Review Article

Applicability of Identified Financial Determinants of Undiversifiable Risk to emerging markets: A Multi-sector analysis of non-Financial Listed Companies on the Ghana Stock Exchange

Abstract

The impact of systematic risk variables on investor decision was widely researched albeit in established economies. This study explores the influence of the identified financial variables on undiversifiable risk and investment decision in emerging markets. Eight financial variables are examined as determinants of undiversifiable risk. Results based on five years of financial data, 2016-2020, of 14 multi-sector non-financial firms listed on Ghana Stock Exchange indicated that liquidity, leverage, operating efficiency, dividend payout and market value of equity have negative relationship while profitability, firm size and growth have positive relationship with systematic risk. Except for profitability and growth, the significant relation of the other variables to beta shows that both investors and managers can utilize their movements to make sound financial decisions that will enhance value.

Keywords: *Undiversifiable risk (Beta), Financial variables, Ghana Securities Exchange*.

1.0 INTRODUCTION

In estimating the value of financial securities and portfolio assets, systematic risk (otherwise known as undiversifiable risk) estimation, which was profoundly explained in financial theories and empirically tested, became imperative. Simply noted as Beta(**β**), systematic risk is a factor that links a company's investment decisions to its stock market value. According to Eldomiaty *et al.*, (2009), Beta answers investors' expectations of stock value; because it serves as a component for determining the investor's required rate of return (*ibid*). Therefore, an increasing systematic risk disturbs the value of the stock inversely and negatively impact stock investors.

Risk associated with investment defines the rate of return investors want from investing in any security (Gu and Kim, 2002). Empirical evidence and literature confirms a direct relationship between risk and expected rate of return (Logue and Merville, 1972; Jarrow, 1978; Haugen, and Heins, 1975). This implies that if uncertainty associated with any investment is higher the expected return of that particular investment will be high as well (Arrow and Lind, 1974, 1978; Wang, Li, and Watada, 2017). Hence, information about systematic risk is paramount for investors to evaluate the nature of risk associated with investment (Gu and Kim, 2002). Likewise, the source(s) of such risks matter in making sound investment decisions. Equally important is that the understanding of financial variables which impact systematic risk (beta) helps firm's executives to formulate the right financial policies and strategies that will maximize wealth for the investor. In this regard, Breen and Lerner (1973) and Lintner (1965) posit that management decisions regarding portfolio construction and management to ensure financial and operational efficiency reduce the uncertainty surrounding portfolio value and performance. Logue and Merville (1972)

used capital-asset pricing model (CAPM) and found significant relationship between management decision and liquidity, investment, and financing. Their result confirms the assertions of Lintner (1965). Iqbal and Shah (2012) also posited that management does have some control over business and financial uncertainties and thus makes decisions to enhance growth, barring any unforeseen exigencies.

Previous studies identified some specific financial indicators that influence the systematic risk factor of companies of different industries (Beaver *et al*., 1970; Lee and Jang, 2006; and Gu and Kim, 2002). The size of systematic risk factor is different from one industry to another. Lee and Jang (2006) focused US airline industries and concluded significant results with systematic risk. Similarly, other studies on casinos (Rowe and Kim, 2010), banking system (Biase and D'Apolito, 2012) and restaurant industry (Gu and Kim, 2002) have all shown significant relationship between beta and the specific financial variables. Olib *et al*. (2007) also found positive association between beta and international diversification. Thus, using the same financial variables for each industry, the results indicated significant relationship between beta and the financial variables chosen.

The main objective of this current study is to identify and evaluate the impact of specific financial variables on undiversifiable risk factor of multi-sector non-financial listed companies on Ghana Securities Exchange (GSE). The rationale is to provide some insight, at macro level, to enable management and corporate executives to identify those financial influencers that significantly impact corporate, investment and financing decisions and hence corporate value, shareholder's wealth in emerging economies. This is critical because shareholders seek to invest in businesses or portfolios that offer the maximum return at minimum risk (Hasan, Kamil, Mustafa and Baten, 2012; Lintner, 1965). Also, interesting is the fact that previous discourse on this topic primarily focus on developed vibrant markets. The incidence of emerging markets and the small and nascent

financial markets indicate a marked difference in characteristic and efficiency from literature based on developed economies. Indeed, the markets in the developed economies are vibrant with highly level of efficiency. There is adequate history and distribution of currency information is guaranteed as compared to early developing markets seen in the developing economies. This study is therefore peculiar as it focuses on yet a very small market which, despite its record of three decades of existence, remains embryonic in its activities. This choice of market which has similar characteristics of stock markets in many other emerging economics is to test whether the variables identified in literature are enough to explain the market risk in these markets. Given the nascent characteristic of these markets, management of listed companies on these markets would thus have onerous task of ensuring prudent financial policies and strategies to improve profitability and stock value are adopted to achieve efficiency and company growth, which ultimately results in value maximization for the owners.

Applying a multi-sector approach, as in the case of (Biase and D'Apolito, 2012) in their cross-sectional analysis of Italian banks, will thus help investors to focus on a minimum target for volatility when investing in a portfolio of socks (Hasan, *et al.*, 2012). Eight financial variables of liquidity, leverage, operating competence, profitability, and size of the firm, growth, dividend payout and market value of equity were examined by previous studies (Biase and D'Apolito, 2012; Olib *et al*. (2007; Gu and Kim, 2002; Rowe and Kim, 2010; Lee and Jang, 2006; Beaver *et al*., 1970); and are adapted for this study. The rest of the paper is organized as follows: the next section provides literature on systematic risk and the financial determinants chosen for this study. This is followed by the model design and methodology for this study. The analysis and discussion of results section is then presented and the last section concludes the paper; and with some recommendations.

2.0 LITERATURE REVIEW

The theory of capital asset pricing model (CAPM) (Sharpe, 1964) was based on the precept that identified two types of risks that companies face: systematic risk, (otherwise known as market-wide risk) and individual firm-specific risk (unsystematic risk) (Rowe and Kim, 2010). The systematic risk, measured by beta(β) (Hong and Sarkar, 2007), which faces all firms in the market (industry) and uncontrollable by individual firms represents the influence of the market on a specific stock value (Gu and Kim, 2002). Literature indicated that systematic risk is undiversifiable (Marshall, 2015) and thus it cannot be eliminated by any diversification strategy management may adopt. Thus, β reflects the market's evaluation of the level of risk a firm takes on through management decisions (Logue and Merville, 1972). Unsystematic risk, however, is firm-specific risk that could be controlled by individual firms by adopting prudent management decisions regarding firm operations and financial management ((Bansal, and Clelland, 2004; Kim, and Gu, 2003; Vakulchyk, and Protasova, 2017). Empirical reviews generally indicated that this element of the CAPM is of less interest to investors as its impact on stock value is relatively less significant (Murphy, 1990; Blitz, Falkenstein, and Van Vliet, 2015). Consequently, the systematic risk of the CAPM is the relevant factor in determining the required rate of return of an investor (Gu and Kim, 2002). Algebraically, CAPM as developed on the premise that not all risks should affect asset (stock) price (Sharpe, 1964; Lintner, 1965(a), (b)) is represented as:

$$\mathbf{E(R_i) = R_f + \beta_i\,(R_m - R_f)} \qquad \mathbf{(i)}$$

where:

$E(R_i)$ = expected return or cost of equity
R_m = market return
R_f = risk free rate
β_i = systematic risk

Beta (β) indicates how the stock value responds or is sensitive to movements in the market (Lee and Jang, 2006). That is, Beta (β) is a statistical measure of the volatility of a stock versus the overall market. This relationship is algebraically stated as:

$$\mathbf{R_i = \beta_0 + \beta_i R_m + e_i} \qquad \textbf{(ii)}$$

where:

$\mathbf{R_i}$ indicates return of a company that has linear function with market return ($\mathbf{R_m}$) and the disturbances in the market (e_i). Thus, β_i is systematic risk of $_i^{th}$ security, R_i as return from $_i^{th}$ security and R_m is market return. β_i in the above equation is computed by:

$$\beta_i = \frac{\mathbf{Cov}\,(\mathbf{ri},\mathbf{rm})}{\mathbf{Var}(\mathbf{rm})}\textbf{, where:} \qquad \textbf{(iii)}$$

β_i is the market beta of asset *i*
Cov is measure of a stock's return relative to that of the market.
Var is the measure of volatility of an individual stock's price over time
r_m is the average expected rate of return on the market; and
r_i is the expected return on asset *i*

An important probe of Lee and Jang (2006) was whether the Beta derived from historical returns is appropriate to be the true representation of expected return and value of stock. To this, Breen and Lerner (1973) observed that Beta obtained from time series data presents unbiased consequences only, if predicted Beta is stationary. However, Logue and Merville (1972) insisted that predicted Beta, though cannot be observed, is like the true Beta. Hence, we can infer that the predicted Beta is suitable magnitude of systematic risk because it is derived from factors that impacts the firm's decision and policies (Breen and Lerner, 1973; Logue and Merville, 1972).

Even though CAPM presents an important model to determine the required rate of return for investors, it is a product of some critical assumptions (Blitz, Falkenstein, and Van Vliet, 2015; Wei, 1988). These critical issues which were challenged by some earlier authors (Slade and Thille,

1997; Elbannan, 2015; Shanken, 1985) called for extension of the market factor to other likely variables that may affect stock value. As a result, additional palpable assumptions are:

i. Investors make investment decisions based on the expected return and variance of returns and subscribe to the Markowitz method of portfolio diversification; E(R) is based on historical mean of asset return over time (mean-variance analysis)
ii. Investors are rational and risk averse; Accept risk only when returns are high to compensate for.
iii. Investors all invest for the same period of time;
iv. Investors have the same expectations about the expected return, correlations and variance of all assets.
v. There is a risk-free asset and investors can borrow and lend any amount at the risk-free rate;
vi. Capital markets are completely competitive and frictionless. No impediments and costs (Wei, 1988; Merton, 1973)

The assertion that investors are only rewarded for systematic risk (market risk) is re-echoed in Merton (1973; 1975). According to the author, variables that predict stock market returns should act as risk factors that help to price cross-section of ex-post average stock returns. Emanating from the above assumptions are that the first four assertions help investors to make investment decision whilst the last two represent the characteristics of the capital market (Merton, 1973; Shanken, 1985).

2.1 Determinants of undiversifiable risk

Logue and Merville (1972) and other previous authors identified some financial indicators (Kim *et al*., 2002; Gu and Kim, 2002; Lee and Jang, 2006; Hong and Sarkar, 2007; Eldomiat *et al*., 2009;

Rowe and Kim, 2010) that influence management financial policies and hence impact systematic risk of the firm's market stock value (Hasan *et al.,* 2012). Similarly, Iqbal and Shah (2012), from investors' perspective, studied liquidity, leverage, operating efficiency, profitability, dividend payout, firm size, growth, and market value of equity to determine the systematic risk for non-financial firms listed on the Karachi Stock Exchange. Vongphachanh and Ibrahim (2020) used similar approach in their study across six industries in Thailand. This study employs those same eight variables and studies their influence on the market volatility of 14 firms, with full stock market data on the GSE, across multiple sectors from 2016 to 2020. The empirical variables are modeled as:

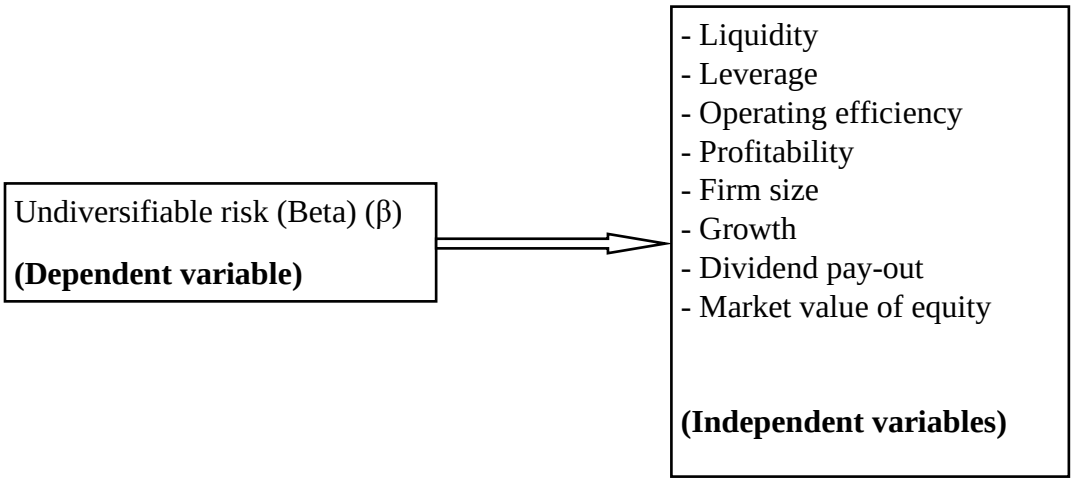

Fig. 1: Modeled variables for the study

Literature on each of these variables thus follows:

2.1.1 Liquidity

Liquidity indicates the financial health of firms. Investors use liquidity indicator as a basic component in making their investment decisions; especially debt investors (Baker and Stein, 2004; Amihud and Mendelson, 2008; Demirgüç-Kunt and Maksimovic, 1999). Linking liquidity to dividend payment, Baker *et al.* (1985) also find that a major determinant of dividend payment was

the anticipated level of future earnings. Alli *et al.* (1993) reveal that dividend payments depend more on cash flows, which reflect the company's ability to pay dividends, than on current earnings, which are less heavily influenced by accounting practices. To this end, Jensen (1984) found positive relationship between systematic risk and firm liquidity. Jensen used the agency costs of free cash flow hypothesis to arrive at his conclusion and posited that when managers have excess cash than is needed to fund viable projects there is an incentive for managers to waste the excess cash on unprofitable investments such as acquisitions. This is the behaviour that increases the firm's systematic risk exposure. However, Logue and Merville (1972); Moyer and Charlfield (1983), among other school of thoughts, argued that systematic risk rather decreases with increases in firm's liquidity position (Gu and Kim, 1998; 2002; Lee and Jang, 2006; Eldomiaty *et al*., 2009). This study subscribes to these latter findings to hypothesize that firm liquidity and the systematic risk of its stock value are inversely related, even in emerging smaller markets.

H_1*: There is inversely relationship between liquidity and Beta.*

2.1.2 **Leverage**

Firm leverage is explained by its capital structure (Modigiliani and Miller, 1958; Bhardwaj, 2018). Any financial policy aims at magnifying returns incentivize management to engage more debt to capital (Amit and Livnat, 1988). Consequently, any adverse market movement makes highly leveraged firms susceptible to financial risk as this tends to magnify their losses instead (Lee and Jang, 2006; Black, 1972). Studies by Gu and Kim (2002) confirmed the findings of Amit and Livnat (1988) which found positive but nonlinear relationship between firm's capital structure and its systematic risk. Mollah *et al.* (2001) examined an emerging market and found a direct relationship between financial leverage and debt-burden level that increases transaction costs. Thus, firms with high leverage ratios have high transaction costs, and are in a weak

position to avoid the cost of external financing. Several other studies maintain that highly levered firms look forward to maintaining their internal cash flow to fulfil duties, instead of distributing available cash to shareholders and protect their creditors (Agrawal and Jayaraman, 1994; Crutchley and Hansen, 1989; Gugler and Yurtoglu, 2003) to pronounce the risk associated with leverage. Similarly, Kim, *et al.* (2002), Lee and Jang (2006), Olib, *et al.,* (2008) and Mnzava (2009) posited positive relationship between leverage and beta. These findings were later confirmed by Hong and Sarkar (2007) who assert beta as increasing function of leverage. The proxy used for leverage is debt-equity ratio, as used by several other studies.

H_2*: Leverage and Beta are positively related.*

2.1.3 **Operating efficiency and firm profitability**

Analysts measure a firm's operating efficiency in terms of how much sales its assets generate in specified period. Known as asset-turnover ratio, the level of operating efficiency therefore depends on quality and quantity of firm's assets and their management (Patin, Rahman and Mustafa, 2020; Sunjoko and Arilyn, 2016). These assertions reflected the findings of Logue and Merville (1972), Scherrer and Mathison (1996) and Gu and Kim (2002) who, with adequate and quality assets, posit that the more sales generated with a given level assets the more profit accrues, and other things being equal, the lesser is the systematic risk of the firm's stock value. Thus, Gu and Kim, (2002; 1998) concluded on negative relationship between operating efficiency and the beta of firm's stock value.

Firm profitability, on the other hand, is a factor that affects the systematic risk of stocks (Banz, 1981). The primary success indicator of any firm is its profitability ratio and profitable firms have high chances of reducing systematic risk (Logue and Merville 1972). Schemer and Mathison, (1996), Gu and Kim, (2002); Lee and Jang (2006) and Rowe and Kim (2010) also shared in the assertion that the relationship between profitability and systematic risk is negative

(Banz, 1981). But, other studies stated otherwise. For instance, Borde, *et al*. (1994) found a positive relationship between profitability and systematic risk in insurance companies and concluded that in finance companies the incentive for higher return demands adoption of credit risk. This assertion is in sync with the theoretical risk-return tradeoff. Profitability (PROF) is the ratio of net profits to the shareholders stake in the company; and ROE has been used in several studies as a proxy for firm profitability.

H_3*: Operating efficiency relates inversely with Beta.*
H_4*: Profitability and Beta are positively related.*

2.1.4 **Firm Size**

Firm size, measured by total assets, was identified by Sullivan (1978) and Olib, *et al.* (2008), to have inverse relationship with systematic risk of a firm's stock value due to the advantages of economies of scale and of scope (Titman and Wessels, 1998). This may arguably be true with both financial and non-financial institutions (Goldin and Vogel, 2010). However, financial institutions with large reserves and other assets can contain short to medium-term shocks in the economy and hence reduce their risk exposure. Several studies including Lloyd et al. (1985) stated firm size to dividend-payout and systematic risk. Their findings support Jensen and Meckling's (1976) argument, that agency costs are associated with firm size. Holder et al. (1998) revealed that larger firms have better access to capital markets and find it easier to raise funds at lower costs, allowing them to pay higher dividends to shareholders. This statement explains a negative relationship between level of market risk and firm size. Firm size is proxied by asset quantity.

H_5: *Firm size is inversely related to Beta.*

2.1.5 **Growth**

The pursuit of excessive growth exposes institutions to higher risk (Goldin and Vogel, 2010), all things being equal. Rapid growth in companies increases systematic risk (Gu and Kim, 2002) and thus beta diminishes growth (Hong and Sarkar, 2007). Roh (2002), confirmed this positive relationship between the need for growth and the required resources to support such level of growth. The author posited that companies pursuing high growth attain their objective by engaging additional resources which need extra financing. The cost of financing the needed resources results in taking a greater risk. Higgins (1981) indicates a direct link between growth and financing needs: rapidly growing firms have external financing needs because working capital needs normally exceed the incremental cash flows from new sales. Growth rate is measured as the growth rate of sales (Lloyd et al., 1985; Holder et al., 1998; Manos, 2003). Thus, growth rate has been identified in this study by Annual Sales Growth. Overall literature portrays a negative as well as a positive relationship between the dependent variable and sales growth.

H_6: *Growth is inversely associated with Beta of firm's stock value.*

2.1.6 Dividend payout

The level of dividend per share is a direct signal to the market and positively impact the market value of a firm's stock (Lonie, Abeyratna, Power and Sinclair, 1996). That is, high dividend payout serves as a signal of good investment and reduces systematic risk because investors become more certain about future inflow of returns on investment; and, capital growth (Logue and Merville, 1972). Dividend studies earns other theories. Another explanation for dividend policy is based on the **transaction cost and residual theory**. This theory indicates that firms incurring large transaction costs will be required to reduce dividend payouts to avoid the costs of external financing (Higgins, 1981; Crutchley and Hansen, 1989; Holder et al., 1998). A

different explanation, which received little consideration prior to the 1980s, relates dividend policy to the effect of agency costs (Lloyd, John, and Daniel 1985). Agency costs, in this case, are costs incurred in monitoring company management to prevent inappropriate behaviour. Large dividend payouts reduce internal cash flows, forcing managers to seek external financing, and thereby, making them liable to capital suppliers, thus, reducing agency costs (Lloyd, 1985; Crutchley and Hansen, 1989; Holder et al., 1998). Others are 'life-cycle' theory (Lease *et al.*, 2000 and Fama and French, 2001), 'catering, theory (Baker and Wurgler, 2004), the 'agency' theory of Jensen and Meckling (1976), 'tax preference' theory (Brennan, 1970; Kalay, 1982; Ambarish, Ramasastry, Kose, and Williams, 1987) and the 'bird in the hand' theory (predating Miller and Modigliani's paper) explains that investors prefer dividends (certain) to retained earnings (less certain): therefore, firms should set a large dividend payout ratio to maximize firm share price (Lintner, 1956). These former studies, including Gu and Kim (2002), thus concluded that dividend payout negatively impacts (Beaver, *et al*., 1970; Breen and Lerven, 1973; Borde, 1998) on systematic risk.

H$_7$: *Dividend payout negatively related with Beta of firm's stock value.*

2.1.7 Market value of equity

Even though studies from Mnzava (2009) showed an insignificant inverse relationship between beta and a firm's stock value, the equity value of a firm depends on the market value of its stock which value is influenced by the systematic risk of its industry or market (Lucas and McDonald, 1990; Baker, Stein and Wurgler, 2003). Theoretically, a higher beta (market risk) increases investors required rate of return and given this, the present value (price) of stock is lower because the investors demand a higher return to compensate them for the additional risk in investing in the particular stock. It can be, therefore, generalized that the level of beta pertaining to a stock directly affects its market value positively or negatively; based on its direction.

H_8: *Market value of equity is inversely related to Beta.*

2.1.8 Theoretical framework and model description

Beta for each firm has been estimated by linear regression equation for five years. Estimated beta is derived by substituting average monthly returns of companies against average monthly returns of market into the following regression equation:

$$Y = \beta_o + \beta_1 x \qquad \text{(iv)}$$

The average monthly returns of the market x is estimated as:

$$\text{Return } (x) = L_n(P_t/P_{t-1}) \qquad \text{(v)}$$

From the regression equation, Y is average monthly returns of company; x is average monthly returns of market while coefficient β_1 is estimated beta on yearly bases.

The panel data used in this study combined effect of times series and cross-sectional data. A common effect model was used to estimate the hypothesis as follows:

$$\beta_{it} = \alpha_0 + \alpha LQ_{it} + \alpha LV_{it} + \alpha OE_{it} + \alpha PROF_{it} + \alpha FS_{it} + \alpha G_{it} + \alpha DP_{it} + \alpha MVEit \qquad \textbf{(vi)}$$

where the independent variables in the model equation and their measurements are defined as:

Variable	**Definition**
α**LQ**	Liquidity
α**LV**	Leverage
α**OE**	Operating efficiency
α**PROF**	Profitability
α**FS**	Firm size
α**G**	Growth
α**DP**	Dividend payout
α**Mve**	Market value

These define the eight financial variables used to determine the systematic risk in this study, and their respective proxies for measurement are in the exhibition 1.

Table 1: Study hypotheses summary

S/N	Variable	Proxy	Expected relationship/Hypotheses
Dependent variable: Undiversifiable (systematic) risk			
	Beta (β)		
1	Liquidity	Quick Ratio = (Current asset – Inventory) / Current liability	Negative
2	Leverage	Debt ratio = Total Debt / Total Assets	Positive
3	Operating efficiency	Asset Turnover = Total revenue / Total Asset	Negative
4	Profitability	Return on Assets = Net income / Total Assets	Positive
5	Firm size	LN (Total Asset)	Negative
6	Growth	Percentage change in earnings before interest and taxes	Negative
7	Dividend payout	Annual dividend payment / Net income	Negative
8	Market value	LN (Market value of equity)	Negative

3.0 Methodology and data collection

This study uses multi-sectoral data on companies listed in the GHSE. Data is obtained from all the non-financial listed companies with full stock market data due to the limited number of listed companies or otherwise the small size of the GHSE. The GHSE presently has 39 listed companies comprising 14 financial institutions and the rest being non-financial institutions. In all, 14 companies across 5 industries with full financial data covering the period of this study were sampled. Data used covered the period from 2016 to 2020 (to ensure at least one business cycle is covered) and was drawn from the SandP Capital IQ (Market Intelligence) website and Microsoft Excel 365 was used in the analysis.

3.1 Descriptive Statistics

The study covers 14 firms across 5 industries. Five years of data spanning 2016 to 2020 was analyzed to determine the relationship between beta and the independent variables. The results from the data indicated a mean beta of 0.26 (Table 1) against the market beta. Given this outcome,

we conclude that the sample firms are collectively less risky relative to the market risk of 1.0. Analysis on the individual variables, except for leverage, operating efficiency and profitability, revealed a standard deviation above all variable mean scores. The range of these variables (max – min values) explain their low standard deviation. The ranges are 120.23 (121.0 – 0.77) for leverage and 3.46 (3.60 – 0.14) and 17.18 (15.08 – [-2.0]) for operating efficiency and profitability respectively. Thus, these results collectively and across industry confirms that the market risk in general is higher than the risk each individual firm is exposed to, based on the mean beta (0.26).

Table 2: Descriptive analysis of data

	LQ	*LV*	*OE*	*PROF*	*FS*	*G*	*DP*	*Mve*	*Beta*
Mean	1.41	59.91	1.25	5.15	1775.42	5.21	2.93	973.85	0.26
Standard Error	0.46	9.70	0.28	1.34	874.59	4.49	1.64	650.03	0.18
Median	0.62	60.50	1.11	5.01	423.98	0.26	0.07	236.27	0.04
Standard Deviation	1.73	36.31	1.04	5.02	3272.41	16.80	6.15	2432.18	0.67
Sample Variance	2.98	1318.32	1.08	25.22	10708692.29	282.26	37.83	5915511.86	0.45
Minimum	0.08	0.77	0.14	-2.00	4.29	-4.35	0.00	10.70	-0.06
Maximum	6.20	121.00	3.60	15.08	9462.80	62.06	17.54	9316.20	2.56
Count	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
Confidence Level(95.0%)	1.00	20.96	0.60	2.90	1889.44	9.70	3.55	1404.30	0.39

Source: Data drawn from S&P Capital IQ on non-Financial listed companies on the GHSE

3.2 Correlation results

The Pearson correlation was used to detect multicollinearity among all variables. The result of 0.760959 between firm size (FS) and market value of equity (MVe) is the highest correlation. This implies that the variables measured have no problem of multicollinearity at correlation value of 0.9 or more. Table 2 shows the correlation among all variables and it indicates that there is no problem of multicollinearity. Similarly, profitability positively correlated with most of the variables, except for liquidity and leverage. A typical observation from the data stream is that all

the firms, except one, made negative returns in 2020; a common result exhibited globally due to the impact of the covid pandemic.

Exhibit 3: Multicollinearity *between the variables and Beta*

	LQ	*LV*	*OE*	*PROF*	*FS*	*G*	*DP*	*MVe*	*5Y Beta*
LQ	1								
LEV	-0.50185	1							
OE	-0.15537	0.21132	1						
PROF	-0.02469	-0.02287	0.190126	1					
FS	-0.23406	0.187848	-0.03557	0.245657	1				
G	0.037612	-0.12302	-0.04483	0.112177	-0.11495	1			
DP	0.030585	-0.31529	-0.05768	0.263227	-0.19161	0.632743	1		
MVe	-0.20838	0.06637	-0.11067	0.5505	0.760959	-0.05969	-0.09876	1	
5Y Beta	-0.13375	0.193463	0.002396	-0.17361	0.671241	-0.13296	-0.15103	0.052782	1

Source: Data drawn from S&P Capital IQ on non-Financial listed companies on the GHSE

3.3 Results of regression analysis

The multiple regression analysis conducted on the eight variables and the beta indicated high R square and Adjusted R values at 0.97 and 0.91 respectively. This implies significant relationship between all the variables and systematic risk; with the adjusted R implying that factors other than examined in this study accounts for only nine per cent. The F-stat is also significant at 0.01. These results simultaneously emphasize the reasonableness of model fitness and also confirm that though there may be other variables that can be included in the model, the current model is sound. Again, the p-values of firm size and market equity value of 0.0005 and 0.0035 are significant in all regards for this study. The outcomes for the other variables however explains insufficiency of data on those variables. This indicates that the GHSE can be described as nascent despite its existence for three decades. The size of the market is very small in terms of numbers and activities and hence there is less stringent regulations resulting in unavailability of full stock market and financial data. Also,

it is the reason why there are large proprietary financial information which deprives access and limits available data.

Table 4: Multiple *Regression analysis*

		Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept		0.129668	0.233826	0.554548	0.608748	-0.519538
LQ	2.72	-0.039802	0.058761	-0.67735	0.535337	-0.202947
LEV	16	-0.000474	0.002099	-0.22565	0.832532	-0.0063
OE	1.14	-0.072709	0.064126	-1.13385	0.320203	-0.250752
PROF	10.14	0.016075	0.019392	0.82898	0.453717	-0.037765
FS	87.06	0.000316	3.2E-05	9.873399	0.00059	0.000227
G	0.51	0.005903	0.016464	0.358503	0.738087	-0.039809
DP	17.54	-0.030120	0.062336	-0.48319	0.654218	-0.203194
MVe	83.59	-0.000335	5.43E-05	-6.16023	0.003524	-0.000485

Source: Data drawn from S&P Capital IQ on non-Financial listed companies on the GHSE
Level of significance at 0.05

Regression and anova: *R^2 0.969405; Adjusted R^2: 0.908216; alpha (α): 0.0088*

4.0 Findings

The first hypothesis of this study is proven by the data in both relationship and in significance. A negative coefficient of 0.0398 and the associated p-value (Table 3) confirms that liquidity is inversely associated with beta. Thus implying that a point increase in liquidity will decrease the systematic risk by 0.0398 points. Lee and Jang (2006) have also found negative coefficient between liquidity and systematic risk (beta) with p-value greater than the critical level. The second and the fourth hypotheses state positive relationship between leverage and beta, and negative correlation between profitability and beta respectively. However, the results indicate a negative coefficient for leverage and a positive coefficient for profitability. In the case of the second hypothesis, an increase in debt will decrease the systematic risk of the firms (Amit and Livnat, 1988). This outcome is in sync with the results of previous studies (Hong and Sarkar, 2007; Kim et al., 2002; Lee and Jang, 2006; Olib, *et al*., 2008; Mnzava, 2009). However, the result is highly

insignificant, given its relative p-value (Table 3). The positive regression co-efficient for profitability confirms the hypothesis that profitability associate positively with beta but the relevant p-value proves that the variable is insignificant for this study. Yet, the results bode well with the conclusions of earlier studies such as Borde, *et al*., (1994); and the result can be associated with the market size and activities which result from the evolving nature of the market. The outcome for the third hypothesis, even though with lower p-value, is similar to the outcome of the first hypothesis. Hence the impact of a change in the operating efficiency variable will be negative for the beta; a result that is consistent with the findings of Gu and Kim (2002). Firm size showed a positive sign which relates well with financial theory and was significant for the study. This means as firm size changes, its beta equally changes. Thus, activities leading to changes in the size of the firm equally impact the systematic risk of the firm. The result for the sixth hypothesis is positive as against the hypothesis that growth has inverse relation with the systematic risk but insignificant. Yet, this outcome agrees with Roh (2002) and Gu and Kim (2002) who also found positive coefficients for growth and they argued that high growth means more resources which demands greater financing need. This will increase leverage and increase systematic risk. The analysis for the study confirms with a negative coefficient for dividend payout. The seventh hypothesis is that dividend payout is inversely associated with systematic risk. The hypothesis is accepted, even though it is less significant. Various previous studies, including Borde, *et al*., (1994) came to the same conclusions in their study. Similarly, the last hypothesis is also accepted as market value of equity inversely related with systematic risk; and the variable being very significant. Per this outcome, if the firms increase or enhance their market value of equity, their systematic risk will decrease by 0.0003 for each point or unit of improvement. Consistent with the

findings of Mnzava (2009), it means if companies enhance their market value of equity it will decrease the systematic risk.

Conclusion

Investors understanding of systematic risk enables them to create a portfolio of investment that will maximize their value. Similarly, a comprehensive grasp of undiversifiable risk factors enables managers to make strategic choices and control financial indicators to reduce the firm's excessive exposure to avoidable risks. This way, value is created to satisfy the optimum objective of upping the bottom-line item and enhancing shareholders' wealth. This study examined the influence of eight financial variables or indicators on a firm's beta. A five-year financial data obtained from the Ghana Stock Exchange was used in the study. Regression model was used to estimate the common effect and the results, except for leverage, firm size and growth, confirmed the hypotheses of the study. Also, four variables: leverage, profitability, growth and dividend payout were detected less significant.

The GHSE is a nascent market with less restrictive regulations resulting in limited data on all the non-financial listed firms. Hence, data for this study was based only on the firms with full stock market data. Notwithstanding this limitation, the study, undoubtedly, provides useful information for investors and firm management alike. This study, unlike the previous studies that focused on individual sectors or industries, includes firms from multiple sectors or industries. Thus, this result sets the paces for future multi-sector analysis with large data on the variables studied by this study; or possibly consider the inclusion of other relevant financial variables.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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