

Empirical Analysis of Firm's Risk by their Degree of leverages: Employ at Textile Industry of Pakistan

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ABSTRACT

This paper measures the risk of firms with respect to their degree of total leverage (DTL), degree of operating leverage (DOL) and degree of financial leverage (DFL). This paper is more concerned with the application of proposed relationship found in literature about these theories with the level of risk by taking actual data of companies. Further, prior researchers prove this theory of DTL by using some assumptions and hypothetical data but this research has analyzed actual records of Textile Firms listed at Karachi Stock Exchange to check the durability of the theory. For this, firstly DTL, DOL and DFL of selected companies have been calculated by using their true records. Then, in the following year changes had been analyzed that whether changes occurred according to the same results as predicted by DTL or not. Result suggests that there is more variation in profits (loss) than expected according to their degrees, which shows that on average firms under consideration are riskier. At the end, this study also highlighted some factors which may cause the variation more than expected and make the firms riskier.

INTRODUCTION

It is very obvious that every rational person/investor wants to invest for high returns with minimum risk that is to make his investment safe and best but to find such type encounter with such ideal situation is normally very rare in practical life. Someone have has to choose one situation where he trades off between both risk and returns according to his own understanding. So, to know about that how his or her investment is free of risk, it is needed to measure the level of risk. There are many methods available to measure the risk of the firms but this paper states one out of them that is degree of total leverage (DTL) that is formed by Marion L Huffman in 1983. This paper analyzes the relationship between risk and degree of total leverage by using firm's actual records. In other words objective of this paper is to measure firm's risk through their degree of total leverage and to check out whether it works properly or not as said claimed by the author or researchers, with the help of using actual data of textile firms of Pakistan.

For the sake of analysis, sixteen firms of the textile sector have been selected randomly. Their degree of total leverage (DTL), degree of operating leverage (DOL) and degree of financial leverage (DFL) has have been calculated. The percentage changes in sales, their operating

profits, profit available to the shareholder after taxation has been also recorded on a time basis. In this way this paper checked the theory or concept of degree of leverages as stated by author and other researchers, i.e. DTL measures the change in Earnings per share by resulting from one percent change in Sales. For doing this, degree of leverages have been calculated for one year and considered them as a base year and then in the next year changes have been measured on the basis of actual data by the annual reports of firms. Then according to the absolute value of degree of leverages, changes have been analyzed as it is shown in table 3 and 4. The analysis shows that although changes occurred but it did not match much according to the interpretation of degree of leverages and showed that there is more variability in changes than expected which shows higher risk in firms. Total leverage means the use of overall fixed costs by the firm. One possible consequence caused by the presence of total leverage is that a change in the volume of sales results in a more than proportional change in profit or loss available to common stockholders. So, degree of total leverage measures the sensitivity of a firm's profit to a change in the firm's sales. DTL is simply a product of DOL and DFL, also it can be calculated through percentage change in earnings per share divided by percentage change in sales. Financial leverage basically is the use of fixed financing costs by the firm. It measures the percentage change in a firm's earnings per share (EPS) resulting from a change in operating profit. It can be calculated through percentage change in earnings per share divided by percentage change in earnings before interest and taxes. Degree of operating leverage is the use of fixed operating cost in business. It measures the percentage change in a firm's operating profit resulting from a percent change in sales and can be calculated through percentage change in earnings before interest and taxes divided by percentage change in sales (Horne & Wachowicz, 2005). With respect to its implication level of risk has been observed. Basically, there are two types of risks: business risk and financial risk, the collective of these both risks known as total risk. Business risk refers to the strength of a company's assets if it uses no debt or preferred stock financing. Business risk refers to the uncertainty in the physical operations of the firm. Its impact can be shown by the variability of the firm's operating profit (EBIT). Business risk also refers to the volatile nature of doing business, i.e., the volatility of doing business in the presence of fixed operating costs. As an outcome, it involves the uncertainty of long-term profitability due to the higher portion of fixed costs and financing costs. Financial risk leads to the variability in earnings per share (EPS) and also increases the risk of possible insolvency that is induced by the use of financial leverage. It is placed on the company by common shareholders because they want a higher expected return for assuming any additional risk, which in turn, lifts up the company's costs. Total risk is simply the sum of both risks which leads to variation in overall profits of the firm. So, companies with high degrees of business risk tend to be financed with relatively low amounts of debt and companies with low amounts of business risk can afford to use more debt financing for the sake of keeping total risk at bearable levels.

Textile industry as we all know that have a major contribution to the total exports of the Pakistan as it contributes more than 60 percent to the country's total exports. The industry of textile contributes approximately 46 percent to the total output produced in the country and in Asia Pakistan is 8th largest textile exporter (Ejaz, 2005). Due to such importance textile sector industries have been selected for analysis.

LITERATURE REVIEW

Horne and Wachowicz wrote that DOL is a quantitative measure of the sensitivity of a firm's operating profit to a change in the firm's sales. They said as a firm operates near to its break-even point, the higher will be the absolute value of its DOL. So they said if the value of DOL will be low then the firm will be less risky as they wrote: "DOL magnifies the variability of operating profits and, hence, business risk". They wrote in their book that high value of DFL

leads to financial risk (insolvency risk) and high value of DTL leads toward overall risk of the firm (Horne & Wachowicz, 2005). Moyer et al. discussed the impact of financial leverage on risk. They write that firms employ financial leverage to increase the return to their common stockholders. These increased returns are achieved at the expense of increased risk (Moyer, McGigan, & Kretlow, *Contemporary Financial Management* 11/E, 2009). An extensive study on the theoretical relationship of risk and total leverage has been conducted. Different factors had been used in the relationship between risk and leverage. The relationship between research and development degree of leverage and common stock systematic risk shows that a firm's operating leverage and financial leverage have a strong relation to the R&D leverage level. The said statement can be expressed in the form of a product of DOL and DFL with adjustment of the ratio of 1 plus R&D strength to its gross margin (Lee & Chang, 2006). Henderson et al. wrote about DTL in their article "combined leverage and stock risk" that the degree of combined leverage is considered to be the product of degree of operating leverage and degree of financial leverage of the firm. They conclude that the degree of combined leverage estimated without regard to levels of its operating and financing components, better explains stock risk (Rong-Jen, Glenn, & Henderson, 1991). Medeiros et al. analyzed "the impact of the degree of operating leverage on stock returns: an empirical study in the Brazilian market". They performed empirical tests by using panel-data regressions with no effects, fixed effects, and random effects to test the hypothesis that the degree of operating leverage is one of the factors determining the systematic risk of stocks. Finally, they documented that there is a wide relationship between the degree of operating leverage and systematic risk and stock returns. They said that it is very logical to infer an association between the degree of operating leverage and stock returns based on their calculations (Medeiros, Lustosa, & Dantas, 2006). Richard empirically investigates a complete theoretical model relating the operating characteristics of a firm to the total, systematic, and unsystematic risk of its equity. He concludes that the degree of operating leverage, the ratio of net profits to firm value, and the variability of unit output are all found to be positively correlated with each of the three risk measures. The degree of financial leverage, while positively related to total and unsystematic risk, does not appear to be related to systematic risk. After controlling for the business risk of the firm, no evidence can be found of an interaction between the degree of operating leverage and the degree of financial leverage (Lord, September 1996). Degree of operating leverage is considered as a risk of operations of business; however, degree of financial leverage is taken as an asset or systematic risk of capital structure. Empirical findings have shown the tradeoff between DFL and DOL on organized risk of the firm. Management at its maximum tries to compress the risk of common stock arising out of leverage. A firm's decision on operating leverage often offsets the decision taken on financial leverage. Thus a negative correlation impact is empirical in DFL and DOL (Mandelker & Rhee, 1984). Another study says that two types of leverage explored so far can be combined into an overall measure of leverage called total leverage; types are operating leverage and financial leverage. Degree of operating leverage is concerned with the relationship between sales and operating profits, and financial leverage is concerned with the relationship between profits and earnings per share. Total leverage is therefore concerned with the relationship between sales and earnings per share. Specifically, it is concerned with the sensitivity of earnings to a given change in sales. The degree of total leverage is defined as the percentage change in stockholder earnings for a given change in sales, and it can be calculated by multiplying a company's degree of operating leverage by its degree of financial leverage. Finally, study concludes that operating leverage, financial leverage and total leverage can boost a company's returns, but it increases risk as well (Gerhardinger, 2006).

ANALYSIS AND METHODOLOGY

To know about the DTL and risk of firms actual data has been used. Firstly, I have calculated the degrees of leverage by using the following formula:

$$DTL = EBIT + FC / EBIT - I - (P.D / 1 - t)$$

$$DOL = EBIT + FC / EBIT$$

$$DFL = EBIT / EBIT - I - (P.D / 1 - t)$$

FC = Rent + Salaries + Depreciation + Insurance + Property tax (if any) + Director's and auditor's remuneration + Legal fee

Where, DTL = Degree of total leverage

DOL = Degree of operating leverage

DFL = Degree of financial leverage

EBIT = Earnings before interest and taxes or Operating profit

FC= Fixed Cost

I = Amount of interest paid

P.D= Preferred dividend

T = Tax rate

Fixed cost can be calculated by adding following costs as suggested by (Meigs, Williams, & Haka, July 2002). So, fixed cost can be found by adding Rent, Salaries, Depreciation, Insurance, Property tax (if any), Director's and auditor's remuneration and Legal fee.

After calculating the DTL, DOL, DFL, percentage changes in sales, earnings before interest and taxes and earnings after taxes have been calculated with the help of actual records of firms. Then, the year 2008 has been selected as a base year and according to the data of base year, degrees have been calculated. Then according to the absolute values of degree of total leverage changes has been observed for next year. Results show that the variability in firm's records is more than expected variation which shows a high level of risk in firms. All tables which showing records and changes has been attached in appendices. The result shows that on average firms are ~~more-risky~~ riskier than expected because there is more variation in profits with respect to their sales, or not according to their degree of total leverage. On the other hand, there is also more variation in operating profit with respect to sales, or not according to the degree of operating leverage. Similarly, variation in earnings available to common stockholders also showed different change with respect to operating profit of the firm, or not according to the degree of financial leverage. For example, if we consider our selected firm number one that is Ali Asgher Textile mills limited. The absolute value of degree of total leverage as calculated in table number three is 4.7 which means that Earnings available to common stock holder will change by 4.7 percent by 1 percent change in sales. And in table four we can see that sales ~~has~~ have been changed by 0.04 percent and according to this degree of total leverage, earning available to common stock holders (EACS) should be change by 0.19 percent. But EACS showed 5.87 percent change, which is very different or varied change according to expected. Similarly, absolute value of degree of operating leverage of the same firm as calculated in table number three is 3.96 which means that Earnings before interest and taxes will change by 3.96 percent by 1 percent change in sales. And in table four we can see that sales have been changed by 0.04 percent and according to this degree of operating leverage, EBIT should change by 0.16 percent. But EBIT showed 3.81 percent change, which is very different or varied change according to expected.

Similarly, absolute value of the degree of financial leverage of the same firm as calculated in table number 3 is 1.19 which means that Earnings available to common stockholders will change by 1.19 percent by 1 percent change in EBIT. In table 4 we can see that there is 3.8 percent change in EBIT and Profit showed 5.9 changes, which is also different change than

expected change by DFL, here according to DFL profit should be changed by 4.5 percent but actually changed 5.9 percent. Similarly, in the table four, we can see that sales have been changed by 0.04 percent and according to the degree of operating leverage, EACS should change by 0.05 percent. But EACS showed 5.87 percent change, which is also different change according to expected. So, we can see that there is much variation in operating profits and in profit after taxation than expected. That's why, one can easily conclude that firm is too much risk, and same is the case with average firms.

INFLUENCING FACTORS

Firm's cost structure is a very important component to predict something about the firm's level of risk on the basis of the degree of leverages. For example, a firm with high fixed costs will need to produce a lot on the proficient scale to generate handsome profit, otherwise average costs will be too high that may lead to failure of firms. In the following, there are some factors that have been found by analyzing the records of firms, which showed an influence on the profits and risk of firms during this period. Major factors that influenced the performance of firm are increasing the cost of finance, increasing the cost of production, energy crises which include electricity shortfall, gas shortage and cost faced by using alternate for energy. Lack of investment opportunities, costly imports and restricted exports, increase in prices of raw material and other general factors that are inflation and devalue of currency which leads to a high cost for imports are also some important factors which influence the performance of firms during this period. These mentioned factors are observed as one of the major causes of the higher variation in results than expected.

For example as a consequence of load shedding of electricity and gas the textile production capacity has been reduced by up to 30 percent as said by (Aftab, 2011). The representatives of all textile associations presented their serious concerns about the huge losses being incurred due to electricity load shedding and the instant rise in the Electricity tariff. The load shedding of electricity caused a rapid decrease in production which also reduced the export order. The cost of production has also risen due to an instant increase in electricity tariff. Due to load shedding, some firms used an alternative source of energy like generator which further increases their cost of production. So, it became one cause to more variation in profits as compared to their DTL because this has increased the costs than expected.

Prices of cotton & other raw material used in textile industry fluctuate rapidly in Pakistan. The rapid increase in prices of raw material affected the cost of production badly. Due to increase in the cost of production the demand for export & home has decreased which results to increase in cost.

The cost of production of textile rises due to many reasons as mentioned above, increasing the interest rate, decreasing the value of Pakistani rupee, raw material prices. The increasing interest rate caused a barrier in opening new manufacturing units and also increase the production cost of existing units. The value Pakistani rupee is continuously decreasing which increased the cost of imported raw material. The removal of subsidy and implementation of new taxes from government also increase the cost of production. The instant increase in the cost of electricity also caused an increase in production. The above all reason increased the cost of production of textile industry which leads to higher variation in profits and costs and disturbed the level of risk. So, as a result, profits and sales and costs attached to firms showed very large variation in results than expected by their DTL.

CONCLUSION

On the basis of data available we can conclude that there is more variation in results than expected as it is shown in table three and four. So, there is more variation in profits (operating profit and profit after taxation) with respect to change in their sales as suggested by their DOL, DFL and DTL. It means firms under consideration show high risk and this may be due to the above mentioned factors. An important point has been observed with respect to more variations in results than expected. Because of variation in total cost profits has been changed with much variation with proportion to their sales. Total cost includes both variable cost and fixed cost and as a result of variability in total cost, profit has been declined with sharper percentage than expected. Consequently, changes in profits are more than proportional to their sales as suggested by their degrees of leverage. If fixed cost remains constant over a longer period of time then degree of leverage might be a very good indicator to measure business risk. But in such type of scenario where fixed cost also changes in short span of time along with variable cost, the degree of total leverage, degree of operating leverage, degree of financial leverage may not be the good measure.

Table 1
Sales, fixed cost and EBIT

No.	Co. Name	Sales		Fixed cost	EBIT	
		2009	2008	2008	2009	2008
1	Ali Asghar Textile Mills limited.	505457647	484555008	98945273	-93997484	33452049
2	Ahmad Hassan Textile Mills Ltd.	2736385752	2556339761	269469793	243897409	84652266
3	Azam Textile Mills Ltd.	465215183	456408893	89063570	1559266	35585835
4	Crescent Textile Mills Ltd.	10750512	8844621	1248013	8891159	515470
5	Chakval Spinning Mills Ltd.	989845307	870628096	1372823	4546030	37905430
6	Dewan Khalid Textile mills Ltd.	652200910	12033311851	368312850	-53774727	-16340243
7	D. M. Textile mills Ltd.	549766023	867528912	1922848	-22490276	37195114
8	Dar Es Salaam textile mills Ltd.	850027063	725702932	2134758	-38048269	-39922651
9	Elahi Cotton mills Ltd	139722355	148163333	13584250	-5327026	-3699326
10	Ellcot Spinning mills Ltd.	247535620	1828932219	238153062	185352465	179061775
11	Fateh Textile Mills Ltd.	3050988913	4716081699	987541532	-1541196	333947784
12	Indus Valley cotton Mills Ltd.	13906465	11725851	3185423	1208851	935677
13	Hafiz Textile mills Ltd.	23954100	15291756	5432810	-22534	5023451
14	Idrees Textile Mills Ltd.	751715779	884805318	355183034	152443711	156730473
15	Island Textile mills Ltd.	1245198110	1024956579	124570240	12148775	9195549
16	Ishtiq Textile Mills Ltd.	226351517	531494407	13287415	-20391779	3722306

Table 2
Interest, Proffered dividend and Profit (Loss) after tax

No.	Co. Name	Interest		P. Dividend		EAT (-Loss)	
		2009	2008	2009	2008	2009	2008
1	Ali Asghar Textile Mills limited.	97203634	61372976	0	0	-195599551	40165055
2	Ahmad Hassan Textile Mills Ltd.	243486868	155211056	0	0	-63844582	-86871566
3	Azam Textile Mills Ltd.	30017463	23916763	0	0	-33805057	-23356156
4	Crescent Textile Mills Ltd.	415438	310155	0	0	179020	-61699
5	Chakval Spinning Mills Ltd.	35168028	13372449	0	0	-45194057	10665321
6	Dewan Khalid Textile mills Ltd.	32752631	43352173	0	0	-93931773	-99649490
7	D. M. Textile mills Ltd.	31119348	35202341	0	0	-67519617	-24135040
8	Dar Es Salaam textile mills Ltd.	58842861	45731102	0	0	-103646519	-96433357
9	Elahi Cotton mills Ltd	721479	191803	0	0	-4187651	13861103
10	Ellicot Spinning mills Ltd.	180108142	94675001	0	0	995951	65077099
11	Fateh Textile Mills Ltd.	428825845	390108500	0	0	34026362	8056385
12	Indus Valley cotton Mills Ltd.	1038990	733839	0	0	80210	102838
13	Hafiz Textile mills Ltd.	983100	754231	0	0	6520740	3239025
14	Idrees Textile Mills Ltd.	142607962	90925540	0	0	-5960908	6567390
15	Island Textile mills Ltd.	137145981	56479011	0	0	-111414116	31151257
16	Ishtiq Textile Mills Ltd.	20064190	15361716	0	0	-33123641	-8338882

Table 3
DOL, DFL and DTL

No.	Co. Name	DOL	DFL	DTL
		2008	2008	2008
1	Ali Asghar Textile Mills limited.	3.96	-1.198099512	-4.741866987
2	Ahmad Hassan Textile Mills Ltd.	4.18	-1.199740897	-5.018822729
3	Azam Textile Mills Ltd.	3.50	3.049585691	10.68203238
4	Crescent Textile Mills Ltd.	3.42	2.510630008	8.589158123
5	Chakval Spinning Mills Ltd.	1.04	1.545080478	1.60103874
6	Dewan Khalid Textile mills Ltd.	-21.54	0.273740688	-5.896437614
7	D. M. Textile mills Ltd.	1.05	18.66500299	19.62991369
8	Dar Es Salaam textile mills Ltd.	0.95	0.466093424	0.441170313
9	Elahi Cotton mills Ltd	-2.67	0.950707622	-2.540374272
10	Ellcot Spinning mills Ltd.	2.33	2.121917529	4.944078523
11	Fateh Textile Mills Ltd.	3.96	-5.946287864	-23.53049267
12	Indus Valley cotton Mills Ltd.	4.40	4.635782162	20.41785987
13	Hafiz Textile mills Ltd.	2.08	1.176667166	2.449220467
14	Idrees Textile Mills Ltd.	3.27	2.381743524	7.779257324
15	Island Textile mills Ltd.	14.55	-0.194477067	-2.829018505
16	Ishtiq Textile Mills Ltd.	4.57	-0.319801949	-1.461390311

Table 4
Percentage changes

Sr. No.	Co. Name	Change in Sales%	Change in EBIT%	Change in Profit%
		2008-2009	2008-2009	2008-2009
1	Ali Asghar Textile Mills limited.	0.04	-3.810	-5.870
2	Ahmad Hassan Textile Mills Ltd.	0.07	1.881	0.265
3	Azam Textile Mills Ltd.	0.02	-0.956	-0.447
4	Crescent Textile Mills Ltd.	0.22	16.249	3.902
5	Chakval Spinning Mills Ltd.	0.14	-0.880	-5.237
6	Dewan Khalid Textile mills Ltd.	-0.95	-2.291	0.057
7	D. M. Textile mills Ltd.	-0.37	-1.605	-1.798
8	Dar Es Salaam textile mills Ltd.	0.17	0.047	-0.075
9	Elahi Cotton mills Ltd	-0.06	-0.440	-1.302
10	Ellcot Spinning mills Ltd.	-0.86	0.035	-0.985
11	Fateh Textile Mills Ltd.	-0.35	-1.005	3.224
12	Indus Valley cotton Mills Ltd.	0.19	0.292	-0.220
13	Hafiz Textile mills Ltd.	0.57	-1.004	1.013
14	Idrees Textile Mills Ltd.	-0.15	-0.027	-1.908
15	Island Textile mills Ltd.	0.21	0.321	-4.577
16	Ishtiq Textile Mills Ltd.	-0.57	-6.478	2.972

***All items have been calculated by using the Annual reports of selected firm (2008-2009)**

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