

The Impact of Idiosyncratic Risk and Macroeconomic Uncertainty on Firms' Leverage and Investment: Evidence from the Different Industries of Pakistan

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Abstract

The main purpose of this study is to empirically examine the impact of idiosyncratic risk and macroeconomic uncertainty on firm leverage and investment. The analysis is carried out for a large panel data which is obtained from different industries of Pakistan comprising textile, auto and allied, cement, fuel and energy and sugar over the period of 2008-2018. Our investigation provides evidence that firm use less debt during periods of high risk. It also shows that as macroeconomic uncertainty and idiosyncratic risk increases, firms reduce their degrees of leverage. This study shows that idiosyncratic risk has an indirect and statistically significant effect on the Pakistan target firms' leverage. However, highly profitable firms' leverage is more sensitive to macroeconomic uncertainty and less sensitive to idiosyncratic risk. The result related to firm characteristics suggests that the firm specific variables such as firm size, tangibility, debt to asset ratio, growth of sales and cash flow to assets ratio are important in the determination of different firms' investment. The finding also reveals that firm's investment is more sensitive during periods of heightened firm idiosyncratic risk. The outcome of the paper is useful for firms' investment decision and authorities in designing of effective fiscal and monetary policies.

Keywords: Cash Flow, Idiosyncratic Risk, Investment, Leverage, Macroeconomic Uncertainty

Introduction

There are several earlier researches that have primarily paid attention that in which situations risk is concerned with earnings of companies that then ultimately impact the decisions of firms related to leverage. On the contrary, researches, for example, Alfaro, Bloom, and Lin (2016), Bartram, Brown, and Stulz (2016), and Bartram, Brown, and Stulz (2018), have mainly investigated the decisions about security issuance while taking into consideration the business cycle and to a certain extent the impacts of risk concerned with the whole position of the financial system. For that reason, it is not investigated that if idiosyncratic risk and macroeconomic uncertainty creates impact on the alteration of leverage of firms or capacity of firms to bring into play funds generated internally, that is retained earnings, equity financing and debt borrowing. There is lack of research on the extent and nature of effect that idiosyncratic and macroeconomic uncertainties cause on the leverage and investment decisions of private limited firms of industrial sector of Pakistan. Although, the private firms react significantly to these types of risk in terms of investment and leverage but still the scarcity of research in this regard make this problem prominent (Baum, Stephan, & Talavera, 2009; Caglayan & Rashid, 2014; Rashid, 2011, 2016; Rashid & Saeed, 2017). The current study has fulfilled that gap in the research by considered and analyzing these both types of risk in terms of their effect on private limited firms' leverage and investment.

The problem and gap identified in the problem statement has been addressed and fulfilled by current research work by working on following research objectives:

- To analyze the influence of idiosyncratic risk on investment and leverage of private limited firms of industrial sector of Pakistan
- To investigate the impact of macroeconomic uncertainties on investment and leverage of private limited firms of industrial sector of Pakistan
- To recognize that which industry of Pakistan is more sensitive to risk

Literature Review

Macroeconomic Risks

Exchange of currency of one country for any other country is known as the “Exchange rate”. It influences the macroeconomic factors such as foreign direct investment (FDI), inflow of money, inflation as well as business trade. Financiers and firms of one nation of non-financial assets in another nation buy the foreign direct investment (FDI) (Boateng, Hua, Nisar, & Wu, 2015; Lindström & Sten, 2018; ullah Khan, Sultan, & Rehman, 2017). ullah Khan et al. (2017) found out that exchange rate (ER) as a measure of foreign direct investment (FDI) has a direct effect on the inflows of foreign direct investment (FDI) for both the short term as well as and long term. Nasir (2016) demonstrated a direct linkage among exchange rate (ER) and foreign direct investment (FDI) of Pakistan and this direct association measured a good symbol for economy that foreign direct investment (FDI) raises because of the appreciation in rupee and financiers anticipate greater rate of returns (ROR). The study in Pakistan has showed that exchange rate (ER) volatility and inflation are negatively associated with foreign direct investment (FDI). Therefore, it has been observed that strategy makers in Pakistan need to follow the macroeconomic control and exchange rate (ER) in the nation (Sajid, Sohail, Manzoor, & Mushtaq, 2016).

Firm Leverage

Firm leverage has been examined in previous studies in a different way. One method is to determine the sensitivity of a corporation’s revenues for each share to a modification in its functioning earnings (Giroud & Mueller, 2015). Consequently, corporation’s working earning sought to directly rise when latest debt investment is gained. This is due to the fact that latest fiscal costs linked with novel debt investment are required to be remunerated by the further working earnings originating from the utilization of latest debt investment (Mai, 2016). Otherwise, critical working revenue impacts the corporation’s subsistence and risk. In general, the corporation’s uncertainty is able to be separated into the operating risk as well as fiscal risk. The inconsistency of revenues for each share is because of the utilization of debt investment is known as the fiscal risk or fiscal uncertainty. Mohohlo and Hall (2018) have described that modification in the structure of the capital impacts the operating leverage as well as fiscal leverage when relations occur. The fiscal leverage and operating leverage are able to move above or move downward with debts relying upon the extent of the debt suppleness of actual capital and payment edge.

Fiscal leverage, Firm size and Firm profitability

The fiscal leverage is indirectly associated to the fiscal performance. Prominently, it appears that inconsistency of the corporation’s profitability significantly and inversely linked with the fiscal leverage Elangkumaran and Nimalathan (2013). The tradeoff theory states that huge corporations are inclined to obtain more debts as the organizations are more diversified and less vulnerable to insolvency (Ahmadimousaab, Bajuri, Jahanzeb, Karami, & Rehman, 2013). Corporation size directly links to the firm leverage. On the other hand, the pecking order theory states that the size of the corporation is inversely linked with the debt capital proportion as huge corporations have a strict

concern of data irregularity. Therefore, huge corporations are inclined to get lower debt due to their capability to issue data sensitive protections. It has been identified that there are no constant results on this subject in the research (Ahmadimousaab et al., 2013). Research showed that an organization with a greater degree of fiscal leverage has lower uncertainty in ROE (return on equity) and share rates altered in contrast to the organizations with a lesser degree of fiscal leverage. It represents that the association between fiscal leverage and volatility in return on equity (ROE) and share rates variation is inverse.

Macroeconomic Uncertainty and Firm Leverage

Rossi, Sekhposyan, and Soupre (2016) have highlighted a vital aspect that may describe repeatedly conflicting outcomes on this matter. It was observed that fiscally restrained corporations respond in a different way to uncertainty than unrestrained corporations. Since exogenous proxies for choice mainly stays an experimental concern.

In this research setting, added uncertainty ought to worsen the examining issue for example with higher uncertainty it is supposed to be more difficult to differentiate among the administrator's awful fate and awful performance. On the other hand, macroeconomic uncertainty also impacts a corporation's capability to borrow, and badly governed corporations with greater leverage are more probable to be credit restricted (da Silva, 2018). There is an irresistible support that greatly leveraged corporations are more probable to be credit restricted in times of greater macroeconomic risks. It has been considered in a study that badly operated corporations are further greatly leveraged. Economic insight states that in more risky time periods these corporations are inclined to boost debt investment with lesser cost comparative to the corporations with higher leverage (da Silva, 2018).

Firm Leverage and Firm-Specific Risk

Many scholars debate that greater industry risk as evaluated by a rise in the volatility of cash flows increases the likelihood of insolvency (Chugh, 2016). An additional study states that industry risk might decrease the organization cost of debt provoking administration of the firm to utilize higher debt in their investment structure (Chugh, 2016). The relationship between industry specific volatility and leverage is frail or totally absent. Alves and Francisco (2015) have offered a particular duration framework in order to demonstrate that there is an indirect relationship amongst a corporation's macroeconomic debt and revenues volatility. Consequently, Le (2017) has documented a negative linkage amongst the firm leverage and earnings volatility. Cassar and Holmes (2003) have reported a study of a negative but poor impact of functioning risk proxy by changes in income flows on firm leverage for little and average sized Australian corporations.

Firm Leverage, macroeconomic uncertainty and corporation

Many researchers have considered the importance of firm-specific characteristics as a determinant of firms' choice of financial leverage (Havakimian, Opler, & Titman, 2001; Titman & Wessels, 1988). Recently, increasing scrutiny has been focused on agency cost related explanations for firms' capital structure decisions. Some of these studies make a strong case that the macroeconomic environment within which firms operate could be an equally important determinant of their financing decision (B. Bernanke, Gertler, & Gilchrist, 1994; Choe, Masulis, & Nanda, 1993). (B. S. Bernanke & Gertler, 1995) also provide a very extensive discussion of the impact of monetary policy on the cost of borrowing. Organizations costs are not visible; however, it might be likely to examine the standard of firm leverage in a hedonic way by viewing a figure of corporation traits.

Methodology

With the positivism philosophy, deductive approach was used to analyze the data. In this study quantitative method was used to study the effect of idiosyncratic and macroeconomic uncertainties on firms' investment and leverage. The time series data from period of 2008 to 2018 has

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been collected from the five industries of Pakistan that are Textile, Sugar, Fuel & energy, Auto & Allied and Cement industries. The panel data was collected from these industries to get information about their investment activities and their leverage as well as risks faced by them.

Following regression equations have been tested through current study:

$$LEVERAGE_{it} = \beta_0 + \beta_1 \delta_t^{ER} + \beta_2 \delta_{it}^{Sales} + \beta_3 Tangibility_{it} + \beta_4 Size_{it} + \beta_5 Cash\ holdings_{it} + \beta_6 Profitability_{it} + \mu_{it}$$

$$GE_{it} = \beta_0 + \beta_1 \delta_t^{ER} + \beta_2 \delta_{it}^{Sales} + \beta_3 Tangibility_{it} + \beta_4 Size_{it} + \beta_5 Cash\ holdings_{it} + \beta_6 Profitability_{it} + \mu_{it}$$

$$INVESTMENT_{it} = \beta_0 + \beta_1 \delta_t^{ER} + \beta_2 \delta_{it}^{Sales} + \beta_3 Tangibility_{it} + \beta_4 Size_{it} + \beta_5 Cash\ holdings_{it} + \beta_6 Profitability_{it} + \mu_{it}$$

$$T_{it} = \beta_0 + \beta_1 \delta_t^{ER} + \beta_2 \delta_{it}^{Sales} + \beta_3 Tangibility_{it} + \beta_4 Size_{it} + \beta_5 Cash\ holdings_{it} + \beta_6 Profitability_{it} + \mu_{it}$$

Table 1. Measures against Variables

Variable	Measure
Cash flow volatility	Cash to asset ratio
Sales volatility	Growth of sales (determined by sales to total asset ratio)
Firm size	Logarithm of total assets
Profitability	EBIT/ book value of assets
Tangibility	Net plants, property & equipment/book value of assets
Cash holdings	Cash from balance sheet
Investment to total asset ratio	Investment/total asset
Leverage	Book value of debt/book value of asset

In this model leverage_{it} and Investment are dependent variables; here δ_t^{ER} denotes macroeconomic risk while δ_{it}^{Sales} (Sales Volatility) shows idiosyncratic risk. For idiosyncratic risk variables like tangibility_{it}, firm size_{it}, cash holding_{it} and profitability_{it} are used and for macroeconomics uncertainties we have observed the fluctuations in these variables such as exchange rate_t, interest rate_t, CPI_t and FDI_t.

Results and Discussion

The data collected through secondary resources was put in to analysis through Eviews and different required tests were run in order to get results. In this regard, descriptive analysis, correlation test and regression tests were performed for making the decision about relationship of variables. As far as the descriptive analysis of current study is concerned, the mean, minimum and maximum values were looked for assessing the existence of outlier in the data.

Table 2. Descriptive Statistics

	Inv.	Lev.	Prof.	Sales Vol.	Stock R	Tang.	Int. Rate	F.E. R	F. Size	Cash Hold.	CPI	FDI
Mean	0.01	0.10	0.10	0.29	3782.64	0.92	9.78	94.64	21.78	0.09	169.90	2983.4
Median	0.01	0.03	0.00	0.01	0.83	0.86	9.70	97.00	13.74	0.00	178.00	3165.0
Maximum	0.08	0.87	1.10	13.26	62223.3	1.24	13.80	109.00	80.85	1.10	220.00	3719.0
Minimum	0.00	0.00	0.00	-0.93	-0.99	0.80	5.80	80.00	8.88	0.00	110.00	2099.00
Std. Dev.	0.02	0.19	0.30	1.59	9474.40	0.13	2.95	10.76	18.16	0.30	36.95	479.41
Skewness	2.40	2.45	3.04	6.34	3.56	1.25	-0.12	-0.09	2.2201	3.04	-0.28	-0.49
Kurtosis	8.50	8.90	10.30	47.39	16.86	3.14	1.53	1.38	6.84	10.29	1.63	2.19
Probability	0.000	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
Sum	2.951	22.8	20.84	63.14	832182	201.63	2152.0	20820	4790.8	20.84	37380	656360

	Inv.	Lev.	Prof.	Sales Vol.	Stock R	Tang.	Int. Rate	F.E. R	F. Size	Cash Hold.	CPI	FDI
Sum Sq. Dev.	0.088	7.16	18.60	552.52	1.97	3.80	1900.72	25370.91	72209.14	18.60	298938.2	50335455
Observations	220	220	220	220	220	220	220	220	220	220	220	220

In table 2, it is clear from the results of descriptive statistics that mean values for all variables are normal and no minimum or maximum value is below or beyond the normal range of data. The independent, dependent and control variable were assessed in terms of their normality and it was found that current data is normal. In this model the investment is regressed on the other independent variables.

Table 3. Dependent Variable: Investment

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Sales volatility	-0.00040	0.000160	-2.6667	0.009
Exchange rate	-0.000162	0.000009	-1.540291	0.081
Tangibility	0.005740	0.004471	1.283782	0.2006
Size	0.008847	0.004834	1.830207	0.0686
Cash	0.012778	0.031923	0.400255	0.6894
Profitability	0.009216	0.010079	0.914459	0.3615
C	-0.125622	0.074233	-1.692280	0.0921
R-Squared	0.115	Durbin Watson Stat		1.795
F-statistic	1.811	Prob (F-statistic)		0.103

Result shows that three variables are statistically significant in this model while the rest of the variables are insignificant. The variable Sales Volatility (SV) coefficient is -0.00040 indicates that it has a significant negative impact on the investment i.e. if there is an increase say by a unit in the risk then firm will decrease the investment by 0.0004 unit. The result is consistent with the (Apergis & Payne, 2010). The coefficient value of Firm Size (SIZE) is 0.0088, meaning that it has a positive impact on the investment, and this variable is also statistically significant in this study. More specifically, if firm size increases by a unit the investment will also increase by a 0.0088 unit, which is in line with the study of (Jaraitė-Kažukauskė & Kažukauskas, 2015).

Regression results: Leverage

Table 4 shows the industrial wise results of regression against dependent variable which is Leverage. The first variable which is cash holding indicated that it has negative and significant impact on all of the mentioned industries. The impact on textile is -0.6421 which indicated that if a firm increase one unit of cash holding it will bring 0.64 negative impact on textile. However, the impact on sugar industry is insignificant. Moreover, the cash holding impact is -0.89, -0.08 and -2.10 on cement, auto and energy respectively. The next is cash volatility, the results of cash volatility indicated that in textile industry the relationship between cash volatility and leverage is insignificant, however in cement industry, auto industry and energy industry the relationship between cash volatility and leverage is significant.

The result in similar sector against cash volatility indicated that if a firm increase one unit of cash volatility it will bring 91% positive impact on it leverage. Next industry is auto result shows that cash volatility will bring 27% positive impact whereas energy industry result indicated that cash volatility brings 30% positive impact on its leverage. Furthermore, we can see that macro risk is positively correlated with leverage and results show that if a firm increases a unit, it will bring 41%, 17%, 3% and 20% positive impact on its leverage in the textile, sugar, auto and energy industries

respectively. In conclusion remarks, we can see that results are significant in only textile sector in other sectors all results are insignificant against sale volatility, same as in auto sector the results against tangibility is significant and in remaining sector the results are insignificant. Furthermore, the results of firm size and profitability are almost significant in all industries except in auto industry, where the results of profitability are insignificant. So, the overall results of this model mostly are significant, and we can say that according to Durbin-Watson stat results there is no issue of multicollinearity in any variable.

Table 4. Dependent Variable: Leverage

Variable	Textile	Sugar	Cement	Auto	Energy
Cash Holding	-1.6421*	-1.0428	-0.8989***	-0.0835**	-2.1002**
	(0.9233)	(0.7518)	-0.3235	-0.0394	-0.8097
Cash volatility	5.2413	2.8061	0.9135**	1.2714**	4.3047**
	(12.91)	(1.477)	(0.3928)	(0.6237)	(2.086)
Firm Size	-0.2544**	-0.1182*	-0.1528**	0.0277***	-0.136
	(0.124)	(0.0561)	(0.0736)	(0.0098)	(0.1099)
Macro Risk	0.4119**	0.1797*	0.04	0.0340**	0.2054
	(0.2001)	(0.0728)	(0.121)	(0.0137)	(0.1579)
Profitability	-0.9798*	0.2914**	-0.6766**	-0.0008	-0.1812**
	(0.5608)	(0.3139)	(0.296)	(0.0059)	(0.4819)
Sales Volatility	0.2802*	0.0136	0.0002	0.0001	0.0982
	(0.1402)	(0.0154)	(0.0009)	(0.0001)	(0.0456)
Tangibility	0.0178	-0.0409	0.1053	0.2330***	0.0009
	(0.2299)	(0.0287)	(0.1212)	(0.0654)	(0.002)
C	2.4813	0.7398	-1.4623	-0.6604	3.0551
	(2.2149)	(1.0712)	(1.3337)	(0.1845)	(2.0716)
R-squared	0.3958	0.2513	0.6586	0.4919	0.4477
Durbin-Watson stat	1.8112	2.0631	2.0375	1.9596	1.6271

Standard Errors are given in brackets. * Significant at 10 % level, ** Significant at 5 % level, *** Significant at 1 % level.

Regression Results; Investment

This second dependent variable in this study is investment and the below-mentioned table 5 shows the results of all independent variable against investment. These results are industry wise; we can see that the overall impact of textile industry on investment is 30%, the impact of sugar industry is 56%, cement industry 70%, auto industry 59%, and energy industry has 55% positive impact on investment.

Table 5. Dependent Variable: Investment

Variable	Textile	Sugar	Cement	Auto	Energy
Cash Holding	0.0244	-0.1606	0.2310*	0.0142**	0.0867***
	(0.0474)	(0.0766)	(0.1345)	(0.0067)	(0.0281)
Cash volatility	-0.1259	3.0924*	-0.0358	-0.2795**	-0.4662
	(0.9948)	(9.4775)	(0.7038)	(0.1068)	(0.4199)
Firm Size	0.0047**	-0.0094	0.0796**	0.0005	0.0005

Variable	Textile	Sugar	Cement	Auto	Energy
	(0.0021)	(0.0304)	(0.0306)	(0.0016)	(0.0038)
Macro Risk	-0.0347** (0.0164)	0.0293 (0.0395)	-0.1016* (0.0503)	-0.0036 (0.0023)	-0.0095* (0.0054)
Profitability	0.0707* (0.0418)	-0.3067* (0.1702)	0.1196 (0.1230)	0.0003 (0.0010)	0.0460*** (0.0167)
Sales Volatility	-0.0207* (0.0118)	0.0090** (0.0043)	-0.0001 (0.0004)	-1.40E-05 (2.46E-05)	-3.60E-05 (0.0015)
Tangibility	0.0146 (0.0149)	0.0568*** (0.0156)	-0.0463 (0.0504)	-0.0462*** (0.0112)	4.72E-05 (7.28E-05)
C	0.0889 (0.0884)	-0.2863 (0.5809)	0.7174 (0.5545)	0.0239 (0.0315)	0.0569 (0.0719)
R-squared	0.3020	0.5634	0.7095	0.5958	0.5579
Durbin-Watson stat	2.1834	1.8673	2.1197	1.9047	2.0855

Standard Errors are given in brackets. * Significant at 10 % level, ** Significant at 5 % level, *** Significant at 1 % level.

In depth, we can see that individual impact of all independent variables on investment, for insistence the first independent variable is cash holding which shows that in textile and sugar industry the relationship of cash holding with investment is insignificant. However, in energy industry the relationship between cash holding and investment is significant. The result indicates that cash holding in cement sector has 23% positive impact on investment. This impact in auto sector is .014 and in energy sector this impact is only 8% and this relationship is significant. The next variable is cash volatility which shows that in textile, cement, and in energy industry the relationship of cash volatility and investment is negative but these results are insignificant so we cannot rely on that results. However, in sugar and auto industry, the results of cash volatility are positive and significant which indicated that if a firm in sugar sector increase its cash volatility by one unit it will bring 9% positive impact on investment. The results in auto sector is negative and shows that if a firm in auto sector increase cash volatility by one unit it will bring 27% negative impact. Firm size is significant with investment in textile sector and cement sector and in sugar sector, energy sector, and auto sector the relationship between investment and firm size is insignificant. The macro risk is negative and significant with textile industry against investment which shows that there is a negative and significant relationship between investment and macro risk. The next independent variable is profitability which shows that there is a significant relationship between investment and profitability in textile industry, sugar industry and energy industry. In energy industry this relationship is positive while in sugar sector this relationship is negative. Sale volatility in all industries shows that it has significant and negative impact on investment in textile and positive impact in sugar industry. While in remaining sector the relationship of investment and sale volatility is insignificant. The last variable which is tangibility shows that it has positive relationship with investment in sugar and auto sector. In auto sector this relationship is negative while in sugar sector this relationship is positive. In other remaining sector this relationship is insignificant.

Conclusion

This study has been conducted on the industrial firms of Pakistan in which different sectors having involved different companies were taken for collecting data from their annual reports about risk, leverage and investment. By collecting whole data, it was analyzed through EViews. Therefore,

after getting results from different tests, it can be concluded about the relationship of macro-economic uncertainties with investment that these uncertainties have negative effect on investment. In case of higher rate of variations in the GDP, interest rate, CPI and foreign exchange rate the investors will consider that country's sectors and firms are more sensitive to risk as there will be more uncertainty in the returns of investments which make investors doubtful about their earnings from investment so they do not prefer to invest there where there are more uncertainties in economy.

The conclusion which can be drawn from the results of macroeconomic uncertainty and investment is that, when uncertainty in macroeconomic indicators enhances then it will give bad impact on leverage as firms will not prefer to get any debt if they will find risk in raising debt due to fluctuations in macroeconomic indicators as debt will make them more unsecure. While the conclusion from the results of idiosyncratic risk with investment revealed that if risk will be high then investment will be low as due to greater risk, people do not prefer to invest in risky areas. It can be concluded from the results of relationship of idiosyncratic risk with leverage that they have positive relationship, if risk will increase then leverage will increase as it makes bank financing more attractive due to high cost of equity capital. Moreover, textile sector of Pakistan is riskier for investors to invest as in accordance with results, it is riskier and sensitive.

Implications

This study has great importance as it helps industries to understand that how they should deal with the economy and its indicators in order to make their investments secure and to handle leverage of their firm in order to make their firm to always have cash in their hand in liquid form. Moreover, this study is also helpful for the industrial firms with the perspective that how idiosyncratic risk should be minimized in order to make investment secure and leverage maintained. Though there is no significant literature to describe the relationship of macro-economic indicators with investment and leverage thus, this study is helpful for future researchers by providing information for respective relationship. It also helps policy makers help in making policies about managing risk and macro economy that how they should invest and where to invest in order to make their investment secure as well as to maintain leverage of their operations.

Limitations and Future Suggestions

This major limitation of this study is the number of fewer companies selected in each sector of Pakistan due to time constraints. More data should be gathered from each sector to know the definite results. For further research it would be interesting to examine the effect of uncertainties on investment behavior of firms that do more expenditure on R& D relative to firms that do not actively engage in R& D. The future researchers can also analyze the cross-country data to compare which country is riskier as managing its economy and risk in an efficient way.

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