermore, the mean-comparison test reported in *Table 4b* shows that the difference in the 4-year mean of the average leverage is significant between SMEs and large companies. Firms in the primary sector have an average leverage of 58.06%, (57.81%) for those in the secondary sector and tertiary sector records a leverage of 53.20%. The investment self-financing ratio is 2.87% on average. Furthermore, the companies in

<sup>2</sup> We suggest that the interested reader explore the work of Balestra and Varadharajan-Krishnakumar (1987) for further reading.



the sample achieve an average of 1.27 points of turnover per unit of assets, while their average operating expenses are 1.43 times higher than their total assets.

The coverage of financial expenses by equity is 1.3%. For most of these variables, the dispersion is small and ranges from 0.05 to 2.37. The result of this statistical description is listed in Tables 2 and 3 below.

Table 2 : <i>Descriptive statistics</i>					
Variables	Obs	Mean	Std. Dev.	Min	Max
tot_leverage	4,086	0.5387	0.2870	0.0000	0.9994
inv_intensity	4,086	0.0432	0.2318	-0.9906	0.9949
Roa	4,086	0.0213	0.4162	-4.1907	3.1533
growth_opp	4,086	0.1548	0.7445	-1.0000	4.8664
inv_caf	4,086	0.0287	1.0915	-5.8860	5.8589
cash-flow	4,086	-0.2249	0.9421	-4.9456	4.6350
Size	4,086	18.6731	2.3703	10.4929	27.5250
managmt_qlty	4,086	1.4350	1.1303	0.0000	6.7334
charfi_caf	4,086	0.0131	0.0504	0.0000	1.1695
turnover	4,086	1.2771	0.9463	0.0000	4.8745
liquidity	4,086	0.9988	0.9320	0.0000	6.3159

Table 3 : <i>Characteristics of the sample by size and industry</i>					
Variable	Obs	Mean	Std. Dev.	Min	Max
<b>By company size</b>					
<b>SME</b>					
tot_leverage	3,657	0.5347	0.2931	0.0000	0.9987
inv_intensity	3,657	0.0418	0.2424	-0.9906	0.9949
<b>GE</b>					
tot_leverage	429	0.5735	0.2250	0.0000	0.9994
inv_intensity	429	0.0555	0.1031	-0.3948	0.8108
<b>By sector</b>					
<b>Primary</b>					
tot_leverage	108	0.5806	0.3005	0.0000	0.9951
inv_intensity	108	0.0508	0.2208	-0.9906	0.9698
<b>Secondary</b>					
tot_leverage	486	0.5781	0.2387	0.0000	0.9987
inv_intensity	486	0.0385	0.1795	-0.8817	0.9152
<b>Tertiary</b>					
tot_leverage	3,492	0.5320	0.2922	0.0000	0.9994
inv_intensity	3,492	0.0436	0.2385	-0.9902	0.9949

Figure 1: Average (2014-2017) firms' investment growth



Table 4a : Comparison of firms' investment growth by type of firm						
ttest avg_inv_intensity , by ( firm_type_1 ) unequal						
Two-sample t test with unequal variances						
Group	Obs	Mean	Std. Err	Std. Dev	[95% Conf. Interval]	
SME	1,219	0.0418	0.0036	0.1262	0.0347	0.0489
LC	143	0.0555	0.0050	0.0604	0.0455	0.0655
combined	1,362	0.0432	0.0033	0.1210	0.0368	0.0497
diff		-0.0137	0.0033		-0.0259	-0.0015
diff = mean (1) - mean (2)						t = -2.2088
Ho : diff = 0			Satterthwaite's degrees of freedom = 315.177			
Ha : diff < 0			Ha : diff != 0		Ha : diff > 0	
Pr (T < t) = 0.0140			Pr ( T  >  t ) = 0.0279		Pr (T > t) = 0.9860	

Table 4b : Comparison of firm leverage by type of firm						
ttest avg_tot_leverage , by ( firm_type_1 ) unequal						
Two-sample t test with unequal variances						
Group	Obs	Mean	Std. Err	Std. Dev	[95% Conf. Interval]	
SME	1,219	0.5347	0.0742	0.2590	0.5201	0.5492
LC	143	0.5735	0.0178	0.2132	0.5383	0.6088
combined	1,362	0.5387	0.0069	0.2548	0.5252	0.5523
diff		-0.0389	0.0193		-0.0769	-0.0008
diff = mean (1) - mean (2)						t = -2.0134
Ho : diff = 0			Satterthwaite's degrees of freedom = 194.779			
Ha : diff < 0			Ha : diff != 0		Ha : diff > 0	
Pr (T < t) = 0.0227			Pr ( T  >  t ) = 0.0454		Pr (T > t) = 0.9773	

## **II. Results**

The empirical results reported in *Tables 5 and 6* show that leverage and investment have a positive and significant linear relationship. Indeed, an increase in financial leverage of 1% leads to an increase in investment of 0.48%. This can be explained by the fact that the debt contracted is effectively allocated to investment, and Cameroonian firms use it efficiently in investment projects. Thus, financial leverage has a direct and positive effect on the investment of the firms studied. This result is not consistent with the agency theory (Jensen and Meckling, 1976), nor with the findings of Aivazian et al. (2005), Mondosha and Majoni, (2018) and Vengesai and Kwenda, (2018), which show that financial leverage acts negatively on the level of investment.

Indeed, since firms in Cameroon are mostly SMEs, where the figures of the manager and the shareholder often merge, agency conflicts are less prevalent. The owner-manager then tends to effectively use debt to finance the investment. Our first hypothesis is not validated.

Moreover, while leverage has a significant and positive influence on investment in SMEs, this relationship is more important in large firms. Indeed, a 1% increase in financial leverage translates into a 0.46% and 0.93% increase in investment respectively. Large companies invest twice as much as SMEs. This is justified by the fact that, unlike SMEs, large companies make better use of the financial resources acquired through debt, and allocate them to the best investment projects.

Furthermore, the results of the Hausman test (*Table 7*), which verifies the existence of endogeneity between two variables, reveal that there is indeed a difference between the instrumental variable estimator and the OLS estimator, confirming that financial leverage is endogenous in its relationship with investment. Indeed, the latter in turn significantly and positively influences the financial leverage of firms in Cameroon. Firms that have invested in both tangible and intangible assets use these assets as collateral to solicit credit. This result is consistent with the predictions of trade-off theory (Stiglitz, 1969; Kraus and Litzenberger, 1973) and empirical work (Harc, 2015; Butt et al. 2013). The hypothesis is 2 validated.

Furthermore, the results show that investment is negatively determined by the square of leverage. This suggests a non-linear relationship between the two variables. This result is consistent with predictions of underinvestment (Myers, 1977) and overinvestment (Jensen 1986) and the findings of (Ahn and Denis, 2006; Lang and Stulz, 1994; Ruland and Zhou; 2005). In these firms, debt plays the role of disciplining managers who tend to waste equity. Specifically, when debt is low for financing purposes, the relationship between leverage and investment is positive. It becomes negative at high levels of leverage. This suggests a relationship that takes the form of an inverted U. This result is consistent with the predictions of Hernando and Martinez-Carrascal (2008) and Gebauer et al. (2018) and Yarba (2021) who find a non-linear relationship between leverage and investment of European firms. Our third hypothesis is validated. However, this inverted-U relational form is only valid in the subsample of SMEs. The relationship is linear in large firms.

In terms of control variables, investment is positively determined by the cash flow and cash flow capacity of firms in Cameroon.

An increase in cash flow of 1 percentage point leads to an increase in investment of 0.02 (0.063). This result is also valid for the SME subsample. In large companies, only cash flow is positively related to investment.

Financial leverage is positively influenced by growth opportunities and size, while it is negatively related to cash flow and liquidity. Indeed, when growth opportunities increase by 1%, financial leverage also increases by 0.9%. This situation translates into the fact that in order to seize growth opportunities, companies tend to take on debt to finance investment. Cash flow has a significant influence on leverage and investment. The larger the size of the company, the easier it is to access debt. This is explained by the fact that larger companies have less asymmetric information about their economic and financial health. An increase in cash flow of 1% leads to a reduction in financial leverage of 0.1%. This reflects the fact that a firm requires less external capital, debt in this case, when it has sufficient cash flow to finance its investments. This result is not consistent with the predictions of the agency theory of Jensen and Meckling (1976), and the conclusions of Jensen (1986). In these firms, however, excess cash flow leads managers to choose unprofitable projects in order to gain a foothold.

Finally, management quality has a positive effect on the use of financial leverage. Thus, a 1% increase in operating expenses per unit of assets leads to a greater use of debt of about 0.0042 points. Although negligible, this result suggests that firms that have difficulty controlling their expenses make greater use of debt to meet their investment needs.



Table 5 : Relationship between financial leverage and investment

	Global model			
	Linear relationship between leverage and investment		Non-linear relationship between leverage and investment	
	First-stage within regression	Fixed-effects (within) IV regression	First-stage within regression	Fixed-effects (within) IV regression
	tot_leverage	inv_intensity	tot_leverage	inv_intensity
tot_leverage_square			0.8451*** (0.0061)	-1.4060*** (0.3938)
tot_leverage		0.4763*** (0.1154)		1.6630*** (0.4571)
growth_opp	0.0087** (0.0039)	0.0069 (0.0066)	-0.0003 (0.0014)	0.0101 (0.0066)
inv_caf	-0.0013 (0.0025)	0.0187*** (0.0043)	0.0008 (0.0009)	0.0167*** (0.0044)
cash-flow	-0.1009*** (0.0061)	0.0636*** (0.0153)	-0.0234*** (0.0022)	0.0544*** (0.0145)
roa	0.0130 (0.0095)	0.0161 (0.0159)	0.0027 (0.0034)	0.0182 (0.0162)
size	0.0721*** (0.0061)		0.0202*** (0.0022)	
managmt_qlty	0.0054 (0.0051)		0.0042** (0.0018)	
turnover	0.0019 (0.0061)		0.0021 (0.0021)	
liquidity	-0.0362*** (0.0045)		-0.0086*** (0.0016)	
charfi_caf	-0.0676 (0.0718)		0.0020 (0.0255)	
_pictures	-0.8054 (0.1171)	-0.2011 (0.0593)	-0.1604 (0.0419)	-0.3191 (0.0980)
R-sq:				
within	0.1891	0.0000	0.8973	0.0000
between	0.1747	0.0007	0.9193	0.0011
overall	0.1723	0.0003	0.9129	0.0002
number of companies	1362	1362	1362.0000	1362.0000
obs	4,086	4,086	4086	4086
F	70.36		2371.0100	
Prob > F	0.0000	0.0000	0.0000	0.0000
Wald chi2		177.54		168.6200

Standard errors in parentheses: \*\*\*p&lt;0.01, \*\*p&lt;0.05, \*p&lt;0.1

Table 6 : Relationship between financial leverage and investment by type of firm

	SME				E			
	Linear relationship		Non-linear relationship		Linear relationship		Non-linear relationship	
	tot_leverage	inv_intensity	tot_leverage	inv_intensity	tot_leverage	inv_intensity	tot_leverage	inv_intensity
tot_leverage		0.4581*** (0.1219)		1.5799*** (0.4644)		0.9325*** (0.3222)		-7.1217 (4.5543)
tot_leverage_square			0.8495*** (0.0065)	-1.3428*** (0.4026)			0.7609*** (0.0158)	5.415 (3.4435)
growth_opp	0.0084** (0.0042)	0.0071 (0.007)	-0.0001 (0.0014)	0.0096 (0.007)	0.0128 (0.0122)	0.0042 (0.0182)	-0.0026 (0.004)	0.0151 (0.0289)
inv_caf	-0.0011 (0.0027)	0.0190*** (0.0047)	0.0008 (0.0009)	0.0172*** (0.0048)	-0.0064 (0.0056)	0.0159* (0.0083)	0.0021 (0.0018)	0.027 (0.0164)
cash-flow	-0.1008*** (0.0064)	0.0631*** (0.0161)	-0.0229*** (0.0023)	0.0531*** (0.0148)	-0.1403*** (0.0347)	0.0581 (0.0592)	-0.0328*** (0.0116)	-0.2942 (0.1787)
roa	0.0121 (0.0099)	0.017 (0.0167)	0.0021 (0.0035)	0.0194 (0.0168)	0.1575** (0.0704)	-0.1193 (0.1111)	0.0364 (0.0232)	0.2757 (0.2528)
size	0.0716*** (0.0064)		0.0208*** (0.0023)		0.1044*** (0.0243)		-0.0055 (0.0083)	
managmt_qlty	0.005 (0.0053)		0.0042** (0.0018)		0.0179 (0.0303)		0.0111 (0.0099)	
turnover	0.0024 (0.0064)		0.0022 (0.0022)		-0.0064 (0.0267)		-0.0048 (0.0087)	
liquidity	-0.0371*** (0.0048)		-0.0092*** (0.0017)		-0.0155 (0.0124)		0.0018 (0.0041)	
charfi_caf	-0.0805 (0.0812)		0.0017 (0.0289)		0.063 (0.11)		-0.0051 (0.0361)	
_pictures	-0.7673 (0.1197)	-0.1887 (0.0617)	-0.1664 (0.0428)	-0.2923 (0.0969)	-1.8392 (0.5735)	-0.479 (0.1852)	0.4037 (0.1939)	2.0938 (1.3118)
R-sq:								
within	0.1924		0.8978		0.1307		0.9067	
between	0.2440	0.0015	0.9249	0.0020	0.0085	0.0213	0.9394	0.0192
overall	0.2320	0.0002	0.9166	0.0001	0.0110	0.0100	0.9343	0.0027
number of companies	1219	1219	1219	1219	143	143	143	143
obs	3657	3657	3657	3657	429	429	429	429
F	64.28		2134		4.63		268	
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Wald chi2		142.6		136.92		96		33.01

Standard errors in parentheses: \*\*\*p&lt;0.01, \*\*p&lt;0.05, \*p&lt;0.1

Table 7 : Endogeneity test

	Coefficients		(b-B)	sort(diag(V <sub>b</sub> -V <sub>B</sub> ))
	(b)	(B)		
	Consistent	Efficient		
tot_leverage	0.4764	-0.0003	0.4767	0.1146
growth_opp	0.0069	0.0255	-0.0186	0.0044
inv_caf	0.0187	0.0089	0.0099	0.0028
cashflow	0.0637	0.0062	0.0574	0.0145
Roa	0.0161	0.0128	0.0033	0.0121
chi2(5) =	(b-B)'[(V <sub>b</sub> -V <sub>B</sub> ) <sup>-1</sup> ](b-B)			
=	36.91			
Prob>chi2 =	0.0000			

### III. Conclusion

Financial leverage in a foreign context has a negative effect on the level of investment. It sometimes plays the role of disciplining the manager and attenuates overinvestment. This study aimed to empirically establish the relationship between financial leverage and investment in firms in the Cameroonian context. We adopted an instrumental variables regression model applied to fixed-effect panel data to mitigate the possibility of the endogeneity problem of leverage and investment. The analysis was done on a sample of 1362 Cameroonian firms over the period 2015 to 2017.

It appears that financial leverage positively influences investment, and this relationship is endogenous. Thus, debt facilitates firm's investments in Cameroon. The higher the debt, the higher the level of investment. However, this relationship is not linear. It takes the form of an inverted "U". This is due to the fact that, at higher level of indebtedness, the relationship turns negative. It stands for the reason that, when the optimal level of firm leverage is achieved, the financial expenses due to the excess leverage become higher than the excess return generated by the investments.

As for the analysis of the relationship by firm type, the results, remain unchanged for both sub-sample. Indeed, financial leverage positively influences investment in both large firms and SMEs. However, the non-linearity hypothesis of the relationship does not hold in large companies.

In African economies and particularly in Cameroon, it is advisable for business leaders to take into account the monetary policy put in place by the authorities. This would allow the company to opt for an adequate financing policy that balances the benefits and costs of debt, and the realization of investments necessary for business growth.

While this work has yielded interesting results on the relationship between leverage and investment, some limitations must be highlighted. The study was based on data from the National Institute of Statistics. The quality of the results obtained depends on the reliability of the data used. This research also presents problems of generalization. The results may not be generalizable to other African countries. There are differences in economic policies from one country to another and in access to capital markets, corporate governance structures. Lastly, it may be interesting to find out the optimal level of firm leverage in the Cameroonian context.

### Bibliography

- [1]. Ahmad, M. M., Hunjra, A. I., and Taskin, D. (2021). Do asymmetric information and leverage affect investment decisions? *The Quarterly Review of Economics and Finance*.
- [2]. Ahn, S., Denis, D. J., and Denis, D. K. (2006). Leverage and investment in diversified firms. *Journal of financial Economics*, 79(2), 317-337.
- [3]. Aivazian, V. A., Ge, Y., and Qiu, J. (2005). The impact of leverage on firm investment: Canadian evidence. *Journal of corporate finance*, 11(1-2), 277-291.
- [4]. Balestra, P., and Varadharajan-Krishnakumar, J. (1987). Full information estimations of a system of simultaneous equations with error component structure. *Econometric Theory*, 3(2), 223-246.

- [5]. Butt, S., Khan, Z. A., and Nafees, B. (2013). Static Trade-off theory or Pecking order theory which one suits best to the financial sector. Evidence from Pakistan. *European Journal of Business and Management*, 5(23), 131-140.
- [6]. Cheng, X., and Degryse, H. (2010). The impact of bank and non-bank financial institutions on local economic growth in China. *Journal of Financial Services Research*, 37(2), 179-199.
- [7]. Cleary, S., Povel, P., and Raith, M. (2007). The U-shaped investment curve: Theory and evidence. *Journal of financial and quantitative analysis*, 42(1), 1-39.
- [8]. Danso, A., Lartey, T., Fosu, S., Owusu-Agyei, S., and Uddin, M. (2019). Leverage and firm investment: the role of information asymmetry and growth. *International Journal of Accounting and Information Management*.
- [9]. De Jong, A. (2002). The disciplining role of leverage in Dutch firms. *Review of Finance*, 6(1), 31-62.
- [10]. De Jong, A., Kabir, R., and Nguyen, T. T. (2008). Capital structure around the world: The roles of firm-and country-specific determinants. *Journal of banking and Finance*, 32(9), 1954-1969.
- [11]. Denis, D. J., and Denis, D. K. (1993). Managerial discretion, organizational structure, and corporate performance: A study of leveraged recapitalizations. *Journal of Accounting and Economics*, 16(1-3), 209-236.
- [12]. Ellili, N., and Farouk, S. (2011). Examining the capital structure determinants: empirical analysis of companies traded on Abu Dhabi Stock Exchange.
- [13]. Fazzari, S. M., and Athey, M. J. (1987). Asymmetric information, financing constraints, and investment. *The Review of Economics and Statistics*, 481-487.
- [14]. Firth, M., Lin, C., and Wong, S. M. (2008). Leverage and investment under a state-owned bank lending environment: Evidence from China. *Journal of corporate finance*, 14(5), 642-653.
- [15]. García-Posada, M., Menéndez Pujadas, Á., and Mulino Rios, M. (2020). Determinants of investment in tangible and intangible fixed assets. *Banco de Espana Occasional Paper*, (2004).
- [16]. Gebauer, S., Setzer, R., and Westphal, A. (2018). Corporate debt and investment: A firm-level analysis for stressed euro area countries. *Journal of International Money and Finance*, 86, 112-130.
- [17]. Harc, M. (2015). The relationship between tangible assets and capital structure of small and medium-sized companies in Croatia. *Ekonomski Vjesnik/Econviews: Review of Contemporary Business, Entrepreneurship and Economic Issues*, 28(1), 213-224.
- [18]. Harris, M., and Raviv, A. (1991). The theory of capital structure. *The Journal of Finance*, 46(1), 297-355.
- [19]. Hernando, I., and Martínez-Carrascal, C. (2008). The impact of financial variables on firms' real decisions: evidence from Spanish firm-level data. *Journal of Macroeconomics*, 30(1), 543-561.
- [20]. Hillier, D., Jaffe, J., Jordan, B., Ross, S., and Westerfield, R. (2010). *Corporate Finance*, First European Edition, McGraw-Hill Education
- [21]. Ho, Y. K., Tjahjapranata, M., and Yap, C. M. (2006). Size, leverage, concentration, and R&D investment in generating growth opportunities. *The Journal of Business*, 79(2), 851-876.  
<https://ins-cameroun.cm>
- [23]. Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, 76(2), 323-329.
- [24]. Jensen, Michael., Meckling, William C. (1976), «Theory of the firm: Managerial behaviour, Agency costs, and ownership structure », *Journal of Financial Economics*, Vol. 3, p. 305-360.
- [25]. Köksal, B., Orman, C., and Oduncu, A. (2013). Determinants of capital structure: evidence from a major emerging market economy. *MPRA Paper*, 48415.
- [26]. Kraus, A., and Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The journal of finance*, 28(4), 911-922.
- [27]. Lang, L. H., and Stulz, R. M. (1994). Tobin's q, corporate diversification, and firm performance. *Journal of political economy*, 102(6), 1248-1280.
- [28]. Lang, L., Ofek, E., and Stulz, R. (1996). Leverage, investment, and firm growth. *Journal of financial Economics*, 40(1), 3-29.
- [29]. Lim, S. C., Macias, A. J., and Moeller, T. (2020). Intangible assets and capital structure. *Journal of Banking and Finance*, 118, 105873.
- [30]. Loumioti, M. (2012). The use of intangible assets as loan collateral. *Available at SSRN 1748675*.
- [31]. Mauskar, N. (2018). Accounting for Leverage in Intangible and Tangible Investments across the Business Cycle. *Undergraduate Economic Review*, 15(1), 1.)
- [32]. Modigliani, F., and Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American economic review*, 48(3), 261-297.

- [33]. Modigliani, F., and Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *The American economic review*, 53(3), 433-443.
- [34]. Mondosha, M., and Majoni, A. (2018). The impact of leverage on investment decisions for South African firms with different growth opportunities. *Journal of Economic and Financial Sciences*, 11(1), 1-7.
- [35]. Morellec, E., and Schürhoff, N. (2011). Corporate investment and financing under asymmetric information. *Journal of financial Economics*, 99(2), 262-288.
- [36]. Morellec, E. (2001). Asset liquidity, capital structure, and secured debt. *Journal of financial economics*, 61(2), 173-206.
- [37]. Moro Visconti, R. (2015). Leveraging value with intangibles: More guarantees with less collateral? *Corporate ownership and control*, 13(1).
- [38]. Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of financial economics*, 5(2), 147-175.
- [39]. Myers, S. C., and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.
- [40]. Nakamura, L. I. (2001). Investing in intangibles: is a trillion dollars missing from the GDP? *Business Review*, (Q4), 27-36.
- [41]. Nyale, Y. (2010). *The relationship between leverage and investment decisions for companies quoted at the Nairobi Stock Exchange* (Doctoral dissertation, University of Nairobi, Kenya).
- [42]. Odit, M. P., and Chitto, H. B. (2008). Does financial leverage influence investment decisions? The case of Mauritian firms. *Journal of Business Case Studies (JBSCS)*, 4(9), 49-60.
- [43]. Onomo, M. B., Ayoub, M., and Fall, F. (2019). Propriété étrangère, investissement et performance des entreprises en Afrique: cas du Cameroun. *Management international*, 23, 159-171.
- [44]. Rajan, R. G., and Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The journal of Finance*, 50(5), 1421-1460.
- [45]. Ross, S. A. (1977). The determination of financial structure: the incentive-signalling approach. *The bell journal of economics*, 23-40.
- [46]. Ruland, W., and Zhou, P. (2005). Debt, diversification, and valuation. *Review of Quantitative Finance and Accounting*, 25(3), 277-291.
- [47]. Sajid, M., Mahmood, A., and Sabir, H. M. (2016). Does financial leverage influence investment decisions? Empirical evidence from KSE-30 index of Pakistan. *Asian Journal of Economic Modelling*, 4(2), 82-89.
- [48]. Sall, M. B. (2002). La source de financement des investissements de la PME: Une étude empirique sur données sénégalaises. *Africa Development/Afrique et Développement*, 84-115.
- [49]. Shleifer, A., and Vishny, R. W. (1992). Liquidation values and debt capacity: A market equilibrium approach. *The journal of finance*, 47(4), 1343-1366.
- [50]. Shleifer, A., and Vishny, R. W. (1997). A survey of corporate governance. *The journal of finance*, 52(2), 737-783.
- [51]. Shukla, A. K., and Shaw, T. S. (2021). Impact of Leverage on Firms' Investment. *Economic and Political Weekly*, 56(35), 45.
- [52]. Stiglitz, J. E. (1969). A re-examination of the Modigliani-Miller theorem. *The American Economic Review*, 59(5), 784-793.
- [53]. Stiglitz, J. E., and Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American economic review*, 71(3), 393-410.
- [54]. Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of financial Economics*, 26(1), 3-27.
- [55]. Tioumagneng, A. (2012). BANQUES ET COMPORTEMENT D'ENDETTEMENT DES ENTREPRISES. *Recherches en Sciences de Gestion*, (89).
- [56]. Titman, S., and Wessels, R. (1988). The determinants of capital structure choice. *The Journal of finance*, 43(1), 1-19.
- [57]. Umutlu, M. (2010). Firm leverage and investment decisions in an emerging market. *Quality and Quantity*, 44(5), 1005-1013.
- [58]. Vengesai, E., and Kwenda, F. (2018). The impact of leverage on discretionary investment: African evidence. *African journal of economic and management studies*.
- [59]. Vo, X. V. (2019). Leverage and corporate investment—Evidence from Vietnam. *Finance Research Letters*, 28, 1-5.
- [60]. Yarba, I. (2021). *Corporate Indebtedness and Investment: Micro Evidence of an Inverted U-Shape* (No. 2131).