Firm Performance and Systematic Risk

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Abstract

The only security specific parameter in capital asset pricing model is beta which can affect the return on a risky security. We develop a framework applicable to securities to test if the performance of firms can explain the level of their systematic risk. Findings from 203 firms across nine industries form the Indian manufacturing sector for the period of 1998–2014 indicate that profitability causes the systematic risk to decline, while the profit retention ratio is positively related to the risk. The ability of profitability, efficiency and appropriate utilization of funds to predict the firm betas is consistent with previous empirical studies. However, the positive association of profit retention ratio with the risk is an inconsistent outcome as opposed to the relevant finance theory and previous research.

Keywords: systematic risk, firm performance, panel VAR, manufacturing, India

Introduction

The phenomenon of stock returns being a function of firm betas is well documented by capital asset pricing model (CAPM) (Sharp, 1963 & 1964; Lintner, 1965). This risk determines the expected return that investors require from their investment in the firm's stock. Since, the unsystematic risk can be reduced by diversifying the portfolio, the portion of risk that is of concern to investors is the systematic risk. Many firm managers, venture investors and even researchers see today's environment as much more dynamic. The hurdles and problems which firms are facing are diverse. Normative firm performance parameters like growth in sales and asset growth do not focus on decomposition of managerial actions and the results that follow. Nor do they signal the potential cash flow problems that firms may face in future. This leads to spectacular failures when it comes to commercialization of opportunities. Thus, there is a need of a firm theoretical base to establish these relationships. A number of researches have responded to this need (Hong & Sarkar, 2007; Lockwood & Prombutr, 2010; Yao et al., 2011; Li et al., 2012; Koussis & Makrominas, 2015). Various studies have focused on growth related performance measures to address new metric needs. Firm performance measures have captured wide attention of stakeholders and they seek more focus on measures like operating efficiency and profitability as superior measures of firm success. We seek to make a contribution with this effort by filling gaps in this growing literature base. Finance literature (except Lockwood & Prombutr, 2010) has so far neglected the ability of sustainable growth and its components in explaining firm beta. We provide systematic evidence to this issue and this qualifies as our major contribution to the literature. Studying the impact of components of sustainable growth rate on systematic risk in this research provides constructive substantiation that investors may consider this forward looking factor while forming expectations. Our approach can also be useful to practitioners in balancing their operational and financial strategies. Using a same theoretical basis as proposed by Higgins (1977), we decompose sustainable growth as:

$$SGR = RR \times NPM \times ATO \times FL \quad (1)$$

where, RR is the profit retention ratio, NPM is the net profit margin, ATO is asset turnover and FL is financial leverage. Calculations related to these variables have been discussed in the methodology section of this study. Segregating earnings retention ratio and leverage ratio as **decisions** and net profit margin and the asset turnover as the **results,** Higgins (1977) formula offers a comprehensive insight into the process of maintaining equilibrium between sales increase and other financial policies of the firm. The decision components are statements of policy which reflects the outlook that the managers, investors, and lenders have towards firm's risks and prospects. The result components, on the other hand, reflect the result of managerial action, in other words, the operating performance. Of particular interest becomes the fundamental behaviour of the financial ratios used to calculate sustainable growth rate.

We propose and test a risk-based justification for the performance measures that combines different ideas. First, the profitability and earnings retention which are important to a class of shareholders who are influenced by taxation. Second idea constitutes a reassessment of performance indicators in the form of asset turnover and financial leverage. There are numerous reasons that validate our study to re-examine the determinants of beta. Transaction costs restrict the ability of investors to create a 'home-made' payout ratio through dealing in shares (Eatwell et al., 1989). Taxation influences retention ratios in multiple ways. In general, tax on dividends

is higher than that of capital gains. Consequently, higher retentions are favoured due to the lower tax rate and tax deferral benefit of capital gains over dividends. Whether the market valuation of a firm depends on its retention ratio has been a subject of debate. The retention ratio is important in decisions concerning the optimal level of investment and the approach in which this investment is funded. The financing decision has no impact on firms' market value (Miller and Modigliani, 1961). The importance of beta to firm value has encouraged financial researchers to examine the relationship between beta and the firm's financial variables (Borde, 1998). He found the firm's beta correlated positively with its liquidity and growth but negatively with its dividend payout and profitability. Profit is one of the most important performance measures of an enterprise (Momčilović et al., 2015). Lev (1974) provided evidence of a positive relationship between beta and operating leverage. Obreja (2013) in a study that linked operating leverage to both premium and bookleverage premium in stock returns observed that an economically significant operating leverage for value firms and low book-leverage firms results in high equity risk premiums. Jacquier et al., (2010) emphasized on the importance of financial leverage along with the operating leverage.

Risk is regarded as the only relevant aspect in stock pricing within the framework of CAPM (Van Horne, 1998). We follow on Borde's (1998) study on firms' risk determinants. Our findings confirm a negative association of betas and profit margins. Results however indicate that beta relates positively with retention ratio. These findings are in line with Zheng & Kim, (2002) who propose that high efficiency in generating sales revenue helps lower the systematic risk, while excess liquidity tends to increase the risk.

The remainder of the study is structured as follows. The next section offers linkages with the literature. This is followed by econometric methodology and also discusses the regression model used to test the presence of any association and causality between performance indicators and firm betas. The subsequent sections present the empirical findings and discussions including the implications of research and scope of future work. Finally, the paper concludes.

Brief Literature Survey

The association between market betas and a variety of specifications has attracted the attention of researchers for long. The ballooning literature in this field includes a wide range of firm specific (accounting) and macroeconomic variables and their relationship with systematic risk (refer Beaver & Manegold, 1975; Bowman 1979; Hamid et al., 1994; Hong & Sarkar 2007). Fewings (1975) investigated the impact of corporate growth on the risk of common stocks. He found risk as a positive function of growth in the total expected corporate earnings. Contradicting results were brought to front by Bowman (1979), who found no significant relationship between earnings variability, growth, size or dividend policy with systematic risk. Hamid et al., (1994) witnessed no empirical evidence of inter-relationship between growth rate and relative systematic risk of the firms. Among a gamut of variables examined, Rowe & Kim (2010) in their analysis found that only market capitalization has a significant positive impact on the beta. These results were robust across varying time periods of before and after the recession of 2007. Among their other non-significant variables were returns on assets, liabilities as a percentage of assets, asset turnover, quick ratio and EBIT growth rate.

So & Nyerges (1995) described the multicollinearity among variables like dividend payout, leverage and size as the major reason of their insignificant relationship with systematic risk in

a multivariate analysis. Li et al., (2012) in their study on analyzing the relationship between asset growth and future returns found the predictive power of two year asset growth rates to be more than one year asset growth rates. Assets in place were found to be less risky as compared to asset growth options (Berk et al., 1999). This results in asset growth leading to a reduced level of risk to the firms. Lev (1974) provided evidence of a positive relationship between beta and operating leverage. Anthony & Ramesh (1992) attempted to gauge the level of association between sales growth and stock prices. Brick et al., (2014) in their study highlighted a significant influence of systematic risk on sales growth rate estimation. Literature provides evidence that size and book-to-market ratio proxy for systematic risk, and thus affect stock returns (Berk et al., 1999). Gomes et al., (2003) examined the riskiness of growth options in comparison to assets in place. They argued that size and book-to-market were associated with true conditional betas. Conflicting conclusions were arrived at by Fewings (1975) and Myers & Turnbull (1977) regarding the effect of growth on risk as measured by beta. While Fewings (1975) argued in favour of a positive relationship among growth and risk, Myers & Turnbull (1977) exerted on the decreasing beta with an increasing growth rate.

It is not shocking that the results of the studies conducted so far have been succinct. The conclusion that emerges from the literature review is that the theories describing the manner in which systematic risk varies as a result of the basic internal performance indicators of a firm is mostly concentrated to cross sectional studies which lack a time element in their perspective. The contribution of our research to the existing theory is twofold. First, it provides a rationale to the managers who link high performance of a firm to higher levels of returns, but ignore the flip side which enhances the level of risk. Second, a lead-lag relationship between performance indicators and systematic risk signals problems that can arise because of misaligned firm performance with the financial policies.

Table 1: Highlights of review of literature (1957 – 2015) on determinants of betas

Variable	Author	Year	Finding
Growth stocks	Durand, D.	1957	Positive association between growth and risk
Operating leverage	Lev, B.	1974	Positive relationship between risk and operating leverage
Corporate growth (capitalization rate)	Fewings, D.R.	1975	Positive relationship between risk and capitalization rate
Project life, expected cash flows	Myres, S.C., & Turnbull, S.M.	1977	Positive relationship between beta and project life, expected cash flows
Earnings variability, dividend, size (growth)	Bowman, R.G.	1979	No association between earnings variability, dividend and size

Growth in dividends and earnings	Hamid S., Prakas A.J., & Anderson G.A.	1994	Positive relationship between growth in dividends, earnings and risk
Dividend payout, leverage and size	So, J.C., & Nyerges, R.T.	1995	No significant relationship with risk
Financial leverage and uncertain earnings	Chen, F., & Zhang, F.	1998	Positive relationship between financial leverage, uncertain earnings and risk
Asset growth	Berk, J.B., Green, R. C., & Naik, V.	1999	Positive relationship between asset growth and risk
Growth options and assets in place	Gomes, J.F., & Kogan, L., & Zhang, L.	2003	Growth options are more risky/ association of size and book-to-market with betas
Default risk and returns	Vassalou, M., & Xing, Y.	2004	Systematic risk of a firm is pertinent in explaining the spread over the risk free rate of interest
Firm characteristics, growth opportunities & macroeconomic variables	Hong G., & Sarkar, S.	2007	Equity betas are non stationary, volatile and varies across firms and time
Asset growth	Li, EXN., Livdan, D., & Zhang, L.	2009	Ability of systematic risk to explain asset growth
Operating leverage and financial leverage	Jacquier, E., Titman, S., & Yalçin, A.	2010	Positive relationship between operating/ financial leverage and risk
Sustainable growth rate	Lockwood, L., & Prombutr, W.	2010	Sustainable growth effect is negatively associated with risk
Market capitalization	Rowe, T., & Kim, J.	2010	Positive relation between market capitalization and risk
Asset growth and returns	Li, X., Becker, Y., & Rosenfeld, D.	2012	Predictive power of asset growth towards stock returns
Sales growth estimation	Brick, I.E., Chen, H.Y., & Lee, C.W.	2014	Significant influence of systematic risk on sales growth estimation

Return volatility, book-to-market, return on assets, operating and financial leverage	Koussis, N., & Makrominas, M.	2015	Higher beta associated with high volatility, low BE/ME, low ROA, high OL, high FL and large ME

Source: Authors' own compilation. Studies have been compiled in the chronological order to highlight the developments in the area of study of determinants of beta.

Methodology

We incorporate a descriptive as well as a causal research design and attempt to examine the relationship between firm performance and its level of systematic risk. We apply regression analysis on a panel data set of 203 firms in the Indian manufacturing sector listed on the National Stock Exchange (NSE) of India for a period of 1998 to 2014. CMIE's (Centre for Monitoring Indian Economy) database 'Prowess' has been used to extract the information required to calculate the accounting variables used in the study. The firms are considered from nine industries. Manufacturing firms which satisfy the non missing value criteria for the period under examination have been considered to be a part of the sample. Use of financial year closing values has been made to calculate different ratios considered as performance indicators. The firms which have only common equity have been included in the sample (refer Lockwood & Prombutr, 2010). We omit firms with a negative value of book equity in any of the years of our sample period. Book equity for the firms has been defined as book value of common equity plus the previous reserves and surpluses.

Measurement of variables

As a common practice, systematic risk of asset is generally estimated by the market model in which the return of asset is regressed against market return and the regression coefficient beta thus offers an estimation of systematic risk (Berk et al., 1999; Li et al., 2009).
This study estimates the level of systematic risk (β) in the same way as:

$$\beta_{it} = Cov(R_{it},R_{mt})/V(R_{mt}) \quad (2)$$

where, R_{it} is return of stock of firm *i* at time *t* and R_{mt} is the market return for time *t*. Cov and V are the covariance and variance representations respectively.

RR is the profit retention ratio calculated as retained earnings divided by net income, NPM is the net profit margin calculated as net income divided by sales, ATO is asset turnover calculated as sales divided by total assets and FL is financial leverage calculated as total assets divided by book equity.

Regression model

Inclusion of financial data related to firms across different industries over a period of time brings in considerable heterogeneity in the units under consideration. The techniques of panel data estimation can take such heterogeneity explicitly into consideration by allowing for specific variables (refer Gujarati et al., 2013, Basic Econometrics, 5e). To examine the possibility of a causal relationship between beta (β) and accounting measures of firm performance in the form of profit retention ratio, net profit margin, turnover of assets and financial leverage, the regression model takes the following form:

$$BETAit = C + \gamma 1BETAit\text{-}1 + \gamma 2RRit\text{-}1 + \gamma 3NPMit\text{-}1 + \gamma 4ATOit\text{-}1 + \gamma 5FLit\text{-}1 + \mathcal{E}it \quad (3)$$

Empirical Results

We commence our empirical examination by establishing that systematic risk and its linkage with firm's performance is a significant and robust phenomenon. As a starting point of the analysis, table 2 reports the pair-wise correlations of the variables under consideration.

Table 2: Pair-wise correlations of explanatory variables

Correlation coefficient (p-value)	RR	NPM	ATO	FL
RR (b)	1			
NPM	-0.034 (0.050**)	1		
ATO	-0.040 (0.021**)	-0.120 (0.000*)	1	
FL	0.032 (0.070)	-0.085 (0.000*)	0.038 (0.032**)	1

Source: Authors' calculations. * Correlations are significant at the 1% level of significance. ** Correlations are significant at the 5% level of significance.

Bivariate regression specifications

In a test of association between firm betas and performance indicators using bivariate regressions, empirical findings reveal a significant association between beta and all four parameters under consideration. There is a positive association between retention ratio (t-stat 5.906) and financial leverage (t-stat 2.399) with firm betas. However, the results signal an inverse relationship between net profit margin (t-stat -3.476) and turnover of assets (t-stat 4.995) with beta.

Table 3: Bivariate regression specifications for determinants of firm beta

	RR	NPM	ATO	FL
Slope	0.057	-0.153	-0.039	0.002
t-stat	5.906	-3.476	-4.995	2.399
(p-value)	(0.000*)	(0.000*)	(0.000*)	(0.017**)

Source: Authors' calculations. * Values are significant at the 1% level of significance. ** Values are significant at the 5% level of significance.

If the pooled regression effect is found significant, this indicates a significant impact of the variable on the firm beta. However, it is insufficient if the combined impact of these estimators of beta is not considered.

Multivariate regression analysis

To assess how well the determinants of beta provide useful information, the next focus is on the suitability of regression model which is applicable to analyze the determinants closely. Our analogy is based on the results of the F-test and incremental F-test for fixed effect regression model and Hausman test for random effect regression model as shown in table 4. Internal and macroeconomic environment influences the effectiveness of firms' strategic choices (Shama, 1978). The intuition is that firms differ on the basis of micro and macro factors which cause different determinants to have different impact on firm betas. Applicability of fixed effect regression model considers the impact of selected determinants considering significant heterogeneity among firms. The results of the fixed effect model (Ftest) and random effect model (Hausman test) are shown in table 4.

Table 4: Applicability of multivariate model for analyzing the determinants of beta

Dependent Variable	Fixed Effect Model		Random Effect Model	
	F-test	p-value	Hausman Test	p-value
Beta	10.109	0.000*	75.157	0.000*

Source: Authors' calculations. * Values are significant at the 1% level of significance.

The results of fixed effect and random effect models as highlighted in table 4 indicate towards the suitability of fixed effect model for analyzing the determinants of systematic risk. The null hypothesis of Hausman test being that the effects across firms are random stands unaccepted (with p-value < 0.05). The impact of various determinants on firm beta is discussed in succeeding discourse of this study.

Multivariate regression specifications

Thus far, the analysis reports the impact of individual variables on firm beta. We now examine these determinants using a multivariate regression model. We test this impact using pooled as well as fixed effect model (as suggested by results of table 4). All the explanatory variables seem to exert a significant impact on the firm beta as per the results of pooled regression. As evident from the results in table 5, retention ratio (t-stat 5.517) and financial leverage (t-stat 2.118) have a positive impact on the firm beta. However, a negative t-statistic value for net profit margin (-3.737) and asset turnover ratio (-5.296) indicate an inverse relationship with systematic risk.

Table 5: Regression specifications of multivariate regression model

Variable	Expected sign of tstat	Pooled Model		R^2	F-stat (p-value)	Fixed Effe ct Model		R^2	F-stat (p-value)
		Slope	t-stat (p-value)			Slope	t-stat (p-value)		
C	?	0.849	63.297 (0.000*)			0.713	42.629 (0.000*)		
RR	+	0.053	5.517 (0.000*)			0.018	2.218 (0.026**)		
NPM		-0.164	-3.737 (0.000*)	0.024	19.540 (0.000*)	0.030	0.751 (0.453)	0.415	10.507 (0.000*)
ATO		-0.042	-5.296 (0.000*)			0.089	6.863 (0.000*)		
FL	+	0.002	2.118 (0.034**)			-0.001	-0.751 (0.452)		

Source: Authors' calculations. * Values are significant at the 1% level of significance. ** Values are significant at the 5% level of significance.

The results so far support the results of previous studies. Our results support those of Zheng & Kim (2002) who proposed that high efficiency in generating sales revenue (asset turnover in our study) helps lower the systematic risk, while excess liquidity (profit retention ratio) tends to increase the risk. Firms having high financial leverage were found to have higher risk levels by Chen & Zhang (1998). They attribute this to firms being under financial stress. Higher profit margins were however found to be positively associated with risk by Hamid et al., (1994).

Importantly, the pooled regression models ignore the two essential aspects pertinent in panel data framework. First, they ignore the individual (space) dimension i.e. the factors which are

precise to each cross sectional unit (firm in this case) but remain unaffected over time. Secondly, these models do not consider the time dimension which may include factors which are specific to the period in which they take place but not carried across time periods for the selected firms. Thus, these models (pooled regression models) neither distinguish between firms, nor do they talk about the behaviour of beta over the sample period. With this caveat in mind, we make use of fixed effects regression model to further examine this relationship. The results of table 5 provide some definite conclusions too. We document an increase in the explanatory power (R^2) of the model from 2.4 per cent (using pooled regression model) to 41.5 per cent (using fixed effect model). Most of the variation in beta however seems to have been affected by profit retention ratio and turnover of assets. However, in particular, net profit margin and financial leverage, which seemed to significantly impact SGR in the initial pooled regression model, lose their importance. The message from the multivariate analysis is clear.

Panel VAR

We define the optimum lag length which is able to capture the cumulative impact of exogenous time series variable on the endogenous time series variable. There is no concrete directive for determining a suitable lag order. Table 6 highlights the appropriate lags as suggested by Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ). Since, the data used in the study involves financial year end values of the variables under examination; it makes perfect sense to go by the Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) as the market betas being dynamic in nature cannot be assumed to be affected by variables for a very long period of time.

Table 6: Criteria for selecting appropriate lag length

VAR Lag Order Selection Criteria

Endogenous variables: BETA RR NPM ATO FL

Exogenous variables: C

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5601.235	NA	0.001	6.904	6.921	6.910
1	-1700.502	7772.642	5.80e-06	2.131	2.231*	2.168*
2	-1654.344	91.692	5.65e-06	2.105	2.288	2.173
3	-1626.802	54.542	5.63e-06	2.102	2.368	2.201
4	-1606.190	40.690	5.66e-06	2.107	2.456	2.237
5	-1565.180	80.707	5.55e-06	2.088	2.519	2.248
6	-1520.105	88.428	5.41e-06	2.063	2.578	2.254
7	-1488.381	62.041	5.37e-06	2.055	2.652	2.276
8	-1454.038	66.951*	5.31e-06*	2.043*	2.724	2.296

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error AIC: Akaike information criterion
SC: Schwarz information criterion HQ: Hannan-Quinn information criterion

Source: Authors' calculations.

Panel VAR regression specifications

Having found an appropriate lag order, we now examine the co-variation results from the panel VAR estimation using RR, NPM, ATO and FL as endogenous variables. The results of the ARDL model have been reported in table 7. The regression coefficient of profit retention ratio (0.010) and net profit margin (-0.052) with t-statistic being 2.089 and -2.483 respectively is statistically significant in first year lag (p-value of 0.037 and 0.013 respectively). This indicates that firms which have higher profit margins have lower levels of subsequent systematic risk. However, increased retained earnings add to the level of beta.

Table 7: Regression specifications of multivariate causal model

Variable	Slope	t-stat (p-value)	R^2
C	0.084	8.683 (0.000*)	
BETA (-1)	0.910	105.686 (0.000*)	
RR (-1)	0.010	2.089 (0.037**)	
NPM (-1)	-0.052	-2.483 (0.013**)	0.791
ATO (-1)	-0.006	-1.644 (0.100)	
FL (-1)	-0.001	-0.035 (0.972)	

Source: Authors' calculations. * Values are significant at the 1% level of significance. ** Values are significant at the 5% level of significance.

Granger causality test

In an effort to explore the ability of performance to cause variations in risk, we apply Granger Causality Test. Literature provides evidence of two way causality between firm performance and risk. Our results show signs of one way causality between the variables in consideration.

Probability values of VAR Granger causality test are reported in table 8. Profit retention ratio and net profit margins (p-values of 0.037 and 0.013 respectively) are relatively rich in exerting a causal force towards systematic risk of the firms.

Table 8: Results of Granger Causality Test

VAR Granger Causality/ Block Exogeneity Wald Tests			
Dependent variable: BETA			
Excluded	Chi-sq	df	Prob.
RR	4.363	1	0.037**
NPM	6.166	1	0.013**
ATO	2.702	1	0.100
FL	0.001	1	0.972
All	12.867	4	0.012**

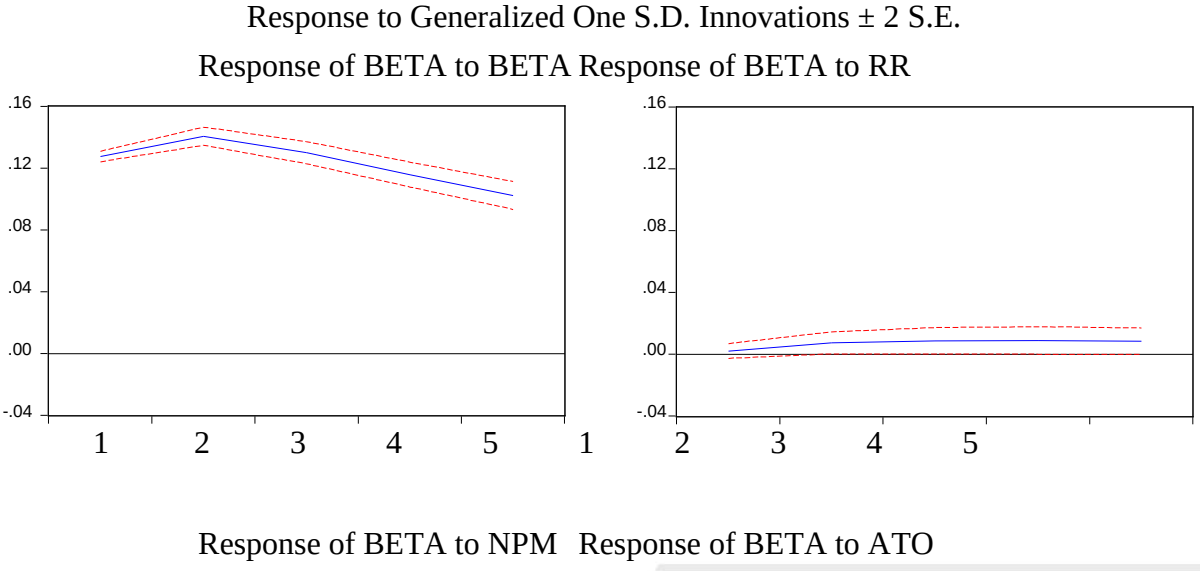
Source: Authors' calculations. ** Values are significant at the 5% level of significance.

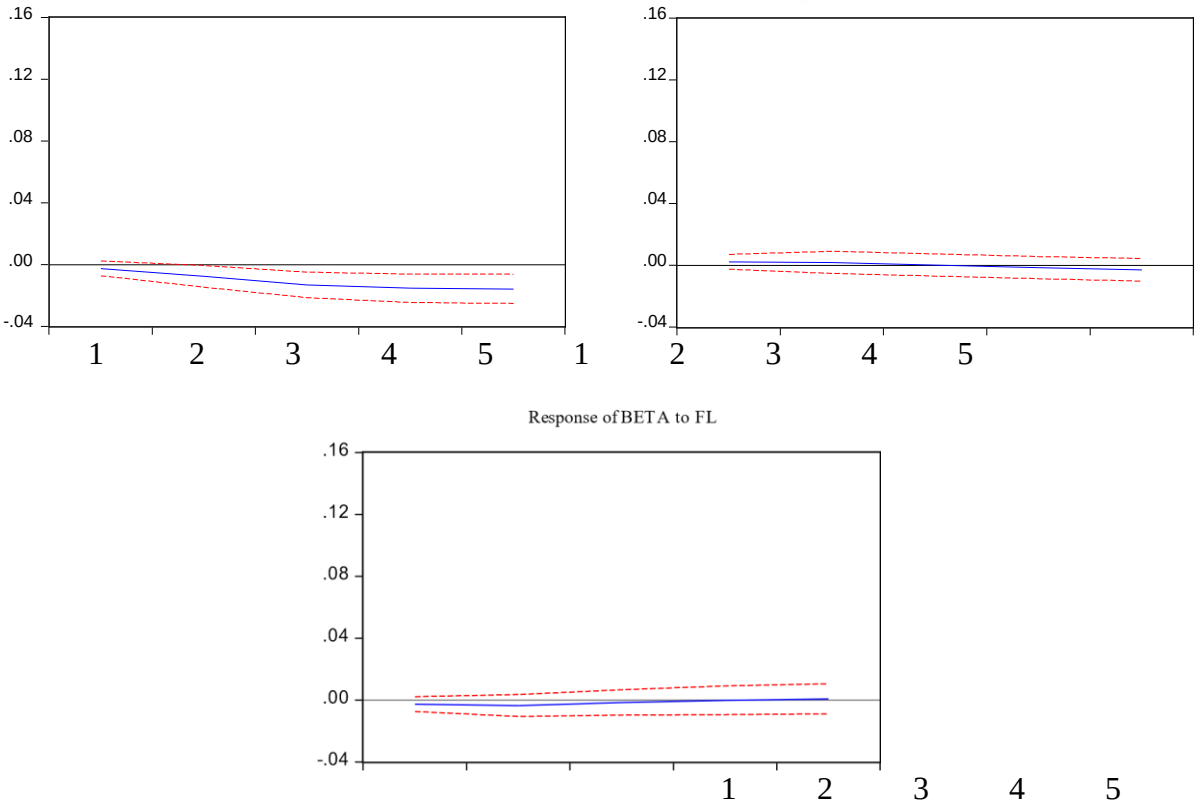
These outcomes seem to provide an additional evidence of the two vital previously documented mechanisms of firm betas. First, firms produce dissimilar risk premia on the basis of performance. Second, the performance measures and the level of systematic risk do not exhibit two way behaviour of among their co-movements.

Impulse response

For the reason that this causal relationship is significant but not outsized, it seems reasonable to explore this relationship further. We test this relationship by way of impulse response function. Undoubtedly, the performance effect is persistent. Interestingly, a unit shock in performance measures does not seem to impact beta considerably.

Figure 1: Impulse response of exogenous variables on firm beta





Source: Depiction based on authors' calculations.

Systematic risk does not seem to be affected by a shock in performance measures. Despite a significant profitability and liquidity effect in the first year lag (table 7), figure 1 shows a feeble ability of shock in performance measures in causing variations in the level of firms' systematic risk. Hence, a priori, performance effect is important. However, we don't find this impact to be completely exclusive.

Impulse response of beta to these variables is however negligible in its magnitude (figure 1). Even though the coefficients of the growth variables used in regression model show empirical significance, it is advisable to read the observations with a precaution. The intuition for these results is straightforward. The stochastic properties of risk are not conclusive (Yao & Gao, 2004). We test this using variance decomposition in the subsequent section.

Variance decomposition

Aside dealing with aptness of the model used and the degree of causality among the variables, we now test if our performance measures have the ability to cause variations in beta in its own sphere of influence.

Table 9: Variance decomposition of firm beta

Variance Decomposition of BETA						
Period	S.E.	BETA	RR	NPM	ATO	FL
1	0.129	100.000	0.000	0.000	0.000	0.000
2	0.191	99.873	0.062	0.050	0.012	0.003
3	0.241	99.724	0.079	0.172	0.023	0.002
4	0.276	99.277	0.130	0.523	0.062	0.008
5	0.300	98.762	0.177	0.912	0.125	0.024

Source: Authors' calculations.

The evidence from variance decomposition of betas propose that in a five lag variation of firm betas, 98.76 per cent of variation has been caused by its own previous values, while performance measures under consideration *viz.* RR, NPM, ATO and FL cause 0.177, 0.912, 0.125, and 0.024 per cent of the variance in the betas respectively. Although there are clear connections, it is notable that firm performance measures do not seem to exert a sizeable impact on the firm beta in the long run. Clearly, the stochastic characteristics of risk are not irrefutable.

Discussion

The predictability literature characterizing performance-risk relationship remains considerably unresolved. We document the existence of a significant performance effect on firms' systematic risk. To support our findings, we explore a battery of tests to include how different performance measures of a firm affect its level of systematic risk. The intuition behind a causal relationship between growth and risk stems from Durand (1957). Our primary belief is that while such causality exists, it is time varying in nature and is also affected by the heterogeneity of cross sectional units. Motivated by Lockwood & Prombutr (2010), we extend the use of performance indicators in defining systematic risk. These measures seem to have a significant correlation with risk.

There has been a momentous development in structural models of cross-sectional differences in risk premia. An interesting enquiry is that if our results hold up to the results of previous studies. It is not surprising to find that higher retentions lead to higher systematic risk. This fetches justification from higher expected returns of the shareholders. Though, this is divergent from Hamid et al., (1994) who reported a positive association of growth in dividends, earnings and risk. In a similar kind of study, So & Nyerges (1995) found no significant relationship of dividend payout, leverage, and size with firm betas. Surprisingly, our results indicate that an important performance measure like asset turnover fails to hold influence in causing firm betas. This is similar to Rowe & Kim (2010) who found no significant impact of asset turnover on risk. They proposed firm size as only significant variable affecting risk. Positive association between financial leverage and risk was reported by Chen & Zhang (1998). However, our results indicate towards no significant impact of financial leverage on firm beta.

Our findings suggest various practical implications. On the firm level, it can be expected that higher retained earnings associated with an opportunity costs of the investors will increase stock riskiness. Hence, the cut-off rate (the cost of capital) to be used for investment decisions should accommodate for the increased risk. The current cost of capital if used as the cut-off rate would probably decrease stock prices, thus obstructing shareholders' wealth. On the investor level, our findings support in the estimation of stocks' risk with expected changes in

the firm's income level and its retained earnings, thus reflecting its growth opportunities. Particularly, we suggest that, if a firm experiences a significant earnings change, the estimation of risk measures based completely on historical returns become inappropriate. Integration of the current study with other asset pricing theories (discussing growth effect) should provide better insights. Thus, this qualifies as a scope of future investigations in this field.

Conclusion

The phenomenon of systematic risk is well appreciated in finance texts. However, there has been far less progress in examining a causal relationship between firm performance and its systematic risk. We show a promising role of earnings in defining firm betas. The message from multivariate regression results is apparent. Clearly, higher earnings lead to reduced levels of systematic risk. However, retained earnings add to the risk of the investors. Regression specifications, though significant, are not outsized. However, the empirical success motivates us to examine this relationship further. Does fluctuations in performance indicators cause beta to fluctuate? We consider this question by allowing for simultaneous shocks in performance measures and analyzing the impact on firm beta. Impulse response of beta to shocks in exogenous variables is feeble. Nonetheless, our main test variable of firm performance, net profit margin seems to exert a noticeable impact on firm beta in the first order lags. Retained profits though considered better by a generation of managers are a reason of concern and demand efficient usage.

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