EXPLORING THE ASSOCIATION BETWEEN FINANCIAL DEREGULATION AND LEVERAGE EFFECT IN AN EMERGING MARKET

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Abstract
This paper investigates the association between financial deregulation and the leverage effect in the Pakistan Stock Exchange (PSX). The study aims to explore the relationship between volatility change and stock returns before and after deregulation. The data set in this study covers the period from 2003 to 2016. The hypothesis established in this study is that the leverage effect after financial deregulation is positive and less significant compared to the period without deregulation. The return-risk theoretical relationship is estimated through the model of the return volatility caused by the leverage (Cheung and Ng, 1992; Schwert, 1989; French, et al., 1987; and Christie, 1982). The results show that industry-level leverage has historically seemed high. Therefore, the relationship of stock return to volatility change is consistently significant and negative, thereby, explaining the leverage effect better during the period of non-reforms/regulation. Balancing deregulation with adequate regulatory control and promoting stronger corporate governance is crucial for ensuring the stability and long-term sustainability of the corporate sector.
Keywords: Financial Deregulation, Reforms, Leverage, Volatility, Emerging Market

1. INTRODUCTION

The impact of borrowed funds on a company's risk and profitability is known as the leverage effect. Leverage is frequently utilized in the corporate sector to raise the possible return on equity. Higher leverage does, however, also carry a higher risk of financial difficulty, especially in times of high interest rates or economic slump.

Financial deregulation is relaxing government supervision and regulations in the financial industry. This includes loosening rules and regulations governing stock markets, banks, insurance companies, and other financial institutions. The basic motive of deregulation is to promote economic growth by allowing such institutions to innovate, expand, and offer new products and services freely. Financial deregulation in Pakistan has been a significant component of the country's economic reforms aimed at liberalizing the financial sector. Since the 1990s, the government has implemented various regulations to reduce state control and promote private sector growth.

Leverage significantly predicts risk premium at the firm level (Zimmer, 1990). In principle, both leverage and systemic risk are related. The systematic risk of a leveraged firm is equal to 1 (one) multiplied by the leverage ratio (i.e., debt-to-equity) and the firm's systematic risk in the absence of leverage (Bowman, 1979; Hamada, 1969). Bowman (1979) states categorically that systematic risk, leverage, and accounting beta have a causal connection (covariability between firm accounting earnings and market portfolio accounting earnings). One explanation for the time variation in stock(s) volatility is where changes/variations in leverage took place as an outcome of changes in relative values of stocks as well as bonds. Schwert (1989) argues that a change in the leverage of a company is necessary for a change/variation in the volatility of security returns.

Haugen and Wichern (1975) looked into the relationship between leverage and the relative stability of stock value using actuarial science. They discovered that the length of the debt is significant in analyzing the leverage influence on volatility. The risk of owning shares will fluctuate as the leverage varies over the period because of the issuance of new debt or appears constant, or when the firms make an effort to repay the loan. An established standard for measurement regarding the benefit of debt financing, according to Kane, Marcus, and McDonald (1985), is equal to the variation

in rate(s) of return optimally gained through both types of firms, unlevered, leveraged, along with net of a return premium to account for potential costs of bankruptcy.

The basic motive the study is to explore the leverage effect after financial deregulation in the Pakistan Stock Exchange. The null hypothesis contains that leverage effect in the period of reform and deregulation is positive and less significant. The alternative hypothesis is that leverage effect in the period of non-reform and regulation is negative and significant. The objective of this study is to find the impact of financial deregulation on change in industrial return volatility in the Pakistan Stock Exchange (PSX) from 2003 to 2016. The findings are consistent with Nishat's (2000) conclusion that leverage has historically been high in Pakistan at the industry-level and that has led to a consistently negative and significant link between volatility change and stock return. However, compared to both reform periods, the leverage effect that causes volatility is better understood during the non-reform period.

The paper is arranged as follows: the second section contains a review of the literature. Section 3 consists of the theoretical background, and the data source & methodology are in section 4. Section 5 has the result discussion. The conclusion is in section 6.

2. LITERATURE REVIEW

Cheung and Ng (1992), Christie (1982), and Black (1976) find that equity volatility increases following a decline in stock prices by looking at firm-specific stock prices. Time-varying risk premia and leverage are possible reasons. According to the leverage effect, a company's financial leverage increases as its stock price drops, which raises the volatility of the stock return (Christie, 1982; Black, 1976).

The responsiveness of volatility to the direction of returns is not well captured by leverage alone, as stated by Black (1976), French et al. (1987), and Schwert (1989). According to the leverage effect, a decline in stock value induces the debt-to-equity ratio to increase, which in turn increases future volatility as a gauge of the company's riskiness. The industries with the least amount of leverage, in contrast to most other industries, exhibit a significant positive correlation between changes or variations in volatility and stock return(s).

The findings confirm the hypothesis put forward. Therefore, it is preferable to explain the leverage impact during the non-reform phase as opposed to the reform period. Financial leverage, size, and value exhibit more consistently behaved than the market premium on the PSX, as per the findings of Mirza et al. (2016). Hafeez (2017), Waqar (2014), and Mahmud and Mirza (2011) have all examined the volatile behavior of security prices in Pakistan and found that the Pakistan Stock Exchange reveals the leverage effect.

Various studies conducted at the firm and industry levels have found that leverage affects stock return (Chorro et al., 2017, Gogia, 2012, Chelley-Steeley and Steeley, 2005, Hull, 1999, and Baker, 1973). A number of studies (Baker and Martin, 2011; Dhaliwal et al., 2006; Hamada, 1972; and Bhandari, 1988) show that stock returns increase leverage, while other studies (Wanjala 2012; Korteweg, 2010; Muradoglu and Sivaprasad, 2009; Dimitrov and Jain, 2008; and Penman, at al., 2007) show that stock gains decrease leverage.

Many scholars have found that there is an inverse relationship between leverage and stock returns (Adami, et al., 2010, 2013, George and Hwang, 2010, Penman, et al., 2007, Hou and Robinson, 2006, Ardatti, 1967, and Hall and Weiss, 1967). The short-term negative impact of economic agents in leverage is highlighted by Kalantonis et al. (2021). However, leverage and stock returns are found to be positively correlated (Muradoglu and Sivaprasad, 2012).

3. THEORETICAL BACKGROUND

Leverage theory states that the volatility of a firm's net asset value (which includes both debt and equity) is time-invariant, whereas the volatility of log changes in equity varies over time in response to the firm's debt-to-equity ratio. A company's equity value is reduced (nearly entirely) by a decline in its assets, which increases the unpredictability of any future returns (Christie, 1982).

The fundamental theory of the leverage (effect) states that there must be a negative and significant association between return and volatility for highly leveraged organizations relative to less highly leveraged enterprises. A negative correlation between a firm's stock returns in period t and variations in stock return volatility from period to t+1. The findings provide greater legitimacy to the theory that small enterprises and those with high debt-to-equity ratios are more negatively impacted (Cheung and Ng, 1992).

Leverage is a theory that has been proposed in the literature to explain the time-varying volatility of stock returns. According to Schwert (1989), a change in the firm's leverage will affect how volatile stock returns are. For instance, the variance of firm asset returns impacts the covariance and variance of stock and bond returns. For a firm that has riskless loans, the variance of the assets is time-invariant. The standard deviation (St. Dev.) of returns exhibits a correlation with the leverage's St. Dev. from the prior year, indicating a change or variation in leverage that impacts the volatility of stock returns.

4. DATA AND MODEL FOR LEVERAGE

Theoretically, the leverage effect is captured by increasing return volatility and it is believed that when the stock market is substantially controlled, the relationship between return and change in volatility is strongly negative. The return-risk theoretical relationship is estimated through the model of the return volatility caused by the leverage (Cheung and Ng, 1992; Schwert, 1989; French, et al., 1987; and Christie, 1982). To determine the leverage effect in the non-reform and reform periods, I estimate the following model in accordance with the aforementioned premise.

$$R_{it} = \alpha_i + \beta_i \Delta(\sigma_{it}) + \mu_{it} \qquad (1)$$

Where, R_{it} shows the daily industrial return. $\Delta(\sigma_{it})$ represents the change in return industrial volatility. A significant as well as negative value of coefficient i.e. β_i implies that leverage effect leads to volatility in industrial return(s). The industries included in this study are textile, sugar, cement, chemical, engineering, food products, fuel & energy, glass & ceramics, ICT, paper & board, automobile, pharmaceutical, synthetic & rayon, and miscellaneous. The dataset of fourteen industries is used to explore the leverage effect that has been obtained from the Data Portal of the Pakistan stock exchange and DataStream from 2003 through 2016.

5. RESULT DISCUSSION

Based on the assumption that leverage is the source of volatility in stock returns (Cheung and Ng, 1992; Schwert, 1989; French, et al., 1987; and Christie, 1982), the return-risk relationship is estimated in this study. A Chow test has been used to demonstrate that the relationship determining the leverage produced by variations in return volatility is the same in both the non-reform and reform periods. Given that the Securities Brokers (Licensing & Operations) Regulations, 2016 established a risk disclosure document to manage a variety of risks, including those related to leveraged products and derivatives in the later stages of reform period from 2013 to 2016.

The findings about the relationship between return and change in industry's volatility are indicated in Tables 1 to 3. The relationship between the return and the variation in return volatility (due to the leverage effect) varies significantly between the non-reform and reform periods exhibited by the Chow test in Table 1.

Additionally, there is a noticeable variation in the relationship between returns and leverage-induced volatility shifts throughout the reform and non-reform periods. The results in Table 1 indicate that more than ten industries (more than ¾) out of the fourteen with the highest leverage throughout the study have been identified. This association broadly suggests a significant negative correlation between return and change in volatility.

These results are in line with the real data obtained from various markets. The industry for textile exhibits a negative relationship between return and change in volatility but it is insignificant. However, ICT and the fuel and energy industries show a significant and positive association. The

Chow test findings demonstrate a considerable difference between the reform and non-reform periods through the values of F-statists in Table 1.

Table 1: Leverage Effect for Overall Period from 2003 to 2016

Industries	*a*	*t-stat*	*β*	*t-stat*	Adj.R^2	**F-stat**
Text.	0.009	0.467	-0.001	-1.303	0.000	15.098*
Sug.	0.028	1.437	-0.002	-3.064	0.003	5.388*
Cem.	0.0393	1.178	-0.001	-2.553	0.002	3.105*
Chem.	0.014	0.661	-0.002	-2.765	0.002	4.301*
Engin.	0.020	1.069	-0.008	-6.863	0.015	0.766
Food Prod.	0.047	2.464	-0.002	-20.002	0.118	6.730*
Fuel & Eng.	0.010	0.347	0.006	4.752	0.007	9.762*
Glass & Cera.	-0.029	-0.823	-0.003	-5.385	0.009	5.824*
ICT	0.013	0.364	0.012	6.276	0.013	9.703*
Pap. & Board	-0.042	-1.371	-0.001	-2.763	0.002	11.146*
Auto.	0.035	1.489	-0.004	-4.174	0.005	17.265*
Pharm.	0.026	1.172	-0.017	-7.063	0.016	9.027*
Syn & Rayon	-0.017	-0.718	-0.003	-10.913	0.038	6.701*
Misc.	0.041	0.020	-0.001	-2.367	0.002	11.152*

The Chow test is used to assess the stability of regression coefficients between the reform and non-reform periods. The coefficients of regressions are different in the two time periods, according to the alternative hypothesis. The calculated risk premia are established to be regulated by a different relationship in both reform- and non-reform- periods by the null hypothesis' rejection. The values of F-stat compare periods of both non-reform and reform. *Level of significance at 5 %, ** level of significance at 10%.

Table 2: Leverage Effect for Non-Reform Period from 2003 to 2008

Industries	*a*	*t-stat*	*β*	*t-stat*	Adj.R^2
Text.	-0.082	-3.469	-0.006	-6.041	0.035
Sug.	-0.036	-0.979	-0.002	-3.365	0.010
Cem.	-0.080	-1.274	-0.009	-2.584	0.006
Chem.	-0.068	-1.665	-0.005	-1.432	0.001
Engin.	-0.009	-0.310	-0.008	-5.402	0.028
Food Prod.	0.025	0.821	-0.003	-12.383	0.134
Fuel & Eng.	-0.063	-1.226	-0.003	-1.097	0.000
Glass & Cera.	-0.155	-3.387	0.001	1.044	0.000
ICT	-0.091	-1.312	0.005	1.867	0.002
Pap. & Board	-0.204	-3.913	-0.004	-3.766	0.013
Auto.	-0.124	-3.089	-0.005	-5.194	0.026
Pharm.	-0.105	-2.815	-0.019	-5.163	0.025
Syn & Rayon	-0.114	-2.868	-0.007	-3.854	0.013
Misc.	-0.011	-0.398	-0.007	-5.628	0.030

Table 3: Leverage Effect for Reform Period from 2009 to 2016

Industries	*a*	*t-stat*	*β*	*t-stat*	Adj.R^2
Text.	0.053	2.152	-0.001	-1.010	0.000
Sug.	-0.024	-0.789	0.006	3.904	0.007
Cem.	-0.002	-0.054	0.009	3.651	0.006
Chem.	0.090	3.520	-0.003	-3.947	0.007
Engin.	0.035	1.533	-0.007	-4.332	0.008
Food Prod.	0.072	2.760	-0.001	-5.568	0.015
Fuel & Eng.	-0.098	-2.583	0.012	7.858	0.029
Glass & Cera.	0.125	2.417	-0.003	-4.322	0.009
ICT	-0.263	-5.532	0.035	11.870	0.065
Pap. & Board	0.026	0.677	0.001	1.357	0.000
Auto.	0.074	1.839	0.004	1.427	0.000
Pharm.	0.212	6.336	-0.026	-6.082	0.017
Syn & Rayon	0.090	3.093	-0.006	-14.746	0.098
Misc.	0.084	2.904	-0.001	-1.230	0.000

Table 2 shows that twelve industries out of fourteen (14) industries appear negative in the non-reform period. Two out of these industries including fuel & energy, and chemical appear insignificant. However, ten industries indicate significant relations of return to change/variation in volatility except for the glass and ceramics (GC) and information, communication, and transportation (ICT) industries, which appear with insignificant but positive coefficients in the pre-reform/non-reform period. These findings confirm the alternative hypothesis that the leverage effect in the period of regulation and non-reform is negative and significant.

Nishat (2000) agrees that a significant and inverse association exists between variations in return volatility and return in the Pakistan stock exchange. The negative leverage effect is characterized by rising interest rates, inflation, depreciating exchange rates, and economic instability. This is a result of rising borrowing costs and a declining ability to produce returns high enough to offset those costs. The confluence of these elements poses serious difficulties for Pakistan, where the leverage effect is risky and frequently negative for companies.

Table 3 indicates that eight (8) industries show a negative relationship between change in volatility and return throughout the reform period. Two out of such industries are insignificant and six industries appear significant. However, six (6) industries show a positive relationship between change in volatility and return throughout the reform period. Two out of these industries are insignificant and four industries appear significant indicating that leverage effect in the period of reform and deregulation is positive and less significant. The leverage effect becomes positive, after the introduction of a reform package to the Pakistan Stock Exchange. When there are favorable regulatory policies and better access to foreign capital, leverage can support a company's growth, innovation, and profitability.

6. CONCLUSION

This study examines how the leverage effect in the Pakistani stock market has been impacted by financial deregulation. The objective of the research is to examine the link between changes in volatility and stock returns prior to and following deregulation. The data set utilized for this investigation covers the years 2003 through 2016. According to the hypothesis developed in this study, the leverage effect is positive and less significant after financial deregulation in contrast to the time before financial deregulation. The results support Nishat's (2000) conclusion that there

has historically been a strong negative relationship between volatility change and stock return in Pakistan due to high levels of leverage at the industry level. But in contrast to both reform periods, the non-reform period offers a greater understanding of the leverage effect that causes volatility. This study is crucial for scholars, investors, portfolio managers, and policy officials who want to gain insightfulness while trading and predicting the trends in the Pakistan stock exchange.

Policy Implications and Way Forward

The study's conclusions provide sensible and cogent policy recommendations for investors, academics, security analysts, regulators of the financial industry, legislators, and portfolio managers.

- It is imperative to make sure that financial institutions follow prudent lending standards, especially for highly leveraged corporations.
- Promoting more robust governance practices can help reduce corporate managers' excessive risk-taking.
- By utilizing equity markets to diversify funding sources instead of just relying excessively on debt financing, the risk of corporate over-leverage could be reduced.

The level of integration in the global financial markets has increased. To find accessibility and integration of the financial markets of Pakistan with other foreign markets, especially credit markets, more investigation is needed.

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