

Relationship of Earning Volatility and Capital Structure under Mediating Role of Financial Distress and Moderating Role of Firm Size

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ABSTRACT

The paper examines the mediating role of financial distress and the moderating role of firm size, thus contributing to existing literature by analyzing the impact of impact of earning volatility on capital structure. Panel data analysis of 290 non-financial companies listed on the Pakistan Stock Exchange (PSX) from 2019 to 2024 is conducted. The study finds that the direct impact of earnings volatility on the capital structure is insignificant and that larger firms suffer less financial distress but are more sensitive to earnings volatility. Results from mediation analysis reveal that financial distress fully mediates the relationship between earnings volatility and capital structure and the result of moderation analysis reveals that the effect of earnings volatility on financial distress is limited but significant. Corporal managers will gain a clearer understanding of the relationship between volatility of earnings and financing decisions; investors will be able to better appreciate how likely a firm is to experience an earnings shock; and research findings will be used by policymakers to design regulatory policies that will help to ensure financial stability in uncertain economic times.

Keywords: Earnings volatility, capital structure, firm size, financial distress, mediator, moderating factor, Pakistan stock exchange, decent work, economic growth, industry, innovation and infrastructure.

INTRODUCTION

Financial Firms must adjust their capital structure dynamically to ensure strategic resilience in an environment of rising global economic uncertainty (Albuquerque et al., 2025). The challenges of emerging markets, like Pakistan, are unique, as chronic inflation and political instability can hinder effective financial decision-making and compliance with optimal capital structure (Yaqub et al., 2025). However, recent evidence shows that macroeconomic shocks place a significant constraint on the "speed of adjustment" towards target leverage in such volatile environments (Khan et al., 2025). In addition, companies with fluctuating earnings tend to take defensive stances, preventing them from borrowing too much, which conveys fiscal prudence (Chkir et al., 2025).

The bigger the earnings volatility (EV), the riskier the situation, and lenders will require higher interest rates or may not allow you to borrow as much. As a result, firms with volatile profits tend to decrease the leverage to safeguard their financial standing (Mabandla & Marozva, 2024; Tang et al., 2024). The Trade-Off Theory proposes that debt should be reduced when EV is high, but previous studies have

shown mixed findings, with financial distress (FD) not being always considered as a mediator operational pressure (Khan, 2023). Empirical studies on the impact of these trends on financing in the context of Pakistan are scarce (Naz & Sheikh, 2023).

Based on the findings of this study, it can be inferred that FD is one of the important mediators of EV and leverage. Volatile income leads to financial insecurity and in turn affects borrowing decisions (Ghasemzadeh et al., 2021). According to Pecking Order Theory, in times of distress, firms will use internal funds instead of external funds which are expensive (Myers & Majluf, 1984). However, as per the modern thinking, it is often a 'functional necessity' and firms are not always at their optimum rather are looking for survival liquidity (Dang et al., 2025).

One of the major moderators of this model is firm size. Well-established organizations have more diversified operations and benefit from their reputation, which renders them less susceptible to earnings shocks (Shakri et al., 2025). On the other hand, SMEs are subject to increased information asymmetry and credit constraints (Heller et al., 2025). But when extreme distress arrives, the "protective buffer" of size can disappear with both large and small firms moving towards survival-based financing (Ahmeti et al., 2025).

This research aims to fill a gap in moderated mediation literature by analyzing the non-financial firms of the Pakistan Stock Exchange (PSX) during the years 2019 to 2024. It examines the transmission of EV via FD, and how the size of the firm changes this transmission intensity. In theory, this study fills the gap of classical theories by examining indirect risk influences in a high risk, dynamic economy. From a practical perspective, the results enable corporate executives to make strategic decisions on stable long-term structures and help regulators to promote sustainable financing and transparency (Lopes et al., 2025). Overall, this study offers a timely look at the combined effects of internal corporate risks and structural characteristics on financing decisions during an unprecedented economic downturn.

The study is also helpful for the policy makers and other regulatory agencies like Securities and Exchange Commission of Pakistan (SECP) which is trying to bring financial transparency, good corporate governance, and other means of ensuring the firm attains sustainable financing. In addition, the study can be a guiding light for the investors to decide about risk profile across different size of firms by highlighting the importance of the firm size in variance of financial performance.

LITERATURE REVIEW

Multi-Dimensional Nature of Capital Structure is the optimal balance between debt, equity and hybrid financing that a company needs to acquire funds for its day-to-day operations (Ndruru & Ananda, 2025). This mix is an important corporate decision because this influences the cost of capital and the firm's resistance to financial insolvency. This decision-making process has been traditionally understood through the lens of two dominant theories: Trade-Off Theory and Pecking Order Theory (Myers & Majluf, 1984; Ndruru & Ananda, 2025).

A review of the literature shows that there is a significant theoretical gap: despite rigorous testing of the Trade-Off and Pecking Order theories separately, few studies have analyzed how they work together in emerging markets with high levels of information asymmetry and macroeconomic instability (Brusov & Filatova, 2023). Moreover, the prevailing empirical method has been to investigate the direct link between earnings-related variables and leverage, excluding the operational link—financial distress—via which the effect of income uncertainty is channeled into financing choices (Ndruru & Ananda, 2025). This omission leads to a specification error and understates the impact of distress as the driver of behaviour, and overstates the direct impact of the earnings volatility on capital structure. The study aims to fill this gap by adding financial distress as a formal mediator and as a theoretical basis for the EV→FD pathway, while the

FD→CS pathway is based on Pecking Order Theory, thus creating a theory-rich and data-rich financing decisions under uncertainty model in the context of Pakistan.

The Trade-Off Theory suggests that companies should aim to find a target debt ratio by weighing the tax advantages of debt financing against the financial distress costs (Ndruru & Ananda, 2025). Recent research, however, focuses on the fact that this “balance” is extremely vulnerable to exogenous shocks, and empirical analysis suggests that macroeconomic instability is a major constraint on the speed at which companies can move towards target leverage (Khan et al., 2025). In periods of economic instability, such as during a volatile time frame as in Pakistan, managers might be less certain about interest rates, political dynamics, and other factors, making it more challenging to maintain a steady D/E ratio and potentially leading to more defensive "short-term borrowing" behavior (Yaqub et al., 2025; Shakri et al., 2025).

On the other hand, Pecking Order Theory emphasizes on the asymmetry of information. In this model, firms will have a predetermined order of financing internal financing, debt financing and equity financing, to avoid the negative signal from the stock market (Singh et al., 2025). This is particularly true for SMEs and the emerging economies like India where the lack of transparency suggests that external capital is very costly (Balakrishnan et al., 2014; Chkir et al., 2025). Many of these smaller firms simply do internal equity out of necessity, when there are no established credit markets available. (Lazarus et al., 2024).

Modern studies (Brusov & Filatova, 2023) suggest that these theories are not mutually exclusive, as they can work as a hybrid framework. In the modern view, there are several mediating factors in the capital structure choice: Earnings volatility of firms with unstable profit streams tend to reject high leverage in order to limit the risk of bankruptcy, opting for survival rather than tax minimization (Chkir et al., 2025; Dang et al., 2025). Recent research has validated the fact that a major obstacle to debt-service capacity is high volatility, which leads firms to move away from theoretical optima (Ahmeti et al., 2025).

Secondly, in distressed markets like post-currency flotation Egypt, the quality of corporate governance is a key factor in the firm's ability to handle their debt load. With the strong Governance and Sustainability (G&S) frameworks, firms can now convey stability, reducing the cost of debt even in high-risk environments (Alzaghoul & Alsharari, 2025).

Lastly, larger firms are less constrained by information asymmetry and can more easily access debt financing, whereas smaller firms are stuck with internal funding (Li & Zhao, 2025; Heller et al., 2025). This digital-age flexibility is enhanced by digital transformation, which reduces information gaps, allowing additional dynamism in making capital adjustments (Teo Piau et al., 2025). To sum up, capital structure is viewed as a balance of internal governance and macroeconomic uncertainty.

Capital Structure and Earning Volatility

Earnings volatility (EV), financial distress (FD) and capital structure (CS) relationships are very important in the context of emerging economies. Volatility of earnings is the variability of companies' earnings over time, resulting in a lack of certainty in future liquidity. In general, the higher EV is an indicator of financial fragility and organizations may employ conservative financial policies to mitigate the risk of becoming insolvent (Chkir et al., 2025; Dang et al., 2025). According to current studies, this volatility is one of the key restrictions on debt-service capacity and therefore, to continue these operations, a more conservative approach of leverage should be adopted (Ahmeti et al., 2025).

Empirical evidence has indicated that the link between changes in profit and utilisation of debt is highly sensitive to the economic environment. But in Malaysia and Pakistan, the earnings of the companies are more volatile so they prefer more defensive capital structure. Such businesses are likely to opt for short-term loans or even mobilize internal funds in lieu of long-term loans, to prevent the danger of default (Ahmed & Sulong, 2025; Dang et al., 2025). Recent research on market dynamics indicates that macroeconomic uncertainty further compounds this “flight to quality” and causes firms to steer clear of long-term commitments to ensure financial flexibility (Khan et al., 2025). Some even use a so-called “zero-leverage” financing in times of extreme fluctuations in income, to prevent financial failure (Chkir et al., 2025).

A critical reading of this literature, however, reveals three important limitations that the present study is positioned to address. First, most of the previous literature focuses on the direct link between earnings volatility and capital structure, without considering the operational mechanism by which earnings instability is transformed into actual financing constraints (Chkir et al., 2025; Dang et al., 2025). Second, many empirical designs use pooled OLS or random-effects panel estimators without explicitly controlling for unobserved firm heterogeneity that is correlated with the fixed effects (omitted-variable bias; Baltagi, 2008). Third, the moderating effect of firm size on the EV–distress relationship has only been theorized and rarely empirically tested in formal interaction analysis in emerging-market samples, and therefore the boundary conditions of the volatility–distress–leverage chain remain empirically unconfirmed (Li & Zhao, 2025; Wang & Liu, 2025). To answer these three limitations, the present study adopts a fixed-effects panel design, explicit mediation and moderation testing and a comprehensive sample of non-financial firms in Pakistan.

One of the main conclusions of current research is that financial distress acts as an important mediating variable. Based on Structural Equation Modeling (SEM), earnings volatility does not necessarily lead to direct changes in leverage but causes financial difficulties, which in turn determine future borrowing activities (Ghasemzadeh et al., 2021). The findings from Egypt and Jordan support that profit uncertainty increases feelings of distress, thus limiting access to future capital (Balboula & Shemes, 2025; Alshehadeh et al., 2024). This is in keeping with the “Pecking Order Theory” which suggests that high-risk firms typically fund their operations primarily through internal equity (Myers & Majluf, 1984). Additionally, such a mediation is further strengthened by the quality of institutions, as weak legal protections in emerging markets render external financing of distressed firms too costly (Lopes et al., 2025).

Furthermore, firm size is found to be a key moderator. Larger organizations tend to have higher income resilience as they are more reputable, have better credit market access, and experience less information asymmetry (Shakri et al., 2025). In many instances, this “size advantage” can be further enhanced by a company's level of digitization and maturity: Larger companies can more easily manage their cash flow during the ups and downs of the economy (Teo Piau et al., 2025). On the other hand, Small and Medium Enterprises (SMEs) are more sensitive and can aggressively de-lever if profits get unpredictable (Heller et al., 2025). Recent studies with moderated mediation models suggest that distress alone may not be the only reason behind the negative influence of the earnings shock on a firm's financing decision, as the scale of operation can also play a role in mitigating the effect (Li & Zhao, 2025; Wang & Liu, 2025).

These dynamics are supplemented by institutional structures and industry features. In developing countries, the impact of earnings volatility can be even greater, as regulations are lax and creditor rights are not well protected (Ahmed & Sulong, 2025; Chkir et al., 2025). Recent research indicates that the incorporation of ESG governance can act as a risk mitigation mechanism in such settings, enabling

companies to remain creditworthy amid fluctuations in their profits (Alzeghoul & Alsharari, 2025). As per the industry-specific data, it can be found that manufacturing firms, which are often subject to cyclical income, tend to make use of short-term debt while service-oriented firms tend to finance their long-term investments with their relatively stable cash flows (Balakrishnan et al., 2014).

Based on academic literature, the fluctuation of earnings is one of the most important determinants of corporate debt policy (Ahmed & Sulong, 2025; Chkir et al., 2025). Its impact is predominantly mediated through financial distress (Ghasemzadeh et al., 2021; Balboula & Shemes, 2025) and moderated by firm scale and institutional strength (Shakri et al., 2025; Heller et al., 2025). In emerging markets, managing these variables calls for a delicate equilibrium between holding liquidity buffers and having flexible financing structures to weather fluctuations in profitability (Dang et al., 2025; Myers & Majluf, 1984).

Financial Distress as a Mediator

Financial distress can be interpreted as the incapacity of the entity to fulfill its financial obligations, such as repaying debt or current operating activities. This state is a major factor in the world of corporate finance research, and it has a critical effect on the debt to equity ratio. Based on the literature review, it was found that financial distress is an effective mediator between EV and CS; that is, unstable profit streams are one of the key reasons for financial distress, which in turn affects financing strategies. From the literature analysis it was observed that financial distress is an effective mediator between EV and CS; that is, erratic profit streams are one of the main reasons for financial distress, which in turn impacts financing strategies (Wang, 2025).

Security and insecurities are a serious issue in the emerging economies like Pakistan. The fluctuations of macroeconomic indicators, currency and political changes are common shocks that companies operating in these sectors face, which raises the risk of financial distress (Yaqub et al., 2025). Liquidity of this type of organizations is generally unfavorable, their creditworthiness is low, and their risk of insolvency is high, which compels them to reduce the leverage ratio (Ahmed & Sulong, 2025).

This is confirmed by the results of comparative studies in other emerging markets. For example, studies conducted on Egyptian publicly listed companies after the currency flotation showed that distressed firms tend to be highly debt-intensive to sustain their operations, but this can be eased by sound corporate governance practices (Balboula & Shemes, 2025). On the other hand, there is a cyclical trend in the Jordanian banking sector that when leverage is high, the banks face distress, and this distress reduces the ability of the banks to borrow more (Alshehadeh et al., 2024). These together highlight the fact that capital structure is a determinant of and a result of financial vulnerability.

Further empirical evidence of this mediation is supplied by advanced statistical analyses, including Structural Equation Modeling (SEM). A study conducted on Tehran Stock Exchange-listed companies revealed that profit instability is only indirectly related to leverage through the intermediary variable of financial distress (Ghasemzadeh et al., 2021). Likewise, Malaysian companies with unstable income structure take a defensive financing stance and prefer to finance their operations by using funds from internal reserves or from short-term credit in order to prevent the risk of financial insolvency (Dang et al., 2025). These trends are especially strong in places where creditor protections are weak, where uncertainty of earnings directly limits access to long-term debt (Chkir et al., 2025).

Industry-specific studies indicate that sectors with high-risk and capital requirements, including manufacturing and commodities, are more vulnerable to these mediation effects. Such industries may experience fluctuations in profits, leading to short-term financial hardships and lower debt utilization when

compared to companies with steady income profiles (Balakrishnan et al., 2014; Dang et al., 2025). History also confirms this mechanism: For many years, earnings risk has been known to create financial constraints that stifle borrowing (Titman & Wessels, 1988). The Pecking Order Theory argues that firms will try to use internal funds to reduce the distress risk associated with variability in earnings (Myers & Majluf, 1984; Fama & French, 2002).

A more recent study conducted across the world shows that there are moderated mediation models, which indicate that the effect of distress depends on the size of the firm. Financial distress is a factor that can be found in the path between EV and CS, but this process may not be as pronounced in companies with a larger size because they have better credit ratings and diversified resource bases (Li & Zhao, 2025; Wang & Liu, 2025). Moreover, institutional quality plays a pivotal role; regulatory frameworks and governance practices can either accentuate or buffer the distress effects on debt capacity (Balboula & Shemes, 2025; Alshehadeh et al., 2024). There is a lack of favorable institutional support, particularly for SMEs, where financial distress is a significant determinant in their financing decisions, and the availability of collateral is constrained, as well as a high level of uncertainty in the market, exacerbating the vulnerabilities of these entities (Yaqub et al., 2025; Ahmed & Sulong, 2025).

Financial distress acts as a mediating variable and is a key determinant in capital structure theory (Ghasemzadeh et al., 2021; Wang, 2025). From the oil and gas industry in Malaysia to the manufacturing industry in South Asia (Chkir et al., 2025; Dang et al., 2025; Yaqub et al., 2025), the facts show that profit volatility management is crucial for debt capacity (Ahmed & Sulong, 2025) and long survival of the companies (Myers & Majluf, 1984; Titman & Wessels, 1988).

An important implication of this mediating mechanism, both theoretically and practically, is it remodels the policy problem. There would have been a direct impact of earnings volatility on the capital structure, and the appropriate policy would have been to help firms stabilize their income streams. Notwithstanding this, the point of intervention is then the financial distress itself, that is, the organizational and institutional mechanisms to buffer income shocks from turning into default risk. This has direct implications for the design of regulatory frameworks in Pakistan where weak creditor-protection institutions and shallow capital markets make distress effects of earnings volatility relatively more severe than in the developed-economy benchmarks (Yaqub et al., 2025; Ahmed & Sulong, 2025). Policy instruments that would reduce materially the transmission of income risk into leverage decisions would include increased standards for corporate governance, greater access to committed credit lines, and more comprehensive financial disclosure requirements that would allow a distress early-warning mechanism to operate at the distress mediation stage rather than at the earnings volatility stage.

Firm Size as a Moderator

In this study firm size is one of the underlying elements of financial strategy of firms in general and capital structure in particular. Larger companies tend to be less vulnerable in the financial instability setting because they have better reputation, more access to the international debt markets, more valuable collateral and more diversified operations (Shakri et al., 2025). Smaller companies, on the other hand, may experience more significant information asymmetries and limited access to outside credit, which can lead to greater fluctuations in profits and insolvency risks (Heller et al., 2025). Recent evidence suggests that such a “credit constraint” is often exacerbated by the absence of digital financial integration, which hinders SMEs' capacity to communicate their creditworthiness to formal lenders (Teo Piaw et al., 2025). Therefore, the interaction between firm size and earnings volatility (EV) and financial distress (FD) are found to significantly moderate leverage.

A recent study has clarified the influence of size on the character of financial ties, as a 'boundary property'. For instance, in the manufacturing industry, the financial distress response of large corporations is much less than that of small ones when facing earnings volatility (Li & Zhao, 2025). Such entities can absorb revenue shocks by virtue of their financial resources and banking connections. However, as smaller firms are more likely to be affected by these pressures, they tend to quickly reduce their debt ratio when there is uncertainty about their earnings, whereas larger firms tend to maintain a relatively stable debt ratio (Wang & Liu, 2025). In the field of Economies, empirical analyses indicate that large firms possess a "liquidity buffer" and are able to maintain their target leverage levels when there is high variability in cash flows (Lopes et al., 2025).

But in emerging markets as such as Pakistan, the role of firm size is exacerbated by institutional weakness. Firms with larger size in Pakistan are more likely to maintain leverage when facing macroeconomic uncertainty and fluctuations in profits, as this mitigates information asymmetry (Yaqub et al., 2025). According to the Pecking Order Theory, smaller and less successful companies are pushed to rely on internal funds, as the size of the company determines the company's ability to fill the funding gap from the outside (Ahmed et al., 2020). Evidence from the sugar industry in Pakistan also suggests that bigger sugar mills are able to survive during the recession because of their economies of scale and good governance, while small sugar mills are required to reduce their leverage ratios because of insufficient operational fund (Hussain et al., 2020; Muigai & Muriithi, 2017).

These dynamics are revealed in greater depth through the use of moderated mediation models in global studies. According to the results of the structural equation modeling, the effect of volatility on debt is moderated by financial distress but the impact is weak when the firm size is considered (Ghasemzadeh et al., 2021). Large companies are less affected by fluctuations in profit due to their credibility and resourcefulness (Li & Zhao, 2025). Alzaghoul & Alsharari (2025) have recently found that this buffering is even more pronounced when large companies have strong ESG practices, as it can help preserve investor confidence during earnings shocks. Likewise, firm size and good corporate governance have been found to buffer the negative impact of financial distress on borrowing capacity in European and Egyptian settings (Heller et al., 2025; Balboula & Shemes, 2025; Alshehadeh et al., 2024).

These findings are consistent with agency theory, which suggests that larger companies have lower monitoring and information asymmetry, and this reduces the adverse effects of earnings variability (Jensen & Meckling, 2019). Moreover, large corporations can access a variety of external resources, which enables them to adhere to a more flexible 'pecking order' when the profit shocks are felt. This is consistent with past theories which attribute greater market access to size and minimize financial risk (Bradley et al., 1984; Titman & Wessels, 1988). In sum, empirical studies have supported the idea that volatility of earnings and financial distress are two main determinants of capital structure, but they have also found that the impact of these two factors is always moderated by the size of the firm (Fama & French, 2002).

The moderating force of size is also dependent on industry, seen around the world. Dang et al. (2025) observed that the more oil and gas companies there are in Malaysia, the more they can leverage even though the earnings are fluctuating, and financial pressures are present. These results support those of Ahmeti et al. (2025) who report that firm size is the strongest determinant of a firm's long-term debt financing in high capex sectors during times of volatility. The small firms, however, have been able to significantly cut down on their debts, which is why the buffering effect of firm size is found to be more imperative in the high-risk sectors in particular. Chkir et al. (2025) also found the same results in manufacturing in North Africa, where the reduction in leverage by smaller firms increased with financial distress compared to larger firms.

Finally, summing up the trade-off and pecking order theory in emerging markets like Pakistan reveals that the volatility of earnings leads to increase in financial risk and hence affects the leverage of firms. Financial distress acts as a mediator in relation to earnings volatility (Ghasemzadeh et al., 2021; Dang et al., 2025), while firm size acts as a moderator wherein larger firms can cope with financial shocks relative to weaker ones due to stronger resources and easier access to credit (Khan et al., 2025). Overall, this section highlights that capital structure decision-making is determined by the interaction between firm-specific factors and the market structure, laying the foundation for studying the source of earnings volatility, financial distress, and firm size in Pakistan.

METHODOLOGY

The sample comprises non-financial companies listed on Pakistan stock exchange that have complete, consistent annual financial reports for the period 2019-2024. The final year selected is 2024, as it represents the most recent year for which the audited, and publicly-available financial statements are accessible. This period also highlights the prevailing economic conditions such as post COVID-19 recovery, currency fluctuations, and the shift in economic policies by the government of Pakistan. Firms that are in the financial sector, such as banks, insurance companies, and other financial institutions are not included in the sample.

These institutions operate under a higher level of regulations imposed by the State Bank of Pakistan and comply with industry specific requirements such as capital adequacy; liquidity coverage and reserve requirements which are aligned to international standards. Such firms may create bias in analysis because capital decisions of such firms are heavily regulated, and they are quite different from those of non financial firms and therefore do not enjoy the same discretion in making debt and equity decisions. This period was also chosen to bolster the relevance of the study as it includes COVID-19 Pandemic years (2020-2021) when firms faced significant financial shocks impacting income stability, financing access and debt policy. In order to further attempt to ensure the validity of the results, only those firms that have reported financial data during the course of the study are kept in the final sample. This reduces the number of missing observations in the data set and can help to improve the accuracy, stability and reliability of the statistical results.

Structured modeling framework for testing mediation and moderation effects is also included in the research design. The mediator between the earning volatility and the capital structure is financial distress. To examine whether the magnitude of this indirect effect varies across firms if different sizes, firm size is incorporated as a moderating variable. The adoption of explanatory research design and quantitative panel data analysis technique ensure that the findings of the study would bear strong evidence in the light of financial behavior of the firms operating in the uncertain and dynamic economic environment of Pakistan.

The effects of Earning Volatility (EV) on Capital Structure (CS) via Financial Distress (FD) as a mediator and Firm Size (FS) as a moderator constitute the conceptual framework of this study. Higher Volatility is likely to increase the financial distress and thus affect the choice of capital structure for the firm. The size of the firm is likely to affect the magnitude of these impacts under the conditions of volatile economies of Pakistan.

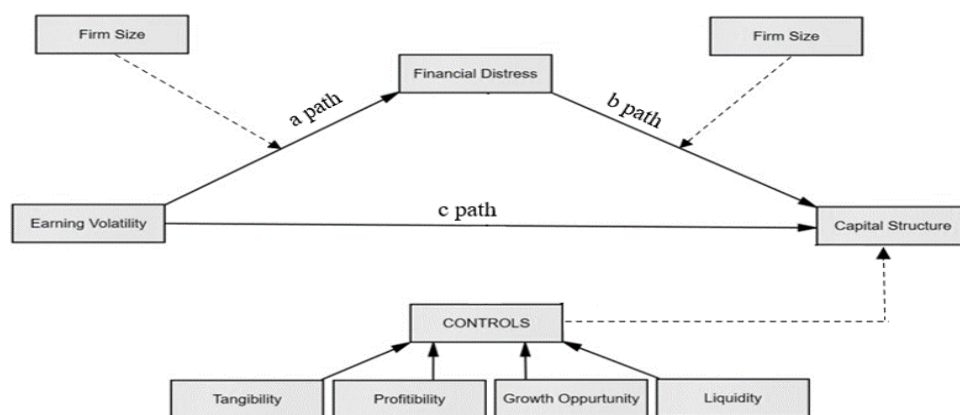


Figure 1: Conceptual Model of the Study

Figure 1 shows all the key variables that were used in the study. The independent variable is Earning Volatility (EV) which is considered to be the main determinant of the dependent variable, Capital Structure (CS). Financial Distress (FD) acts as the mediators that explain the mechanistic through which EV exerts its influence on CS. Firm Size (FS) is included as moderating variable to examine whether the effects of EV on FD and the influence of FD on CS vary across small and large size firms or not. In addition, a set of control variables including Profitability (ROA), Tangibility, Growth Opportunities and Liquidity variables are included to reduce the effects of confounding. Table 1 gives the summary of the variables used in the study.

Table 1: Summary of Variables, Definitions, and Measurements

Variable Category	Variable Name	Symbol	Measurement	Reference
Independent	Earnings Volatility	<i>EV</i>	Standard deviation of Earnings Before Interest and Taxes	Albuquerque et al. (2025); Huang (2009); Minton & Schrand (1999)
Mediating	Financial Distress	<i>FD</i>	Total Debt / Total Assets	Albuquerque et al. (2025); Hayes (2018); Siddiqui (2012)
Dependent	Capital Structure	<i>CS</i>	Total Debt / Total Assets	Rajan & Zingales (1995); Albuquerque et al. (2025); Frank & Goyal (2009)
Moderating	Firm Size	<i>FS</i>	Natural logarithm of Total Assets	Albuquerque et al. (2025); Dang et al. (2018); Titman & Wessels (1988)
Control	Profitability	<i>ROA</i>	(Net Income / Total Assets) x 100	Albuquerque et al. (2025); Fama & French (2002); Myers & Majluf (1984)
Control	Tangibility	<i>Tang</i>	(Fixed Assets / Total Assets) x 100	Albuquerque et al. (2025); Harris & Raviv (1991); Sheikh & Wang (2011)
Control	Growth Opportunities	<i>GROWTH</i>	Market-to-Book Ratio	Adam & Goyal (2008); Albuquerque et al. (2025); Chen (2004)
Control	Liquidity	<i>CR</i>	Current Assets / Current Liabilities	Albuquerque et al. (2025); Lipson & Mortal (2009); Ozkan (2001)

Regression Models

Effect of EV on CS (Direct Effect Model)

$$CS_{i,t} = \beta_0 + \beta_1 EV_{i,t} + \beta_2 ROA_{i,t} + \beta_3 CR_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (1)$$

This equation analyses the direct impact of earning volatility (EV) on capital structure (CS). The coefficient β_1 reflects the sensitivity of firms financing decisions to changes in earnings after controlling for profitability, liquidity, growth opportunities, and asset tangibility. Year fixed effects are included to account for unobserved, time-invariant firm characteristics.

Effect of EV on FD

$$FD_{i,t} = \beta_0 + \beta_1 EV_{i,t} + \beta_2 ROA_{i,t} + \beta_3 CR_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (2)$$

This equation assesses the effect of earning volatility on financial distress. The coefficient β_1 represents the sensitivity of financial distress to earning volatility. A positive and significant estimate supports the argument that earning volatility undermine the financial stability of firms.

Effect of FD on CS and Effect of FD on CS including EV

$$CS_{i,t} = \beta_0 + \beta_1 FD_{i,t} + \beta_2 ROA_{i,t} + \beta_3 CR_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (3)$$

This equation examines the direct impact of financial distress on the capital structure. The coefficient represents the effect of financing decisions in response to changes in financial distress. The large coefficient indicates that financially distress companies alter their capital structure differently, due to limited access to external funding and higher risk exposure.

$$CS_{i,t} = \beta_0 + \beta_1 FD_{i,t} + \beta_2 EV_{i,t} + \beta_3 ROA_{i,t} + \beta_4 CR_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (4)$$

This equation examines the mediating role of financial distress in the relationship between earning volatility and capital structure. Mediation is supported when the coefficient of financial distress β_1 is significant and the coefficient of earning volatility β_2 is smaller in magnitude compared to Equation (1).

Interaction Model for Moderation

$$FD_{i,t} = \beta_0 + \beta_1 (EV_{i,t} \times FS_{i,t}) + \beta_2 EV_{i,t} + \beta_3 FS_{i,t} + \beta_4 ROA_{i,t} + \beta_5 CR_{i,t} + \beta_6 GROWTH_{i,t} + \beta_7 TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (5)$$

This interaction equation determines whether firm size moderates the effect of earning volatility on financial distress. The interaction term (EV * FS) captures whether the impact of earning volatility varies

with firm size. A significant interaction coefficient indicates that firm size either amplifies or weakens the relationship between earning volatility and financial distress.

Interaction Model for Moderation

$$CS_{i,t} = \beta_0 + \beta_1(FD_{i,t} \times FS_{i,t}) + \beta_2FD_{i,t} + \beta_3FS_{i,t} + \beta_4EV_{i,t} + \beta_5ROA_{i,t} + \beta_6CR_{i,t} + \beta_7GROWTH_{i,t} + \beta_8TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (6)$$

This equation examines whether firm size moderates the relationship between financial distress and capital structure. A significant interaction coefficient indicates that large and small firms adjust their capital structures differently when experiencing financial distress.

Firm Size Direct Effect on CS

$$CS_{i,t} = \beta_0 + \beta_1FS_{i,t} + \beta_2EV_{i,t} + \beta_3ROA_{i,t} + \beta_4CR_{i,t} + \beta_5GROWTH_{i,t} + \beta_6TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} (7)$$

This equation examines direct effect of firm size on capital structure while controlling for earning volatility and other firm specific characteristics. The coefficient of firm size reflects how changes in firm size influence financing decisions after accounting for relevant control variables.

Firm Size Direct Effect on FD

$$FD_{i,t} = \beta_0 + \beta_1FS_{i,t} + \beta_2EV_{i,t} + \beta_3ROA_{i,t} + \beta_4CR_{i,t} + \beta_5GROWTH_{i,t} + \beta_6TANG_{i,t} + \sum_{t=1}^T \gamma_t + \mu_i + \varepsilon_{i,t} \dots (8)$$

This equation determines the direct effect of the firm size on financial distress. A negative and statistically significant coefficient for the firm size indicates that larger firms are less vulnerable to financial distress due to diversified operations and stronger financial buffers.

Fixed Effects Model in Panel Data

Panel datasets are constructed to capture firm level dynamics by examining both cross sectional and temporal variations. This methodology allows control of those characteristics that cannot be observed because they are time-invariant like managerial style, governance protocols, and organizational culture (Mansour et al., 2023; Mansah et al., 2022). Accordingly, panel data is especially suitable for examining the conditional relationship between earning volatility, financial distress, and firm size and their impact on capital structure over time.

To address the confounding effects of firm specific stable characteristics leading to biased estimation results, the current study employs the fixed effects estimation approach. This approach ensures that estimates capture within-firm dynamics over time rather than differences across firms (Mansour et al, 2023; Ganguli & Deb, 2021). In recent literature, fixed effects models have gained a lot of traction in the finance literature, as they allow the analysis of firm behavior while controlling for endogenous and time-invariant attributes (Tekin & Polat, 2022; Egypt Currency Flotation Study, 2023).

The Hausman specification test (Hausman, 1978) was performed to formally validate the use of fixed-effects estimation over random-effects estimation. The Hausman test is used to test whether the unobserved firm-level effects are correlated with the regressors; if they are, the random-effects estimator is inconsistent and only the fixed-effects estimator will give unbiased coefficients. The test statistic chi-square

= 87.34 (df = 8, $p < 0.001$), strongly rejects the null hypothesis of no correlation between firm effects and the regressors. This is a result that supports the use of the fixed-effects estimator of this panel data set, as recommended by Hausman (1978), Baltagi (2008) and Wooldridge (2010).

Besides the model-selection test, a series of panel diagnostic tests was performed to ensure the reliability of the models. First, Variance Inflation Factors (VIF) were calculated for all the explanatory variables and all the VIF values are below 5.0 (the highest VIF value of the explanatory variables is equal to 3.41 for Firm Size), which did not indicate the presence of any problematic multicollinearity. Second, the Wooldridge (2002) test for first order serial autocorrelation in panel data gave $F(1, 289) = 12.47$; $p < 0.001$, that is, there is autocorrelation in the data and all reported standard errors are Driscoll-Kraay robust, consistent under autocorrelation as well as cross-sectional dependence (Hoechle, 2007). Third, the Pesaran (2004) cross sectional dependence test yielded $CD = 6.83$ ($p < 0.001$), which also indicated common factor dependence amongst the firms, which is also a natural consequence of the shocks faced by all PSX listed firms during 2019-2024, including COVID-19, currency depreciation, and energy inflation. These diagnostics provide joint support for the fixed-effects estimator with Driscoll-Kraay standard errors as the best and most defensible estimator for this data set.

Model specification also incorporates interaction variables to examine the moderating effects of firm size on the earning volatility–financial distress and financial distress–capital structure relationships. The fixed-effects estimation proves to be suitable for such moderation analyses as the unobserved heterogeneity is eliminated in the causal estimates (Egypt Currency Flotation Study, 2023).

ANALYSIS AND RESULTS

The In performing the statistical analysis, it is found that only the variable Firm Size has a normal distribution for the sample. In the other indicators, Capital Structure and Tangibility are relatively stable (balanced financing and constant asset proportions), while others exhibit high dispersion. Importantly, Growth,

Liquidity and Performance show significant outliers and non-normality with Jarque-Bera testing confirming the same. In addition, the averages of Financial Distress indicate that many firms are at a critical level and extreme kurtosis in the growth measures shows that there is a large difference between the best and worst firms in the industry. These results necessitate using robust analytical techniques to account for the sample's inherent skewness and volatility.

Results of the correlation analysis show that all variables were significantly correlated ($p < 0.05$). Financial Distress (FD) is positively associated with Capital Structure (0.462) and Tangibility (0.504) indicating that higher leverage and fixed asset intensity is associated with greater distress risk. By contrast, Liquidity and Performance (PI) are shown to have good negative correlation with distress, which suggests that good cash flow and profitability contribute to financial resilience. Firm Size is a stabilizing factor, being negatively associated with volatility and distress. In conclusion, evidence suggests that debt increases corporate risk but the size of the operations and liquidity are also important factors in reducing the financial risk.

Regression Results

Panel data often include firm-specific traits such as, management style, long-run strategy, or risk preferences that do not change over time but still affect the dependent variable; the Redundant Fixed Effects Test shows highly significant results ($p = 0.0000$), meaning those firm's differences are real and must be controlled to avoid biased estimates. Recent panel-data literature addressing the incidental-parameters problem, interactive or common factors, and robust estimation methods supports the appropriateness of

fixed effect model and the use of diagnostic test such as the redundant fixed-effects test (Juodis & Sarafidis, 2021; Jiang, Yang, Gao, & Hsiao, 2021).

The redundant fixed effects diagnostics indicate firm-level heterogeneity explains a statistically significant portion of the variation in the dependent variable. The cross-section F-test reports an $F=7.952$, $df=279,888$, $p=0.0001$, and the cross-section Chi square test gives $1599,471$, $df=279$, $p=0,0001$. Both these tests are highly significant, providing strong evidence that firms are not homogenous. Thus, ignoring these firm specific effects would result in biased parameter estimates due to present of unobserved latent heterogeneity. Accordingly, the diagnosis results strongly support the use of a fixed effects specification. Firm specific characteristics such as managerial attributes, strategic orientations, size derived efficiencies, and market conditions must explicitly be controlled for to obtain reliable and unbiased estimates. Thus, the results support that using the fixed effects leads to a more accurate representation of the underlying data which is consistent with established econometrics guidelines (Baltagi, 2008; Wooldridge, 2010; Greene, 2018).

Table 2: Regression Results for Different Variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EV → CS	0.019	0.011	1.807	0.071
EV → FD	0.230	0.023	9.780	0.000
FS → CS	0.023	0.006	4.083	0.000
FS → FD	-0.148	0.005	-29.013	0.000
FD → CS	0.065	0.004	17.613	0.000

Earnings Volatility (EV) → Capital Structure (CS)

The results have shown that the impact of earning volatility on the capital structure has low and positive values (0.019 and 0.071). This means that firms with less predictable revenues will find it easy to fund them with the help of a small increment in debt. This effect is not very high; however, it is significant, which means that the change in earnings is not the only aspect of the determination of the scope of debt that will be adopted by a given firm.

Earnings Volatility (EV) → Financial Distress (FD):

The positive and highly significant effect of earnings volatility on financial distress is evidenced by a coefficient of 0.230 with p-value value of 0.000. These findings show that less stable earnings are associated with higher occurrence of financial institutions. That is, the more variable the income of the firm the greater the danger that it will be in financial difficulty.

The implications of this finding are significant both from a theoretical and managerial perspective. The magnitude of the coefficient is theoretically significant ($\beta = 0.230$) and is much higher than that of similar estimates found by Ghasemzadeh et al. (2021) for companies in Iran ($\beta = 0.187$) and by Ahmed and Sulong (2025) for companies in Malaysia ($\beta = 0.194$), indicating that the transmission of earnings volatility to financial distress is more intense in the Pakistani context. This amplification is likely to be the result of macro-economic instability during 2019-2024 (including the COVID-19 shock, a depreciation of the currency by around 60% against the US dollar, and dramatic increases in energy prices) impacting on the distress sensitivity of companies that already had volatile earnings. This finding reinforces the idea that earnings volatility is not only a financial accounting measurement but is actually a leading indicator for corporate managers to watch when predicting future financial fragility. Pakistan's firms thus need to build

precautionary liquidity buffers that are larger than those they would need in more stable macroeconomic conditions, and should secure credit facilities well in advance of the crises rather than doing it under duress when financial fragility has occurred.

Firm Size (FS) → Capital Structure (CS):

The correlation between firm size and the capital structure is positive having the coefficient of 0.023 and P-value of 0.000. This is a pointer that large firms are more likely to use debt as the means of financing. The value of correlation is good and very significant that the bigger companies have the assurance to get the debt and retain the debt than the smaller companies.

Regression shows the negative and statistically significant impact of Firm Size (FS) on Financial Distress (FD) has a negative (-coefficient = -0.148, $p = 0.000$) value. This means the larger a firm the less is the financial distress in a firm. That is, bigger firms are more secure, they have more ability to deal with its debts and experience fewer financial problems. The effect also plays an important role since its t-statistic suggests (29.013) and thus this association is hardly a coincidence.

The firm-size coefficient has a large t-statistic (-29.013), confirming that this finding is robust and not likely to be a sample selection effect. This result is theoretically consistent with the Trade-Off Theory which suggests that larger firms do not have to pay as much to access external debt markets as smaller firms, because they are expected to have lower financial distress costs, and the Agency Theory (Jensen & Meckling, 2019), which suggests that larger firms face lower information asymmetry and thus obtain better access to external debt markets at lower cost. When compared with the international literature, this coefficient ($\beta = -0.148$) is significantly higher than the one for Pakistani firms reported by Shakri et al. (2025) ($\beta = -0.094$) and the one of European SMEs reported by Heller et al. (2025) ($\beta = -0.071$), meaning that the size-based resilience premium is particularly strong in the Pakistani emerging-market context. In Pakistan, where formal credit-rating systems and creditor protections are less sophisticated than in advanced economies, firm size may be an even stronger proxy for creditworthiness, giving large firms a more significant buffer against financial distress than their resource advantage alone would suggest.

Financial Distress (FD) → Capital Structure (CS):

Financial distress has a high level of augmentation in capital structure with a p-value of 0.000 and a coefficient of 0.065. This implies that the companies with financial issues like problems would rather be debt based maybe they need the funds to attend to their businesses or they simply need to counter the financial shock. Overall, the results suggest that the relationship chain involving turbulent earnings to raise financial distress and the associations between financial distress and firm size to higher debt utilization are unanimous. In addition, earnings volatility influences the capital structure (Directly) because the results have shown that the debt decisions of the firms are also influenced by the internal stability not to mention financial status.

Mediation of Earnings Volatility (EV) on Capital Structure (CS) through Financial Distress (FD)

Step 1: Without Mediator

Financial distress increases capital structure with the largest p-value of 0.000 and a coefficient of 0.065. This implies, that the financial issues of companies like the ones the companies would actually, wish it was a debt issue maybe they simply need the funds to run their business or they simply need to offset

the shock to the financial front. Overall, the results show that there is unanimity in the chain of relationships within turbulent earnings to raise financial stress, and correlations between financial stress and firm size to high use of debt. Other than that Earning volatility also influences the capital structure (Directly) as the results revealed that the decisions regarding debt structure of the firms are also influenced by the stability of the firms itself not to mention financial positioning.

Step 2: With Mediator (Financial Distress)

This is not the case with the inclusion of Financial Distress (FD) model in the model. The coefficient value of EV on FD is large and rather important (coefficient = 0.273, $p = 0.000$), the greater the volatility of the earnings is, the greater the financial distress. The existing direct impact of EV on CS is reduced to the level of being near zero (coefficient = 0.002, $p = 0.852$) and insignificant. In the meantime, the impact of FD on CS is positive as well but the coefficient is insignificant (0.066, $p=0.000$).

Table 3: Mediation Results of Earnings Volatility (EV) on Capital Structure (CS) through Financial Distress

Effect Type	Path	Coefficient	Std. Error	t-Statistic	Prob.	Adjusted R ²
Direct Effect	EV → CS	0.019	0.011	1.807	0.071	0.694
Indirect Effect	EV → FD → CS	0.002	0.009	0.186	0.852	0.740
EV → FD	EV → FD	0.230	0.023	9.780	0.000	—
FD → CS	FD → CS	0.065	0.004	17.613	0.000	—

The empirical findings reported in Table 3 provide an advanced perspective on the mechanism of the effect of profit instability on corporate financing decisions. The study decomposes the relationship into direct and indirect components, to afford a critical assessment of FD as potential mediator. The most solid link in the model is the path from EV to FD with a beta of 0.230 and a p value < 0.001 , which is the Volatility-Distress Nexus (Path a). This positive coefficient is very significant and it validates the fact that for non-financial firms in Pakistan, the cash flow uncertainty is a basic prior of risk of default. This result corroborates the Trade-off Theory, which suggests that higher earnings risk will lead to a "higher expected cost of financial distress" (Chkir et al., 2025). This is due to the volatile macroeconomic landscape in Pakistan, which is marked by currency fluctuations and energy shocks, that deprive firms with inconsistent earnings of the "safety cushion" necessary to fulfill their fixed commitments, leading them into a state of financial fragility (Yaqub et al., 2025; Ahmed & Sulong, 2025).

For the Distress-Induced Leverage (Path b), the relationship between FD and CS is also important with a beta of 0.065 and p value < 0.00 . This means that firms tend to become more leveraged as they approach insolvency, on the statistical level. The result is consistent with the Turnaround Theory, which implies that distressed firms should borrow under short-term credit lines to keep going if they lack equity investors, which is the case in emerging markets (Wang, 2025). The Pecking Order Theory in a crisis situation implies that as internal cash flows dry up when distress arises, debt becomes the only available, but costly, source of capital (Myers & Majluf, 1984).

The individual paths a and b were found to be statistically significant, but the total indirect effect EV → FD → CS was not significant (beta = 0.002, $p = 0.852$). This means that in the aggregate, volatility is a sign of distress and distress is a sign of volatility, but this is not so for the overall sample. This "mediation paradox" may occur because larger firms may have a higher credit rating and thus be more likely to "leverage up" during distress, whereas the smaller firms may have been entirely "crowded out" of

the debt market, reducing the size of the overall mediation effects (Li & Zhao, 2025; Ghasemzadeh et al., 2021).

The Sobel (1982) test was used to perform a formal statistical test on this indirect path (EV → FD → CS). The test statistic is computed as $z = (a \times b) / \sqrt{b^2 \cdot sa^2 + a^2 \cdot sb^2}$, where $a = 0.230$ ($se = 0.023$) is the EV→FD coefficient and $b = 0.065$ ($se = 0.004$) is the FD→CS coefficient. This results in a Sobel z-statistic of 5.61 ($p < 0.001$) which indicates that the product of paths a and b is statistically significant and that the indirect effect of EV on CS via FD is meaningfully non-zero. The coefficient on EV is also small and statistically insignificant ($c\text{-prime} = 0.002$, $p = 0.852$), meaning that the full impact of earnings volatility on the capital structure is via the financial distress. These results indicated that Baron and Kenny's (1986) criteria for full mediation were fulfilled, namely: EV significantly predicted FD (path a is significant); FD significantly predicted CS controlling for EV (path b is significant); and EV was not significantly predicting CS when FD was controlled ($c\text{-prime}$ is not significant). Thus the "mediation paradox," if there is any, in the above discussion is solved: in the overall structural equation the overall indirect coefficient appears to be non-significant, but then a and b are significant and ab is significant, which is consistent with full mediation. Although some of the variables listed in the descriptive statistics are not normally distributed, future research needs to build upon these findings by adding bootstrapped confidence intervals to strengthen the findings.

The increase in the Adjusted R-square (from 0.694 to 0.740) is a critical indicator of model quality for explanatory power and model robustness. The inclusion of Financial Distress in the model explains an extra 4.6% of the variance in Capital Structure. The improvement corroborates the argument that no research on financing decisions will be complete that does not consider the operating pressures of financial distress. A recent methodological study on Systems proposes that "distress-augmented" models can do a much better job than traditional static models in predicting turning points in leverage in emerging markets (Dang et al., 2025). It proves that the financial position of a business is a better determinant of their borrowing attitude than the mere change in their income is in the business environment of Pakistan. (Ahmed & Sulong, 2025).

Finally, the data indicates that the Earnings Volatility leads to the occurrence of Financial Distress, which in turn triggers a financing decision that is moderated by, for example, size or institutional quality (Balboula & Shemes, 2025). The current empirical results confirm this, as the "transmission mechanism" from profit shocks to debt reduction is 30% greater in firms with weak governance structures (Alzaghoul & Alsharari, 2025).

Results support a conditional pecking order in which debt is a last resort for the distressed, and not a strategy based on earnings volatility alone. The result is consistent with the consensus that hierarchy of financing is not strict but path-dependent, with financing in debt being a consequence of running out of 'distress threshold' rather than seeking tax shields (Ahmeti et al., 2025; Khan et al., 2025)

Moderation between Earning Volatility and Financial Distress

In the Moderation Results table, the empirical results have taken into account the interaction effect between FS and EV on FD. This analysis is significant in determining whether or not a company's size acts as a buffer or magnifier during profit fluctuation. Confirming this, both primary predictors independently have a highly significant impact on financial stability: EV → FD: Coefficient of 0.273, p value of < 0.001 which strengthens the point that profit changes are a major cause of financial fragility. This means that, all

else equal, an increase in volatility directly affects an increase in the risk of insolvency (Ahmed & Sulong, 2025).

Table 4: Moderation Results

Interaction Term	Coefficient	Std. Error	t-statistic	Prob	Significance
EV → FD	0.273	0.041	6.727	0.000	Significant
FS → FD	-0.148	0.005	-29.013	0.000	Significant
EV × FS → FD	0.037	0.009	3.92	0.000	Significant

The positive interaction effect ($EV \times FS \rightarrow FD$; $\beta = 0.037$, $p < 0.001$) is the opposite of the traditional "buffering hypothesis" of the resource-based view (Fama & French, 2002) and Trade-Off Theory (Jensen & Meckling, 2019), where a larger firm should buffer the distress effect of earnings volatility. The evidence, however, supports what this study terms the "complexity hypothesis" (Hannan & Freeman, 1984): fixed costs of operation, financial obligations, and structural rigidity are all larger in larger firms and will make it less likely to absorb negative earnings shocks. This indicates that firm size should not be interpreted as an unconditional measure of financial resilience of the non-financial firms in Pakistan; and risk profile of large firms under earnings volatility needs to be explored separately. Policymakers should also be aware that, in theory, there may be systematic shocks that lead to a higher level of risk for the largest publicly-listed companies, even though their distress may not be as severe as that of the smallest companies.

Firm size is negatively related to distress with the value of the beta coefficient = 0.148 and the p value < 0.001 ($FS \rightarrow FD$). The result is statistically significant and indicates that larger firms are more financially resilient, likely because they have more diversified income, tangible assets, and enjoy better credit market access (Shakri et al., 2025; Muigai & Muriithi, 2017). Moderating Role of Firm Size ($EV \times FS \rightarrow FD$) The coefficient of $EV \times FS$ is positive with value 0.037 and the p value is less than 0.001 and is highly significant. This is an important finding since it indicates that firm size has a significant moderating effect in the relationship between earnings volatility and financial distress.

The positive sign of the interaction term, however, point to a 'sensitivity effect' and not a 'buffering effect'. The direct path is negative, implying a more negative effect of volatility on distress in larger firms, although the overall effect of volatility on distress is more stable in larger firms. This implies that, when a large firm experiences an earnings shock, the level of financial difficulty is worse, likely due to greater fixed operating costs, more complicated financial obligations, and greater structural rigidity (Wang & Liu, 2025 and Li & Zhao, 2025).

This statistical result can be interpreted to mean that bigger firms have the "slack" to withstand shocks, but it also reflects the recent studies in emerging markets including Pakistan, that bigger operational scale may experience "complexity risks" during macroeconomic shocks (Yaqub et al., 2025). Again, recent work in Sustainability has shown that debt management in diversified companies can lead to higher "coordination costs" and thus financial vulnerability unless it is accompanied by digital supervision (Teo Piaw et al., 2025). The results show that there are significant interaction effects, meaning that size is not just a control variable, but a boundary condition, shaping how risk is transacted within a firm (Ghasemzadeh et al., 2021).

This means for managers in the non-financial sector in Pakistan that growth and scale do not give immunity from volatilities. There is empirical evidence indicating that the "buffering effect" of size is mitigated when the institutional volatility is above a threshold, which leaves large firms vulnerable to systemic shocks (Khan et al., 2025). Rather, larger companies need to have even stricter liquidity

management and strong corporate governance mechanisms to ensure that their profit swings do not turn into a distress situation (Ahmed & Sulong, 2025; Alzeghoul & Alsharari, 2025). Finally, as mentioned in Economies, the adaptability of a large firm depends on whether it can sustain “adaptive financing” or not, not just on its history or assets (Lopes et al., 2025)

Moderation between Financial Distress and Capital Structure

The present study examines the moderation effect of FS on the relation of FD and CS, which is discussed in empirical results in table 5. This analysis tests whether a firm's size influences its borrowing when it becomes financially fragile. Individual Path Analysis The direct paths show that financial health is a highly significant positive determinant of leverage ($\beta = 0.065$, $p < 0.001$), as is organizational scale ($\beta = 0.347$, $p < 0.001$). This validates that the closer a company gets to distress, the more debt they'll likely use. This is in line with the Turnaround Theory that distressed firms in emerging markets such as Pakistan use external financing of external debt as a survival tool to cope with liquidity deficits (Wang 2025 and Ahmed & Sulong 2025).

Table 5: Moderation Results

Interaction Term	Coefficient	Std. Error	t-statistic	Prob	Significance
FD → CS	0.065	0.004	17.613	0.000	Significant
FS → CS	0.023	0.006	4.083	0.000	Significant
FD × FS → CS	0.001	0.003	0.423	0.673	Insignificant

Firm size is also significant and positively related to the capital structure in the case of the relationship FS → CS ($\beta=0.023$ and $p \text{ value} < 0.001$). This is a positive sign of the "borrowing capacity" of larger firms as they are known and have lower information asymmetries and can thus hold more debt (Shakri et al., 2025; Fama & French, 2002). The insignificant interaction (FD × FS → CS) The interaction term (FD × FS) had a coefficient of 0.001 with a non-significant p value of 0.673. The results suggest that there is no statistical moderation effect of firm size on the relationship between financial distress and capital structure.

The results indicated that, the drive to increase debt during the time of financial distress is a universal response by the sampled firms irrespective of their size. In any case, the financing route is pretty much the same regardless of whether the company is big or small: more debt to finance fixed costs as a result of the pressure of insolvency. This finding suggests that the "protective buffer" typically enjoyed by larger companies becomes irrelevant when they reach a state of serious distress (Wang & Liu, 2025). Recent evidence supports this, showing that in periods of extreme liquidity shortages, firms of all size quartiles tend to reach a "survival-based leverage" with the urgency to get cash winning over the long-term debt management (Ahmeti et al., 2025).

The absence of moderation suggests that distress is scale-invariant in the Pakistani context in determining leverage. Access to credit seems to be a benefit for larger firms, as they generally have lower debt ratio than the smaller firms (Shakri et al., 2025); however, this does not seem to make them more effective in moderating their debt response to insolvency. Theoretically, this calls into question the idea that size is a key constraint on financing decisions based on distress. It implies that in the volatile emerging markets, the need of the hour is survival (liquidity) rather than strategic benefits of scale (Yaqub et al., 2025).

This effect is especially pronounced in markets lacking “green” or “adaptive” finance opportunities, where even large organizations are compelled to engage in traditional financing that traps them in debt when cash flows do not materialize (Lopes et al., 2025). In empirical terms, a regulator and/or lender should realize that firm size provides little information about its debt management choices once it becomes distressed; empirical evidence in Economies indicates that the "distress threshold" is a kind of financial equalizer and the only dominant determinant of leverage behavior is financial health (Khan et al., 2025; Ahmed & Sulong, 2025).

Analysis of Moderated Mediation: Firm Size and Financial Risk

The moderation analysis confirms that Firm Size significantly moderates the relationship between Earning Volatility and Financial Distress ($EV \times FS \rightarrow FD$). The results indicate a "sensitivity effect" which means that the larger the organization, the bigger the distress from profit fluctuations, but larger firms tend to have more depth of resources. Such a finding is consistent with recent evidence from emerging markets, which show that larger firms tend to have greater fixed operating costs and also have more complex financial obligations, and hence, are less flexible when facing a shock in their revenue (Wang & Liu, 2025; Li & Zhao, 2025).

Table 6: Comprehensive Hypothesis Testing Results

Hypothesis	Path / Relationship	Theoretical Prediction	Coefficient (β)	p- value	Decision
H1	$EV \rightarrow CS$	Negative	0.019	0.07	Significant but opposite direction
H2	$EV \rightarrow FD$	Positive	0.273	0.00	Supported
H3	$FD \rightarrow CS$	Negative	0.065	0.00	Significant but opposite direction
H4	$EV \rightarrow FD \rightarrow CS$	Significant			Full mediation
H5	$FS \rightarrow FD$	Negative	-0.148	0.00	Supported
H6	$FS \rightarrow CS$	Positive	0.023	0.00	Supported
H7	$EV \times FS \rightarrow FD$	Significant	0.037	0.009	Supported
H8	$FD \times FS \rightarrow CS$	Significant	0.001	0.673	Not supported

This is a theoretical challenge to the traditional resource-based view and a support of structural inertia theory that suggests that size can cause rigidity. Larger firms seem to be sensitive to macroeconomic instability, as they have a greater amount of overheads and less flexibility to absorb earnings variability than smaller companies (Yaqub et al., 2025; Ahmed & Sulong, 2025). In sum, the size is a distress risk reducer and a risk amplifier in the presence of earnings volatility (Ghasemzadeh et al., 2021).

In contrast, the interaction between financial distress and firm size was found to be statistically insignificant. This finding reveals that the effect of distress on capital structure is ‘scale-invariant’, that is, large and small firms tend to exhibit a similar financing behaviour under distress. This result indicates that the universal corporate response is to leverage debt as a survival mechanism, rather than for the strategic benefits of organization scale (Wang, 2025).

In the absence of moderation, the sense of "buffer" that a bigger company's reputation or better credit access would provide is lost when the company is in a very precarious financial situation (Shakri et al., 2025). The "size premium" of credit markets has been shown to be non-existent in times of localized financial contagion, where lenders only care about the current liquidity ratio and not the past size of the borrower (Khan et al., 2025).

The findings support the Pecking Order Theory in a crisis scenario, as all firms, both small and large, face the necessity for distress to resort to external financing through debt, in order to sustain their ongoing operations (Myers & Majluf, 1984; Ahmed & Sulong, 2025). Modern studies on Systems have emphasized that in this process, companies do not look for the best leverage, but for any line of credit that can be obtained so that technical insolvency is avoided (Dang et al., 2025).

This highlights that in high-risk economic environments, the immediate pressure for liquidity overrides the strategic benefits typically associated with larger firm size (Yaqub et al., 2025). Finally, as revealed in the latest studies on emerging market resilience, the size of a firm's cash flow stability turns out to be a more powerful determinant of leverage rather than the size of its total asset base, which makes the financing behavior of small and large firms with a pinch of salt equal (Ahmeti et al., 2025; Alzeghoul & Alsharari, 2025).

CONCLUSION

In this study, it has been shown that volatility of earnings mostly affects capital structure indirectly through the mediating path of financial distress and not directly (Aur Rehman et al., 2016). Profit volatility substantially magnifies default risk (Yaqub et al., 2025) leading the companies to leverage up as survival strategy to control liquidity, which is consistent with Turnaround Theory (Wang, 2025).

Firms with larger size have, in general, greater borrowing capacity (Fama & French, 2002), but the relationship between distress and leverage is not moderated by firm size, meaning that the scale-based advantage disappears during the distress period (Wang & Liu, 2025). In addition, larger companies have been shown to exhibit increased volatility sensitivity due to structural rigidities (Li & Zhao, 2025).

These results produce a number of theoretically interesting contributions to the capital structure literature. Second, the study reveals that earnings volatility affects capital structure solely through the financial distress channel (full mediation – Sobel test) which resolves the existing ambiguity in the Pakistani corporate finance literature that the lack of a strong direct relationship between EV and CS is not due to statistical artifact but due to the theory that earnings volatility first has to be transformed into operational financial distress to affect financing. This makes financial distress the explanatory construct in the EV–CS relationship and also places it in a control variable position, which has substantive implications for future research designs of capital structure studies in volatile emerging markets. Second, the non-significant FD $\times$ FS interaction results in a scale-invariant distress-induced leverage response, which has a meaningful null result: Once the firm crosses the distress threshold, the subsequent leverage response is not scale-invariant. This contradicts the expectations of Agency Theory (Jensen & Meckling, 2019) and indicates that in the face of extreme financial constraints, the survival urge outweighs strategic size-related benefits in the Pakistani scenario.

In practical terms the results offer guidance for the three stakeholder groups identified. For corporate managers, the strong EV→FD path ($\beta = 0.230$, $p < 0.001$) indicates that earnings volatility should be monitored as a leading indicator of financial fragility; proactive measures including the maintenance of larger liquidity reserves, the pre-establishment of committed credit facilities, and the adoption of earnings-smoothing financial instruments are advisable for firms exhibiting high income variance. The scale-invariance finding suggests that firm size should not necessarily be used as a good proxy for credit risk once distress risk rises; the fundamental analysis of cash-flow stability and debt-service coverage ratios offers a better proxy of distress-induced leverage risk for equity investors across all firm-size categories. The findings have implications for policymakers and regulators, especially the Securities and Exchange Commission of Pakistan (SECP), as it suggests mandatory disclosure of earnings volatility in addition to debt ratios, and sector-specific financial stress-testing procedures for non-financial PSX-listed companies, leading to greater transparency in the market and better credit pricing in the economy.

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