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FIRM LIFECYCLE AND FINANCIAL DISTRESS: A STUDY OF NON-FINANCIAL FIRMS LISTED ON THE PAKISTAN STOCK EXCHANGE

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Financial distress, stages of the firm lifecycle, Dickinson Model, Altman Z-Score, Industry analysis

ABSTRACT

Distress affects the financial health and sustainability of firms. A lot of studies have been conducted in the past where the effect of different variables on financial distress has been studied. However, relationship between different stages of a firm life cycle and financial distress is less explored. This research analyzed the relationship between financial distress and firm life cycle. The purpose of this research is to identify the stages of firm life cycle in which companies are financially distressed so that it helps the stakeholders in making decisions according to stage of the firm life. The firm cycle is divided into five stages based on Dickinson's model. Altman Z-Score was used to measure financial distress. The control variables were leverage, firm size, profitability, sales growth, and fixed assets growth. The data was collected from the annual reports of nonfinancial companies listed on Pakistan Stock Exchange from 2014 to 2021. Panel data regression with fixed effects was run for 314 Companies in 11 industries. The finding of this research is that the firm life cycle does influence financial distress. Firms in introduction and decline stage are financially distressed. Growing and mature firms are not financially distressed. Industries were also analyzed to find out which industries are financially distressed. The industries were financially distressed. Thus, stakeholders should make financial policies and decisions according to the stage of the firm life cycle and the nature of the industries.

INTRODUCTION

The human race is facing many issues and sustainability is one of the most important ones. Sustainability is also considered as a key challenge in corporate society. The most important pillar of corporate sustainability is financial sustainability as it has been a focal area of

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research in recent times (A. Akbar et al., 2019). The corporate world has a direct effect on society. A firm is beneficial to its stakeholders, and society in general. Thus, if a firm is in financial distress, then all stakeholders are affected. The long-run sustainability of the firm and society then becomes questionable (Iotti & Bonazzi, 2018; Zhou et al., 2022). A mechanism is needed that can identify early warning signs of financial distress (Sewpersadh, 2022).

Prediction of financial distress and bankruptcy has been the focal point of consideration for the academia and financial markets since the notable works of Beaver (1966) and Altman (1968) in the last part of the 1960s (Zhou et al., 2022). Bankruptcy does not only make the firm cease to exist but before that the investors, mainly creditors and shareholders, suffer huge losses (P. Sari & Ismah, 2022; Zhou et al., 2022). For potential investors, it is also important as they know that every business has financial, market, and other risks inherent in them. These risks may lead to default. So, they want to add this factor in their calculation for the premium or interest that will be demanded from the firm.

Firm lifecycle models have been researched since 1960 and many researchers proposed that firms pass from one phase to another in a predictable way. This is also called firm lifecycle theory. Once the firm evolves to the next phase, it is very difficult for it to go back to the previous one as each stage has a different set of characteristics related to operations, employed business strategies, activities, the behavior of the firm, business structure, capital structure, etc. (Chhillar & Lellapalli, 2022; Jaafar & Halim, 2016; Miller & Friesen, 1984). The measures used in the literature for stages of the firm lifecycle are age, size, growth, dividends paid, leadership style, cash flow patterns, strategic orientation, and many more (A. Akbar et al., 2019). Some of these are sequential and linear whereas some are non-sequential.

The objective of this research is to study the relationship between financial distress and different stages of the firm lifecycle. Stakeholders face many kinds of hurdles in today's complex market environment, thus a financially distressed firm poses a threat to all its stakeholders including society (Rubab et al., 2022). Many indicators of financial distress have been highlighted in developed markets but limited work has been done when it comes to developing markets and its important as developing markets are less efficient and has information asymmetry more than their counterparts (Sewpersadh, 2022). Moreover, it is important to identify the stages of firm life cycle in which companies are financially distressed so that it helps the stakeholders in making decisions according to stage of the firm life (P. Sari & Ismah, 2022). The relationship between firm lifecycle and financial distress is

overlooked and under-researched leading to a lack of empirical support in the existing literature in Pakistan i.e., very limited research has been done to explore and explain the relationship between different stages of a firm lifecycle and financial distress. Pakistan is a developing economy and faces many economic, financial, political, and social challenges. This research extends the literature by examining the influence of the firm lifecycle on financial distress (bankruptcy risk). The applied benefits of this research are for investors, managers, companies, and society.

LITERATURE REVIEW

Firm Lifecycle

For decades, researchers have resembled the organizational lifecycle with the biological lifecycle of humans. Life-Cycle theory suggests that the life of the firm, like a living being, is not stationary or still, rather it is moving. Like humans, firms are born (from an idea), grow, and ultimately expire. These are called stages of the firm lifecycle and each stage is comprised of activities and structure. These change over time (A. Akbar et al., 2019; Amiri & Saeedi, 2022). A firm's lifecycle affects the performance and major decisions of the firm as well as it acts as a roadmap for the company. These decisions are related to operations, investment, dividends, financing or capital structure, dividends, expansion, etc. Movement between stages is due to resources and available opportunities (M. Akbar et al., 2022). Firm lifecycle models have been researched since 1960 and many researchers proposed that firms pass from one phase to another in a predictable and non-sequential way. The duration of each stage varies across firms too (A. Akbar et al., 2019). Evolution of business firms can be due to internal factors such as resources, strategies, and ability of management or external factors such as market environment and macroeconomic variables (Chhillar & Lellapalli, 2022).

Stages of firm lifecycle

In the literature, there is no consensus on the number of stages a firm passes through from. Some researchers have classified each stage that a firm passes from distinctively (leading to more stages) whereas others have clubbed or integrated stages sharing similar features into one so that they can have parsimony in their models (Jaafar & Halim, 2016).

The stages of the lifecycle range from as few as three to as many as ten. Some authors classify the firm life cycle in 3 stages (Chen & Yoon, 2022; Tan & Zhu, 2022), while other divide it in 4 stages (Koh et al., 2015; Lyden, 1975; Quinn & Cameron, 1983). However most authors present 5 stage firm lifecycle model (M. Akbar et al., 2022; Chhillar & Lellapalli, 2022; Dickinson, 2011; Khuong et al., 2022; Lester et al., 2003; P. Sari & Ismah, 2022)

a. Introduction stage

Firms just came into existence therefore they are small and owners or founders have control (A. Akbar et al., 2019). Amiri and Saeedi (2022) state that firms have simple structures but are very risky. Firm invests in the idea and its marketing. High investment is needed as the firm has many attractive, positive net present value projects and opportunities. However, one of the biggest challenges a firm face is related to financing as the firm is new and potential investors are usually skeptical about its survival. The result of this skepticism is that firms borrow capital at a higher rate increasing leverage (Bulan & Yan, 2011; P. Sari & Ismah, 2022). Therefore, the debt ratios for new and smaller firms are higher and their net profit margins and cashflows are low. Thus, firms are financially distressed in this stage. M. Akbar et al. (2022) present the opposite idea that equity financing is relatively easier and sometimes preferred by companies. An equity investor (venture capitalist) may assume the return in the future is high enough that the wait is worth it. Processing of information and decision-making is at low level in this stage. This study hypothesizes that:

H_1: Firms in the introduction stage are financially distressed.

b. Growth Stage

If the firm survives the introduction stage, it will develop rapidly in this stage as it will be successful in the market. They develop and enhance core competencies, and increase sales by enriching their product lines (Amiri & Saeedi, 2022). The firms move from a simple structure (manger-owner) to a more formal structure (several shareholders) and focus on expansion, diversification, and innovation. The firms heavily rely on external financing to fund this rapid growth in sales due to a lack of internal funds known as retained earnings (A. Akbar et al., 2019). Equity financing is preferred over debt financing. The reasons are similar in that although a firm has made a name for itself in the market, the cash flows are not certain or stable enough for debtors to finance it. Information asymmetry and uncertainty about future cash flows are reduced. The reduction in uncertainty and superior operational performance is reflected in the lower cost of equity capital required by the investors (M. Akbar et al., 2022; Hasan et al., 2015). Accounting measures are better and growing at a rapid pace according to Atif et al. (2022). Hence, growing firms are not financially distressed. This study hypothesizes that:

H_2: Firms in the growing stage are not financially distressed.

c. Maturity Stage

During this stage, firms experience a slowdown in sales (units) due to increased competition ultimately leading to a stable sales level. Firms' aggression reduces, fewer positive net present value projects are available, and innovation decline (Amiri & Saeedi, 2022; Yi et al., 2021). Primc and Čater (2016) suggest that prices of the products are kept constant and firms use the accumulated profits earned over the last years to bear the expenses. The earning expectation is highest as production processes are optimized (Aldaas, 2021). Equity and debt financing are available to companies at this stage. Due to their reputation, accumulated profits, substantial asset that can be kept as collateral and older companies in the market, the lending rate at which firms can raise funds is lower (M. Akbar et al., 2022). Hasan et al. (2021) predicts higher earnings, earning per share, retained earnings and return on operating assets in the mature and growth stages. Financial stability and fewer investment opportunities make mature companies pay dividends. Thus, firms are not in financial distress. Therefore, this study hypothesizes that:

H_3: Firms in the maturity stage are not financially distressed.

d. Shakeout Stage

Firms are operating in more complex, heterogeneous and extremely competitive markets to defend their market share. Debt financing becomes vital in post maturity stages. Firms move to rebalance their existing capital structure by substituting debt for equity (M. Akbar et al., 2022). For some researchers such as Amiri and Saeedi (2022) as well as Miller and Friesen (1984), this is an interesting and happening stage of the lifecycle due to extreme measure taken by the companies to stop decline in sales. Whereas Dickinson (2011) believes that prices fell, and a decrease in units sold leads to huge losses in sales. This ultimately threatens the very existence of the firm. suggest that this stage should be used as a benchmark and the performance and results of other stages of the lifecycle should be interpreted in comparison to this stage (Habib & Hassan, 2017).

e. Decline Stage

Sharp Decrease in market share and demand due to "unattractiveness of product lines" and no innovation is the reason for firms to be in decline stage (Amiri & Saeedi, 2022). Control and decision-making are concentrated. The rebalancing of capital structure through debt financing in the shakeout stage is now becoming a problem for the firm as they are unable to meet obligations. Sari and Ismah (2022) state that the demand becomes inelastic, leverage increases, earning reduces, market share and revenues contract. Firms are in distress as

profitability drops, firms suffer huge loses, and instead of reducing their investments, it increases, especially in research and development at high cost. Thus, firms in decline stage are financially distressed.

H_4: Firms in the decline stage are financially distressed.

Financial Distress

When a firm's total liabilities exceed the total assets and a required revenue is not generated to meet obligations, the firm is in financial distress. The factors can be enormous fixed costs, cyclical industries, and illiquid assets (M. Akbar et al., 2022). Sewpersadh (2022) highlights the characteristic of financially distressed companies i.e., reduced earning power, high probability of not settling obligations and bad credit profile. Rubab et al. (2022) in their paper explain that if any firm faces deteriorating financial and operational efficiency, issues related to liquidity or timely credit payments, it is said to be in financial distress. If a firm does not take corrective measures, it may have to face liquidation or bankruptcy.

Zhou et al. (2022) state that bankruptcy is not sudden. Financial distress takes precedence and a firm passes through years of distress before bankruptcy. Therefore, financial distress is also considered a "likelihood of bankruptcy" (Aasen, 2011; Gordon, 1971). Financial distress has a negative impact not only on firms but also on the global economy. Thus, financial distress and bankruptcy are very important in corporate finance (Raza et al., 2020).

Because of financial distress, the firm faces difficulties in raising capital from external sources leading to a higher cost of capital than in a normal situation. These consequences are internal. There can be external or reputational consequences such as a bad reputation for the firm or executives, pressure from the media and government, sanctions, fines, or penalties (Altman & Hotchkiss, 2010). According to Sewpersadh (2022), firm can be in financial distress but might not default. But a firm that defaults has passed through stages where it was financially distressed. Financially distressed companies consecutively have poor performance, price reduction, decrease firm value and negative earnings (Chhillar & Lellapalli, 2022; Gestel et al., 2006)).

The primary internal factors leading to financial distress is high leverage in a firm and cash flow difficulties. Distressed firms also sell their assets to avoid bankruptcy (Nurul Salamah et al., 2023; Rafatnia et al., 2020). Financial distress can also be because of changes in consumer preference (matured markets), advancement in technology, low production, fierce competition, management failure, shortage of liquid assets etc. (Rubab et al., 2022; Sewpersadh, 2022). Karina and Soenarno (2022) suggest more external factors such as

economic distress at the global (pandemic) or national level and due to issues faced by the whole industry. Examples can be exchange rate risk, rise in inflation, increase in raw material prices, overcapacity in the industry, security risk, ban from the government on certain activities, deregulation, local and international competition, sanctions from global bodies, etc, (Aasen, 2011).

Financial distress in the context of different Theories:

i. Static Trade-off theory:

Chhillar and Lellapalli (2022) explain financial distress in the context of static trade-off theory. According to the static trade-off theory, every firm has an optimal capital structure. This structure is based on a cost-benefit analysis of the use of equity versus debt. The use of debt up to a certain level (in comparison with equity) has its benefits. The main benefit is receiving a debt tax shield. However, the use of too much or excessive debt leads to potential financial burdens or distress. So, a firm must weigh and make a tradeoff between the benefit and cost of debt.

ii. Signaling Theory:

Ross, Westerfield and Jordan (2010) state that this theory points out the information gap (known as Information Asymmetry) that exists between managers and potential investors. According to Raza et al. (2020) and W. P. Sari (2020), decisions taken by businesses send a signal to investors. For example, if the firm takes debt, it sends a positive signal to the market that managers have enough profitable investments and will be able to generate enough cash flow to pay back the debt. Thus, that firm is considered financially stable. The opposite is also true in their opinion i.e., not taking or reduction of debt sends a negative signal to the market that the firm will not be able to make payments in the future, thus it is in distress. (Romadhina et al., 2022).

iii. Pecking Order Theory:

A firm in any stage of its lifecycle has two main modes of financing and these are internal or external funds. The researcher further suggests that internal funds (i.e., retained earnings) are a firm's first choice. The next is debt and equity is the last. This is known as the pecking order theory (Khalaf, 2022). Hastutik et al. (2022) also support this and state that Myers and Majiuf (1984) made this theory popular. Founders and managers prefer internal funding as they want to keep control. They also prefer debt over equity as it places fewer restrictions (Ahmad & Atniesha, 2018).

Measurement of Financial Distress:

Researchers in past have measured financial distress in different ways. These are presented in Table 1:

Table 1
Proxies used for Financial Distress in Literature

Author	Proxy used
(Gebang & Purba, 2022)	Financial ratios analysis
(Karas & Srbová, 2019)	Interest coverage ratios
(Sousa et al., 2022)	Macroeconomic Variable (Interest rate, GDP, Inflation rate, Unemployment rate)
(Rubab et al., 2022)	Distance to default Approach
(Phan et al., 2022)	Zmijewski's (1984) model
(Beaver, 1966)	30 financial ratios
(Younas et al., 2021)	Altman Z Score Model

METHODOLOGY

Research Question

The primary research question that this research answer is:

1. Does firm lifecycle influence financial distress?

Sample and Sources of Data

The sample of this research consists of all the non-financial firms listed on the Pakistan Stock Exchange. The time frame is from 2014 to 2021 i.e., 8 years. 334 firms are listed on PSX. Every firm which had at least two consecutive years of data is selected in the sample. As a result, data for 314 firms is collected. Data related to dependent, independent, and control variables of the study is collected from Financial Statements of Pakistan Stock Exchange (PSX) listed non-financial companies retrieved from the PSX data portal, opendoors.com, and the Statistical Bureau of Pakistan.

Measurement of Variables:

Financial Distress

Marginingsih (2022) suggests that Altman Z-Score model checks the financial health of a firm and identifies a firm as distressed or not distressed. This allows the investors to make sound investment decisions. Cındık and Armutlulu (2021)in their paper has stated Altman Z-Score's predictive and statistical power. This formula is composed of five different but important financial ratios of any firm. This model is still considered to be statistically highly accurate and robust in checking the financial health of the companies and predicting bankruptcy even after 50+ years since its development. The lower the score, the more

financial instability, and the higher chances of bankruptcy and vice versa (M. Akbar et al., 2022).

The Z-score formula is as follows:

$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$

Where,

X_1 = Working capital / Total assets

X_2 = Retained Earnings / Total assets

X_3 = Earnings before interest and taxes / Total assets

X_4 = Market value equity / Book value of total liabilities

X_5 = Sales / Total assets

Z = Overall Index or Z-Score"

Krishnamoorthy and Vijayapriya (2023) have identified three zones as such as if:

- Z-score < 1.81, the company is in distress (Red zone)
- 1.81< Z-score < 2.99, the company is in the gray zone and can move to either red or green zone
- Z-score > 2.99, the company is in the safe zone and financially stable

Firm Lifecycle:

The measurements used for firm lifecycle are either non-financial i.e., strategic orientation, organizational state, leadership style, age of the firm, etc. or financial i.e., dividend payout ratio, growth in sales, cash flow patterns, etc. (A. Akbar et al., 2019). The linear measures used in literature for firm lifecycles are age, size, and growth have been criticized (Yoo, (Yoo et al., 2019).

This research implies the method used by Dickinson (2011) for the division of a firm lifecycle into stages based on cash flows or more specifically cash flow patterns which are derived from accounting information (i.e., cash flow statements) and is considered by Dickinson (2011) to be a robust indicator. The same proxy is also used by Aderin & Amede (2022), Atif et al. (2022), P. Sari & Ismah (2022) and Durana et al. (2021).

This model has two benefits. Firstly, it captures and reflects all the financial information related to any firm. The other measures (size, age, sales growth, etc.) focus on a single attribute thus it's one-dimensional. The second benefit as stated earlier is that it assumes that the lifecycle stages do not follow a sequence (A. Akbar et al., 2019). The lifecycle is divided into phases or stages based on the combination of cash flows from operations, investment, and financing activities at each financial statement date. Based on the signs of three types of

cash flows, Dickinson (2011) has integrated 8 patterns sharing similar characteristics and ended up with five stages as presented in table 2:

Table 2
Patterns of cashflows in different stages

Pattern	1	2	3	4	5	6	7	8
Stage	Introduction	Growth	Mature	Shakeout			Decline	
CFO	-	+	+	-	+	+	-	-
CFI	-	-	-	-	+	+	+	+
CFF	+	+	-	-	+	-	+	-

Firm-Level Control Variables

Literature suggests that many internal factors affect financial distress. This study also includes some control variables. The definition and measurement of control variables used in this study are presented in Table 3:

Table 3
Measurement Of Control Variables

Variable	Variable Definition	Measurement
Leverage	Leverage tells us about the extent to which assets are financed through debt financing	$Leverage = \frac{Total\ Debt}{Total\ Equity}$ (Nopiana & Salvi, 2022; Wangsih et al., 2021)
Firm size	The total assets a company has in order to classify a company as big or small	Natural log of total assets (M. Akbar et al., 2022; Fachrudin & Ihsan, 2021)
Profitability	Profitability is a single figure but it reflects all the revenues and costs incurred by the companies by using assets and liabilities.	$Profit\ Margin = \frac{Net\ profit\ before\ tax}{Total\ Sales}$ (Rafatnia et al., 2020; Rubab et al., 2022)
Sales growth	By what percent the annual sales in year T of a company have increased or decreased from year T-1	$Sales\ Growth = \frac{Sales\ in\ Year\ T - Sales\ in\ year\ T-1}{Sales\ in\ Year\ T-1}$ (Diah & Putri, 2021; Elviana & Ali, 2022)

Fixed assets growth	"The ratio of the current year's fixed assets to lagged fixed assets. It is used to proxy the growth in capital expenditures".	$Fixed\ Asset\ Growth = \frac{FA\ in\ Year\ T - FA\ in\ year\ T-1}{Fixed\ Assets\ in\ Year\ T-1}$ (A. Akbar et al., 2019; Cahyanti et al., 2022)

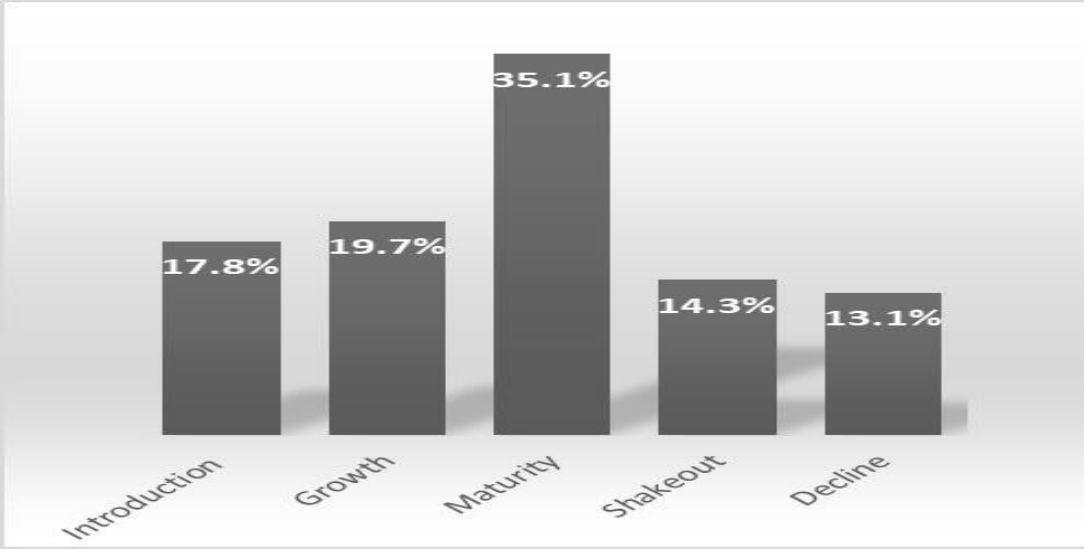
Industry and covid-19 are dummy variables where codes are assigned to them.

ANALYSIS

Stage wise Segregation

Figure 1 shows the percentage of observations in each stage of lifecycle.

Figure 1: Stage-wise distribution of data



Other descriptive data

It is also important to discuss descriptive analysis of variables in different stages of the firm lifecycle. Table 4 presents the average dependent and control variables in different stages of the firm lifecycle.

Table 4
Means of dependent and control variables in different stages

Stages	Z-Score	Leverage	Firm Size	Profitability	Sales Growth
Introduction	1.14	1.58	22.46	0.01	0.17
Growth	2.14	1.94	22.85	0.06	0.16
Maturity	3.57	1.79	22.85	0.19	0.18
Shake-out	1.78	1.24	22.55	0.11	0.11

Decline	1.03	1.88	21.92	-0.30	0.22

On average, the Z-Scores for the introduction stage, shake-out stage, and decline stage are lower than the maturity stage. This indicates that firms in these stages are distressed as compared to the growth and maturity stages. Firms in introduction stage have low profitability. Mature firms are largest with highest profitability as compared to other stages. Similarly, the firms in the decline stage are also financially distressed as profitability becomes negative and leverage increases. The results are in line with the literature and hypotheses of the study.

Statistical Analysis

Model

A. Akbar et al. (2019) argue that companies are dynamic and operate differently which leads to different results. Panel data models effectively control heterogeneity which is unobservable resulting in unbiased empirical results. To analyze the secondary data, panel data random or fixed techniques are used to test the hypotheses.

The research model is:

Financial Distress (Altman Z-Score) = $\alpha + \sum_{i=1}^{4} \beta_i$ (Firm Lifecycle Stage) $_{i,t} + \beta_5$ (Leverage) $_{i,t} + \beta_6$ (Firm Size) $_{i,t} + \beta_7$ (Profitability) $_{i,t} + \beta_8$ (Sales Growth) $_{i,t} + \beta_9$ (Fixed Asset Growth) $_{i,t} + \beta_{10}$ (Industry) $_{i,t} + €_{i,t}$

Whereas, the firm lifecycle stage is a dummy variable and thus β_1 to β_4 denotes represents stages of the firm lifecycle namely introduction, growth, maturity, and decline. The shakeout stage will be considered as the benchmark stage (A. Akbar et al., 2019; M. Akbar et al., 2022; Habib, 2017). € represents error terms.

Panel Data regression analysis

Table 5 presents the panel data regression analysis results of firm lifecycle stages on financial distress proxies as well as control variables.

Table 5

Results of Panel Data Regression

Hausman Test (p-value) < 0.05

	Coefficient	Standard Error	T-value	Significance level
Introduction	-0.5518	0.102	-5.40	0.00
Growth	0.3738	0.0999	3.74	0.00
Maturity	1.5704	0.0909	17.26	0.00

Decline	-0.5767	0.1101	-5.23	0.00
Leverage	0.0017	0.0012	1.42	0.16
Firm size	0.0416	0.0170	2.45	0.01
Profitability	0.1002	0.0184	5.45	0.00
Sales growth	0.0206	0.0326	0.63	0.53
Fixed asset growth	-0.0039	0.0134	-0.30	0.77
COVID-19	-0.1914	-0.6512	-2.94	0.00
Cement	-0.9470	0.1683	-5.63	0.00
Chemical	-0.6554	0.1586	-4.13	0.00
Engineering	-1.1895	0.1852	-6.42	0.00
Food and Personal Care	-0.3814	0.1634	-2.33	0.02
Pharmaceuticals	-0.0039	0.1951	-0.02	0.98
Power Generation & Distribution	-1.5595	0.1780	-8.76	0.00
Sugar & Allied Industries	-1.5108	0.1591	-9.49	0.00
Technology & Communication	-1.1001	0.1855	-5.93	0.00
Textile	-1.5021	0.1343	-11.19	0.00
Miscellaneous	-1.0862	0.1316	-8.25	0.00

It is clear from the above table that in comparison with the shakeout stage, the firms in the introduction stage and decline stage are financially distressed and have bankruptcy risk as indicated by negative signs of their coefficients which are also statistically significant (p-value < 0.05). Growing and mature firms are not financially distressed as the signs of their coefficients are positive and statistically significant (p-value< 0.05). Thus, all the hypotheses of this study (H_1, H_2, H_3, and H_4) are accepted. Evidently, it is concluded that there is an influence of the firm lifecycle on financial distress. The findings are like those of A. Akbar et al. (2019) as well as Iotti & Bonazzi (2018). A. Akbar et al. (2019) studies the non-financial firms of Pakistan and found out that firms in the introduction and decline stages are

financially distressed whereas companies in the mature stages are least financially distressed. Iotti & Bonazzi (2018) studied tomato processing firms in Italy and found similar results.

DISCUSSION AND RECOMMENDATIONS

This research aimed to study the relationship between stages of the firm lifecycle and financial distress. It was found that the financial stability of firms varies in different stages. In comparison to the shakeout stage, firms in the introduction and decline stages are financially distressed. The reasons are high debt financing, limited profitable projects, more asymmetric information, low profitability, etc. Growing and mature firms are not financially distressed in Pakistan. The results are statistically significant. These results indicate that the managers must make decisions or policies according to the stage of the firm lifecycle and should not implement a standard single policy in all stages. The policies should be made to deal with financial distress accordingly. This implies that managers should not take very risky decisions in the introduction and decline stages, in the context of Pakistan, as it may further intensify the financial distress and may lead to bankruptcy or default.

Aasen (2011) claims that the frequency of business failure in the introduction stage is more than later stages. Managers are risk-takers in the introduction stage but it doesn't benefit the firm in terms of return. Uncertainty about the future is high. Due to potential opportunities and positive net present value projects, high investments are needed in the introduction stage. This is because investors are skeptical about new firms. The reasons for this skepticism are asymmetric information, firm-specific risk, and cash flows that are very uncertain. Because of this firms rely highly on debt in the early stages as the option of equity issuing is costly (Jaafar & Halim, 2016; P. Sari & Ismah, 2022). Firms in the introduction stage also have low-profit margins as compared to other stages. All this increases the financial distress in the introduction stage. Thus, H1 is accepted.

Firms in the growing stages have established a presence in the market. They have created a demand for their products and product lines. Development of core competencies, expansion, and innovation are the key features of this stage (A. Akbar et al., 2019). The purchase of more effective and efficient assets (physical and otherwise) improves their internal operations. All this led to more demand, better sales, and reduced costs. Information asymmetry and uncertainty are reduced (Hasan et al., 2015). Accounting measures are better and growing at a rapid pace according to P. Sari and Ismah (2022). Therefore, H2 is supported.

Prices and sales in the maturity stage become stable. The investment opportunity reduces and innovation declines. Firms uses accumulated profits from the introduction and growth stages. The cash flows and earnings are positive. This increases the retained earnings and equity and leads to relatively less reliance on external financing. Firms start following the pecking order theory more closely (M. Akbar et al., 2022; P. Sari & Ismah, 2022). According to Al-Hadi et al. (2019), earnings are positive. Financial ratios are best and firms start paying dividends at this stage. Firms are financially sound and the chances of bankruptcy at this stage are lowest. As a result, H3 is supported.

Decline is the last stage of the firm lifecycle. Firms start cutting costs in the shakeout stage but this becomes intensive in the decline stage where most of the employees are let go by the firm. Debt Financing becomes severe threat for companies. Demand reduces day by day and profitability becomes negative (Amiri & Saeedi, 2022). The firm incurs huge losses. Firm is unable to make timely payments on debt raised in previous stages and this increases leverage and leads to bankruptcy. Hence, H_4 is accepted.

The effect firm size has on Z-Score is also consistent with the literature. In this research, the firm size has a positive and significant association with Z-Score. The results are similar to Dirman (2020) as well as M. Akbar et al. (2022). If the firm owns more assets, it pays off its debt obligations more easily. Profitability has also a positive and significant association with Z-Score meaning that profitability leads to financial stability. This is in line with the theory that profitability is low in the introduction stage but increases in the growing stage (Curry & Banjarnahor, 2018; Iotti & Bonazzi, 2018; Rafatnia et al., 2020). Profitability is highest in the maturity stage (Aldaas, 2021).

This research also analyzed the impact of the COVID-19 pandemic on financial distress. From table 6, it is also found that the firms were financially distressed in the years of the pandemic (2020 and 2021) as compared to earlier years. The coefficient is negative and statistically significant. This is supported by Khan and Ullah (2021) and Amir et al., (2022). Mushafiq (2021) studied the industries in the PSX during COVID-19 and found out that the Pharmaceutical, and food and personal care industries, performed better in COVID-19.

Industry Analysis

Table 6 presents the coefficients, standard error, and significance level for the industries.

From the table, it is interpreted that, except for Pharmaceuticals, all the industries are financially distressed. The coefficients of these industries are negative and significant as p-value < 0.05. From a debt point of view most of the firms listed on PSX are highly leveraged.

Farooq et al. (2021) state that financially distressed firms are unable to make the most of their "tangible assets". Due to a lack of literature in this regard, the researcher studied the combination of financial ratios in Altman Z-score to get insights. The findings are presented in table 6:

Table 6
Industry Analysis and Altman Z-score ratios

Industry	WC/ TA	RE/TA	EBIT/TA	MVE/BVL	SALES/TA
Cement	0.089	0.231	0.102	2.255	0.562
Chemical	0.145	0.095	0.119	1.684	1.115
Engineering	-0.007	-0.790	0.061	1.819	1.404
Food and personal care	0.039	0.161	0.095	2.107	1.400
Pharmaceuticals	0.226	0.309	0.158	2.649	1.261
Power generation & distribution	0.156	-0.349	0.075	2.171	0.575
Sugar & allied industries	-0.051	0.035	0.047	0.637	1.016
Technology & communication	0.141	0.028	0.072	1.570	0.628
Textile	-0.044	-0.020	0.056	0.567	1.085
Miscellaneous	0.042	0.098	0.054	1.612	0.890

From the table above we can see that PHARMACEUTICAL industry has the highest working capital to total asset ratio. As per Marginingsih (2022), the lower the ratio, the higher the financial distress as current assets shrunk in comparison to total assets. Aasen (2011) explains this ratio as a sign of firm's leverage. This reduces the chances of bankruptcy and the firm is following the pecking order theory. The ratio is also the highest for the PHARMACEUTICAL industry. The PHARMACEUTICAL industry also has the highest return on total asset ratio (EBIT/Total Assets). This is a profitability ratio. Stepanyan (2018) states that this ratio measures return on assets. Market sentiments can be linked to MVE/BVL ratio. The higher the ratio, the better it is. The PHARMACEUTICAL industry has the highest MVE/BVL ratio (2.469) among all the industries.

The last of the ratios is Sales/total assets. According to Gunawan et al. (2022), the "turnover of the assets owned by company" can be found through this ratio. The PHARMACEUTICAL industry does not have the highest asset turnover ratio but it is still very high (1.26).

From the above analysis, it is clear why the PHARMACEUTICAL industry is not financially distressed as they have the highest ratios, part of Altman Z-Score, as compared to other industries.

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