International Journal of Economics and Finance; Vol. 6, No. 12; 2014
ISSN 1916-971X E-ISSN 1916-9728
Published by Canadian Center of Science and Education

Degree of Operating Leverage, Contribution Margin and the Risk-Return Profile of Emerging Companies: Evidence from Nigeria

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Received: September 28, 2014 Accepted: October 21, 2014 Online Published: November 25, 2014

doi:10.5539/ijef.v6n12p148 URL: http://dx.doi.org/10.5539/ijef.v6n12p148

Abstract

This article investigates the effects of degree of operating leverage and contribution margin on profitability and risk of Nigeria's emerging companies. Emerging companies were described in this study as small and medium-sized enterprises that are high-potential and high-growth in character listed in the Nigerian Stock Exchange's Alternative Investment Market. Cross-sectional and time series data were collected from Nigerian Stock Exchange for the top ten emerging companies listed in the market. Additional restricted-access data about internal management accounting decisions were retrieved directly from these firms. Data were sought to estimate values for operating profit, operating risk, degree of operating leverage, and contribution margin. Since data were collected for ten years in each case, a ten-by-ten panel study involving two models was designed. The probability of both f-test and t-test was 0.05. First, the study shows that degree of operating leverage (DOL) contributes less to profit before interest and tax (PBIT) of emerging companies than contribution margin (CM), yet DOL contributes more to their operating risk profile than CM does. Second, only CM was found to have caused significantly positive changes in operating risk. It was, therefore, concluded that emerging companies face challenges in recovering fixed costs or take unusually longer period to breakeven.

Keywords: Degree of operating leverage (DOL), operating risk, contribution margin (CM), profit before interest and tax (PBIT), emerging companies

1. Introduction

1.1 Background of the Study

The Nigerian business environment has been discredited for too long as one of the most turbulent in the world. The self-evident support for this unfriendly remark is the regular heresy in financial and economic discourses that average returns on Nigeria's equities are about the highest in the world, which may seem notional, but is founded in the following financial axiom: the higher the risk, the higher will be the expected return. Theoretical works of Fama and Miller (1972), Yakov (1994), and Van Horne (2005) attest to the application of this axiom. Recent review of private equity finance also articulated this point in the context of Nigeria (Dagogo, 2012). Similar evidence was found in Wright (2002), where the average return on European venture capital investment was 16 percent whereas Nigeria's overall equity return was put at 30 percent in the post-financial crisis era. New York Stock Exchange's average market return between 2001 and 2005 was 6.5 percent, and London Stock Exchange's for the same period was 6.7 whereas Nigeria's average for the same period was 21 percent (Joshua & Mungo, 2008; Osisanwo & Atanda, 2012; Dagogo, 2013).

While this was comprehensible about a decade ago, evidence from Nigeria's economic facts file increasingly makes it contestable or arguable as true of Nigeria in recent times. Not the truth in the axiom itself but in its interpretation as there have been structural changes in the nation's economy forceful enough to cause fundamentally positive changes in macroeconomic target variables (Oyelaran-Oyeyinka, 2013; Osisanwo & Atanda, 2012). There are glimpses of economic progress in selected indicators. More impactful is the recent rebasing of Nigeria's gross domestic product (GDP) that brings the country to the 25th position in the ranking of world economies. Again, with tremendous improvement in its telecommunications, electricity, ports and the advances made in intellectual property right, certain sectors have been stimulated with corresponding increase in employment (National Bureau of Statistics, 2012). In parity with above, basic economic analysis suggests that positive employment trend is an indication of utilization not only of labour resources but also of capital and land

resources (Iyoha, 2010). It must be admitted however that performance appears quite unimpressive in relation to our resource base, the achievement of other emerging economies, the awful mismanagement of tax payers' funds, the level of insecurity caused by ethnic and religious insurrections, corruption of the political class that transcends the entire society, and the absence of predictable private sector growth pattern.

Failure to attract investment especially from the international arena in spite of the supposed high returns is simply the intelligence of investors, and it alludes to the need to prioritize systemic structures in emerging economies where it is unlikely that potential investors would have all the basic systemic structures attractive (Hirt & Block, 1999). The strategy of investing in emerging economies therefore demands that investors appraise the systemic structures of target countries with the highest impact on a given business rather than expect that all the basic structures must be right. In other words, there should be diligent identification of core systemic structures with the highest impact factor in that industry after which an investor should create a shortcut, albeit with increasing overhead cost, for the rest such as installing own power plant, water plant, transport system, training institutions, etc. Indeed, the reality of doing business in Nigeria is that the investor must accept the selective mode for his core systemic structures and incur unusually higher operating cost for the non-core structures. This no doubt is the main source of rising operating cost structure which in turn makes Nigerian products uncompetitive. Again competition is a market condition that exposes the investor to market risk. This addresses part of my concern: only high risk investors can dare into the turbulence of Nigerian business environment and they must be equally compensated as the axiom goes.

China, which is today's manufacturing hub of the world, identified this *ala cat*-typed investment strategy as they gradually moved from one sector to another before encompassing the world of manufacturing. To do this, China did not have to start with *chaebols*, neither did South Korea nor Japan. They all started with the small and medium enterprises (SMEs) to grow the private sector (Agundu & Dagogo, 2009; Nuechterlein, 2003). In spite of copious research evidence supporting the need to grow and consolidate the SME sector, no significant milestone has been recorded in Nigeria. Sanusi (2013) stated that in many of the newly industrialized nations, more than 90 percent of their industrial outputs are engineered by the SME sector and account for the bulk of the labour force. Also Kayanula and Quartey (2000) posited that SMEs employ over 22 percent of labour force in Ghana and provide more employment per unit of capital investment than large enterprises. This is also true of SMEs that employed venture capital funds in Europe (Dagogo & Ollor, 2009). In the US, most of the Fortune 500 companies of today started out as Small businesses ably mentored and financed by government supported small business investment corporations and such like agencies. And in Japan, small businesses are supported by large enterprises in a process of enterprise development commonly referred to as *keiretsu*, an extension of theory *Z*. In South Korea, agencies similar to Nigeria's erstwhile small and medium enterprises equity investment scheme (SMEEIS) were established by the government that targeted Koreans in diaspora to set up businesses in South Korea (Nuechterlein, 2003). In fact it was the Korean SME development model that was replicated in Nigeria as SMEEIS in 2001 (Sanusi, 2001), which passed away in 2009 (Dagogo, 2012).

Oyelaran-Onyeyinka (2013) believes Nigerian governments have not shown unsullied commitment to building a strong SME sector as much as other nations have done through access to finance and financial derivatives, basic and technological infrastructures, adequate legal and regulatory framework, and development of domestic expertise and knowledge. This is a difficult pill to swallow for a country where 96 percent of enumerated businesses are SMEs. Comparative statistics for US and Europe are 53 percent and 65 percent respectively. Even more worrisome is the fact that while SMEs represented 90 percent of manufacturing sector's employment in 2012, its contribution to gross domestic product (GDP) was a paltry one percent. Sadly, while Nigeria's commercial bank lending to SMEs as a proportion of total lending dropped remarkably from 7.5 percent in 2003 to one percent in 2006 and down to 0.14 percent in 2012, the statistics for other emerging economies show upward trend (Sanusi, 2013; Rubb & Robinson, 2012). The thrust of Oyeyinka's proposition is that absence of government support translates to increased operating and financial risks. Operating risk arises from the inability to generate cash flows from business operation enough to cover the present value of fixed costs incurred or simply to cover rate of return over cost while financial risk derives from the inability to generate cash flows to cover fixed interest obligations. These are some of the relevant business risks that justify high premium for investors in Nigeria. Logically, this high premium, which is the ultimate effect of the increase in fixed cost, is double-edged: upside return and downside risk.This study examines the degree of operating leverage of Nigerian SMEs as a determinant of profitability in the context of the avertable operating risks. It also estimates the effect of contribution margin on both profitability and risk profiles of emerging companies that have been in existence for at least ten years and are part of the alternative investment market of Nigeria Stock Exchange. Emerging companies are SMEs that are characteristically high-growth and high-potential as reflected in their sales, profit,

asset base, investment in innovation, technology, employment, product quality, etc.

1.2 Theories of Operating Leverage

This section reviews relevant theories of operating leverage in order to provide an insight into its importance especially in growing SMEs. In doing so, the section identifies existing gap or departure that might explain the frailty of Nigeria's SMEs in spite of the transcendental dossier of government policies. Anyone versed in financial matters can tell from hindsight that external stakeholders of any firm are often exposed more to the dimensions of financial leverage than to their operating leverage even when the risk impact on the firm by either leverage is of similar magnitude. This is explained by the mere fact that it is easier to access data on financial leverage with its corresponding risk than to access same on operating leverage with its corresponding risk. Fundamentally, the former is for both internal and external assessment while the latter is frequently for internal management assessment and decisions only.

Now, this virtually implies that only fundamentalists or such like professionals attempting to catch a glimpse of operating risks facing quoted SMEs can go out of their way to generate internal management data, given their experience, contacts and resources. This may not be true of SMEs whose data for internal operations are shrouded in unprecedented confidentiality, except again, by private equity experts or debt-holders whose interest in the business will normally spur them to stop at nothing to define for each investee SME the determinants of the bottom lines and net positive cash flows, one of which is operating risk. Again, a lot of other interests in SMEs, which surprisingly include managers and owners, are passive about the effect of operating leverage on their businesses borne out of ignorance, absence of due diligence skills, not wanting to deal with the complexities or algorithm of this theory, simply denying that the theoretical interpretations cannot fall in line with empirical evidence, and having no passion for scientific methods of decision making. Indeed, the more business managers describe this logic as mere farcical contemplations, the more they ignore its devastating effect on SMEs.

At the root of financial profit planning is the concept of operating leverage which underscores the axiom of risk-return trade-off in basic financial analysis. That is to say, at both ends of the risk-return bifurcation are operating risk and operating leverage respectively. The higher the operating leverage, the higher is the operating risk. This is not novel to any financial theorist, as observed in Bierman and Hass (1975), Weston and Brigham (2008), Van Horne (2005), Pandey (2002), and Olowe (2009). Weston and Brigham mapped their baseline from breakeven analysis and defined operating leverage as the extent to which fixed costs are used in business operations to generate more than proportionate increase in operating profit. They further derived a measure of a firm's operating leverage at any activity called the degree of operating leverage (DOL). This shows the percentage change in operating profit resulting from a percentage change in output sold given a change in fixed cost. Van Horne (2002) defines operating leverage as "the employment of an asset with a fixed cost in the hope that sufficient revenue will be generated to cover all fixed and variable costs". Pandey (2002) refers to it as the use of fixed costs in the operation of a firm, that a firm will not have operating leverage if its ratio of fixed costs to total costs is nil, and that for such firm, a given change in sales would produce the same percentage change in the operating profit. Olowe (2009) did not only relate operating leverage to the use of fixed costs but also pointed out the implication for managers of high operating leverage, stating that first a high degree of operating leverage is an indication of extended break-even point, and second, that highly leveraged firm will have its profits increasing at a high rate with a small increase in sales after the breakeven point. Bierman and Hass (1975) drew attention to the relevance of operating leverage in terms of the firm's risk complexion. They did this by assuming that given a constant cost structure and probability distribution of quantity sold, the mean, standard deviation and coefficient of variation could be employed to show that an increase in fixed cost increases the coefficient of variation of operating profit, which is a relative measure of business risk. They further showed that the fixed cost to variable cost ratio depends on the manager's risk-return preference function.

Others include the study of Reily and Bent (1974), which measures the concept of operating leverage in three dimensions: the effect of degree of operating leverage on business risk, the amount of operating leverage as a proportion of fixed cost to total costs of firms, and the comparative importance of operating leverage and sales volatility in explaining business risk. Percival (1974) extended the theory of operating leverage to investment analysis in the context of capital asset pricing model (CAPM) by demonstrating that an increase in operating leverage will increase the covariance of a security's return with that of the market by a factor which is proportional to the increase in the contribution margin (CM) but independent of the new breakeven quantity. This implies that an increase in fixed cost, contribution margin held constant, does not increase the covariance despite the fact that the breakeven increases, further implying that a firm's position relative to its breakeven point is a portion of its diversifiable risk. And finally, Lev (1974) demonstrated that the overall risk of a common stock

is positively correlated with the firm's operating leverage or negatively associated with its level of variable costs. The overriding assumption central to the review above is that the bases of analysis are large corporations that operate in developed economies. This study looks specifically at SMEs, hereafter referred to as emerging companies, operating in Nigeria (an emerging economy fraught with incidence of diseconomies of scale, inappropriate government support, poor state of systemic structures, and competitively disadvantaged international trade environment). Emerging companies are SMEs that are viable enough to be listed in the Nigeria Stock Exchange's Alternative Investment Market, which serves as a second-tier market for upcoming companies in the economy.

1.3 Risk, Return and the Concept of Operating Leverage

Certain variables are central to the review of theories above, which in my opinion demand detailed understanding as they constitute the subject matter of this study. They include breakeven analysis and risk-return trade-off. I will begin with the determination of breakeven analysis. Breakeven point may be demonstrated under assumption of linear cost and revenue functions as $\{Q(P - V) - F\} - \pi = 0$. Where Q equals quantity produced and sold, P equals price per unit, V equals variable cost per unit, F equals fixed costs, and π equals profit. This shows the normal breakeven equilibrium between costs and profit as $\{Q(P - V) - F\} = \pi$, which can also be expressed in the following form in order to determine the breakeven quantities: $Q_{BE} = F/P - V$, where Q_{BE} equals quantity produced and sold at breakeven. It further shows that the breakeven quantity is determined by absolute size of fixed cost and the contribution margin per unit of sales given the excess of price over variable cost. The normal logic under breakeven is that contribution margin first goes to recover fixed cost and thereafter contributes straight to profit. A firm can therefore influence its breakeven and profit in two ways: first by obtaining larger contribution margin per unit given a known fixed cost which ensures speedy recovery of fixed cost and thereafter greater absolute increases in operating profit than smaller contribution margin. Second is to obtain lesser fixed cost, given a known contribution margin, which ensures quicker recovery of fixed costs than larger fixed costs and thereafter contribute relatively lesser amount to operating profit, albeit with lower risk. The high points of these scenarios are: first, a lower contribution margin requires larger increases in quantity sold to achieve noticeable increase in operating profit or vice versa, and second, a lower fixed cost requires lesser quantity to be sold in order to breakeven. There is another side to this analogy, that is, while contribution margin determines absolute change in profit per unit of quantities sold beyond breakeven point, the use of/addition to fixed cost or operating leverage determines what the percentage change in operating profits will be as a result of the change in sales. This leads to a crucial element of the study's research question, i.e. to what extent will operating profit change with a percentage change in sales if fixed charges are increased? This question is imperative because with an increase in fixed cost, a percentage change in sales is magnified into a greater percentage change in operating profit because as sales change in either direction, operating expenses change less than proportionately.

To demonstrate this, assume two firms with the same fixed cost but different contribution margins. The firm with higher contribution margin will breakeven earlier and obtain higher absolute operating profit than the firm with lower contribution margin. Secondly, assume two firms with the same contribution margin but different F/V ratio. The firm with higher F/V ratio or operating leverage ratio will take a longer time to breakeven than the firm with lower F/V ratio. So, to this extent, breakeven analysis can only tell how early a firm can expect operating profit or what changes a firm needs to make to achieve a given level of profit beyond breakeven point. It does not show the multiplier effect of the changes made in the F/V ratio on operating profit or loss. The degree of operating leverage does not only indicate the multiplier effect, but it is also an easier means of expressing differences in operating leverage between two activity levels or two firms. It is therefore suitable for comparison or benchmarking especially when expressed as an index. The degree of operating leverage at Q units of output is given as:

$$DOL = \frac{Q(P-V)}{Q(P-V) - F} = \frac{Q}{\pi} \; x \; \frac{\delta\pi}{\delta Q} \tag{1}$$

The degree of operating leverage (DOL) is unique to each output level and measures the percentage change in profit that will result from a percentage change in quantity sold. Assume that a firm's current sales level of 1,000 units of a particular product is associated with the DOL of 5. At the upside return, a 10 percent increase in sales to 1,100 units will result in a 50 percent increase in operating profit, and at the downside risk, operating profit will decline by 50 percent where sales drop by 10 percent to 900 units. Examine equation (1), and it will be observed that the numerator Q(P – V) is an algebraic expression of pre-breakeven contribution margin while the denominator is the post-breakeven contribution margin. Therefore DOL can also be expressed as

$$DOL = \frac{\pi+F}{\pi} \quad (2)$$

Making F the subject of equation (2) will give

$$F = \pi(DOL - 1) \quad (3)$$

Equation (3) shows that for a given amount of fixed cost, there is a unique DOL associated with each level of operating profit, that contribution margin and quantity sold are not part of this equation, and that for any change in fixed cost, operating profit will be multiplied by the extent of the DOL. For example, assume that a firm increases its fixed cost in lieu of variable cost indicating that profit will respond more to DOL associated with the new level of activity than with the an earlier level. Assume further that the volume of output generated from the change in cost structure can be sold. Then a percentage change in output arising from the change in cost structure will result in a greater percentage change in operating profit than will occur under the old cost structure. In other words, equal operating profits under two different cost structures have different degrees of operating risk measured in terms of the degree of volatility or variability of operating profit. The overriding implication of fixed cost leading to increase in DOL rests on the assumption that if two firms are only different in their cost structures but have the same absolute operating profit, the one with lesser fixed cost is less risky with respect to potential fluctuation in cash flow. According to Gahlon and Stevens (1975) this implication is independent of F/V ratio, that the effect of the ratio on magnifying return or risk is greater around the breakeven point, and that for a given cost structure, operating profit becomes less sensitive to volume changes as the firm's output increases beyond the breakeven point such that the $DOL = \frac{Q(P-V)}{Q(P-V)-F} = 1$, ie. DOL tends towards unity at levels of activity well beyond breakeven point. This simply means that the risk-return multiplier or volatility inherent in DOL flattens out at production activities far beyond the breakeven point, so, DOL at that point becomes more and more irrelevant in explaining operating risk as there is one and only one value of Q/Q_{BE} which is a measure of a firm's level of output relative to breakeven point, which further means that there is equal risk for all firms that produce with some fixed costs. Operating risk must then be associated more with contribution margin rather than DOL. That is, the riskiness of, say, two firms operating beyond their breakeven point with different DOL depends not on the differences in their DOL but on their contribution margin because operating leverage beyond breakeven point is constant. If these firms have the same unit contribution margin then the differences in their risk is associated with their sales position (or total contribution margin) relative to the breakeven point or the relative distance between expected quantity and breakeven point.

Here lies the justification of this study as I examine the relative effect of DOL and contribution margin in determining the risk-return profile of Nigerian emerging companies. Accordingly, this study answers the following questions: (a) Does DOL of emerging companies have significantly greater effect on operating profit than their CM? (b) Does DOL of emerging companies have significantly greater effect on operating risk than their CM?

2. Method

I begin this section with the following assumptions: First, because there is a specific DOL for each level of a firm's activity, average sales activity level is estimated for each of the firms studied. Second, the estimation of firms' DOL and contribution margin only took account of the key or *cash cow* product of firms producing multiple products. Third, the relationship between the dependent and independent variables is linear. Forth, Q, P, V and F used in estimating DOL and contribution margins for the firms are normally distributed. Ten years annual data from the financial statements of ten firms in the emerging markets category of Nigerian Stock Exchange were collected. Added to this were restricted-access data from the respective firms particularly concerning the identification of their *cash cows* and their annual demand covering the period of the study. In all, the quest for data was guided by the need to provide estimates for the following variables: (a) operating profit, retrieved from financial statements represented by profit before interest and tax (b) operating risk represented by the standard deviation of operating profit. Standard deviation is widely accepted as the absolute measure of operating risk. (c) DOL was estimated as follows: $DOL = \frac{\pi+F}{\pi}$ For this, π equals PBIT, and fixed costs were estimated by summing up non-variable cost operating expenses including depreciation charges per annum. (d) To estimate CM represented by P-V, additional data were sourced to derive unit price and unit variable cost.

The collection of the ten-by-ten dimension data suggests that a time series analysis was combined with cross-sectional survey. Accordingly, a panel study was envisaged with two models, one to estimate the effect of DOL and CM on operating profit, and the other to estimate the effect of DOL and CM on operating risk. Thus assuming a functional relationship between the dependent variables (operating profit and operating risk) and the independent variables DOL and CM, the following econometric models are tenable:

$$PBIT = a + \beta_1(DOL) + \beta_2(CM) + \mu \quad (4)$$

$$OpRisk = a + \beta_1(DOL) + \beta_2(CM) + \mu \quad (5)$$

where a = the intercept of *PBIT* and *OpRisk* axes; β_1 and β_2 are parameters of the independent variables *(DOL)* and *(CM);* and μ in equations (4) and (5) is the random variable or error term usually explained away in order to estimate the effect of the core independent variable. The estimates of the true parameters a, β_1 and β_2 of the determinants *(DOL)* and *(CM)* are symbolized as follows:

$$PBIT = a + \beta_1(D\tilde{o}L) + \beta_2(CM) + \acute{\varepsilon} \quad (6)$$

$$OpRisk = a + \beta_1(D\tilde{o}L) + \beta_2(CM) + \acute{\varepsilon} \quad (7)$$

where $\acute{\varepsilon}$ = estimate of the random variables μ,

Furthermore, estimation of panel data requires that the models reflect the spatiotemporal dimension such that

$$PBIT_{it} = a + \beta_1(D\tilde{o}L_{it}) + \beta_2(CM_{it}) + \acute{\varepsilon} \quad (8)$$

$$OpRisk_{it} = a + \beta_1(D\tilde{o}L_{it}) + \beta_2(CM_{it}) + \acute{\varepsilon} \quad (9)$$

Where i = 1,2,3…10 and t = 2003, 2004, 2005 … 2012. We further treat the intercept for each model which bears the cross-section effect as random variables with a mean value of a_i, such that $a_i = a + \mu_i$, where i = 1, 2, 3…10, and $a = 1/10\Sigma ai$; t = 2003, 2004, 2005…2012. This obviously implies that Random Error Model (REM) is preferred since it is assumed that there is no correlation between the individual or cross-section error component $\acute{\varepsilon}_i$ and the regressors *(DõL and CM)*. Accordingly, the random effect model is of the form:

$$PBIT_{it} = a + \beta_1(D\tilde{o}L_{it}) + \beta_2(CM_{it}) + w_{it}, \quad (10)$$

$$OpRisk_{it} = a + \beta_1(D\tilde{o}L_{it}) + \beta_2(CM_{it}) + w_{it}, \quad (11)$$

where $w_{it} = \mu_i + \acute{\varepsilon}_{it}$, and w_{it} is a composite error term that clearly involves two errors, the first (μ_i) is the cross-section or firm specific error component and the second ($\acute{\varepsilon}_{it}$) is the combined time series and cross-section error component. The assumptions of random effect model are that $\mu_i \sim N(0,\delta_u^{\ 2})$; $\acute{\varepsilon}_{it} \sim N(0, \delta\acute{\varepsilon}^{\ 2})$; $E(u_i\acute{\varepsilon}_{it}) = 0$; $E(u_iu_t) = 0$; $(i \neq j)$; $E(\acute{\varepsilon}_{it}\,\acute{\varepsilon}_{is}) = E(\acute{\varepsilon}_{it}\,\acute{\varepsilon}_{jt}) = E(\acute{\varepsilon}_{it}\,\acute{\varepsilon}_{js}) = 0$; $(i \neq j;\ t \neq s)$, Gujarati and Sangeetha (2007). This means that the individual error components were not expected to be correlated with each other and were not to be auto-correlated across both cross section and time series units.

The *a priori* position is that DOL contributes less to SMEs' profitability than contribution margin yet DOL contributes more to their risk profile than contribution margin. To be free from the secondary caveat concerning the strength of DOL around breakeven point, firms enlisted for this study have been in existence for over ten years and are assumed to have surpassed their breakeven point. The analysis was conducted with a p-value of 0.05 for both *f*-test and *t*-test.

3. Results and Discussions

The results of the first model (equation 7) presented in table 1 below shows no significant effect of DOL and CM on the PBIT of Nigeria's emerging companies. The R^2 of 0.005 is so insignificant that it is as good as saying that none of the independent variables appeared to have contributed to changes in the dependent variable. This low value also reflected in the very high *f*-probability value of 0.79. Similarly, *t*-probabilities for the independent variables are expectedly high at 0.87 and 0.5 for DOL and CM respectively. Notwithstanding their insignificance, both *t*-values proved to have negative causal effects on PBIT. Thus the substituted coefficients in the model PBIT = 693541 - 509.57DOL - 0.0311CM implies that for every unit increase in DOL or CM, PBIT of emerging companies drops by approximately ₦510 or ₦0.0311 respectively for. The result appears rather absurd as DOL takes a heavy toll on profit and reflects the downside of operating leverage. Recall that operating leverage creates a double-edged phenomenon: dramatic increases in profit or devastating multiples in loss. The upside profit or more than proportional increase in profit arising from operating leverage is a function of sales. Where sales dropped after operating leverage was increased, then a devastating downside effect manifests. Similar effect is created with CM as given in the result, albeit with lesser impact.

Each of these concepts is directly related to breakeven point and as mentioned in the literature review above, the volatility of operating leverage or contribution margin changes as production surpasses breakeven point and each variable generates different impact on operating profit. DOL tends towards unity as CM becomes more sensitive to changes in revenue (unit CM is sensitive to price and variable cost while total CM is sensitive to quantity sold in addition to price and variable cost sensitivity) and thus creates short term oscillations in PBIT. Since evidence available neither points towards volatility nor shows linear trend toward unity in DOL, it could be inferred that emerging companies in Nigeria, have difficulty in breaking even. However, given that these companies have been in operation for more than 10 years, not operating beyond breakeven point becomes a rather difficult reason

to comprehend especially on the basis of qualifying them as emerging companies. In other words, emerging companies in Nigeria may be facing challenges of recovering fixed cost as strategically as they might have intended.

Table 1. Summary of panel data regression (random effect model) with PBIT as dependent variable

R2	f-test	Sig. (f-test)	Parameters	Indep. Variables	Coef.	t-test	Sig (t-test)
0.005	0.233	0.792	C	Constant	6935419	0.567855	0.5714
			X1	DOL	-509.57	-0.164987	0.8693
			X2	CM	-0.031159	-0.671426	0.5035

Note. E-view version 7 output.

The second model (equation 8) sought to explain the effect of DOL and CM on the operating risk profile of emerging companies. Operating risk is represented by the standard deviation of the firms' PBIT over the period of 10 years. To do this, annual time series data were dropped in preference for quarterly data in order to estimate annual standard deviation, as it was necessary to generate balanced data in the 10 by 10 matrix panel regression model. R^2 value of 0.14 with *f*-value of 7.9 was significant at 0.0006 implying that the independent variables acting together significantly caused changes in operating risk. Specifically, the coefficient of DOL (264.5) shows an outrageous value of 0.88 suggesting that changes in DOL did not cause changes in operating risk, but changes in CM did. Put together, the substituted coefficients give the following regression line: OpRisk = 5156622 + 264.5DOL + 0.113068CM. That is, for every unit increase in DOL or CM, operating risk increases by ₦264.5 or ₦0.113068 respectively. Again, irrespective of the absurdity of the value for DOL, it points to the direction that DOL positively impacts operating risk measured in terms of the absolute variability of PBIT of emerging companies. Secondly, the positive effect of CM on operating risk is in discordance with theoretical studies of Gahlon and Stevens (1975), Gahlon and Gentry (1982) and O'brien and Paul (1987), that is as CM increases, operating risk will normally follow a particular trend, linear or curvilinear but not significant fluctuation in the short term. So, on account of the results above, it is inferred that factors other than variable cost might be responsible for rising operating risk. This alludes to our earlier presupposition that firms in the study might just be battling with endless recovery of fixed costs or that revenues are affected by other exogenous variables. First, as a firm operates beyond breakeven point, it begins to enjoy greater certainty of contributing straight to operating income, which should normally reduce risk associated with operating income variability. The outcome of this study is capable of eliciting further investigations as it interestingly departs from known financial phenomenon.

Table 2. Summary of panel data regression (random effect model) with operational risk (*OpRisk*) as dependent variable

R2	f-test	Sig. (f-test)	Parameters	Indep. Variables	Coef.	t-test	Sig (t-test)
0.141	7.933	0.0006	C	Constant	5156623	6.9*	0.000
			X1	DOL	264.5	0.1399	0.88
			X2	CM	0.113	3.982*	0.0001

Note. Statistical significance at $p \leq 0.05$. E-view version 7 output.

4. Conclusive Remark

The outcome suffers statistical significance and therefore care should be taken while drawing inference upon them except for the effect of CM on operational risk as shown in table 2 above. Suffice to recall that the outcome conforms with our *a priori* position as far as the analyses of variance of the two models are concerned. First, it shows that DOL contributes less to PBIT of emerging companies than CM, yet DOL contributes more to their operating risk profile than CM. Conclusively, this study has empirically determined that there is a positive effect of CM on operating risk of emerging companies in Nigeria, a phenomenon which alludes to unending recovery of fixed costs or unusually longer period taken by these companies to breakeven. This allusion provides scope for future empirical studies in this area such as lifting the assumption of linearity.

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