Non-systematic Review of Financial Sustainability and Financial Distress

[1]Hamad Raza, [2]*Syed Muhammad Ahmad Hassan Gillani, [3]Suresh Ramakrishnan, [4]Syed Muhammad Afraz Hassan Gillani , [5]Muhammad Imran Qureshi

ABSTRACT--Every business entity starts its operations for the purpose of earning profit for undefine time period. Beside earning profit, firms also emphasize on their growth and business expansion. However, due to poor financial planning or unseen factors, firms could not achieve targets and eventually face financial distress and bankruptcy. Once any business fails or bankrupt then it damages not only business its self but also damages many stakeholders like banks, suppliers, creditor and economy over all. In past, particularly in recent financial crisis many researchers and practitioners are engaged in developing the models which can predict financial failure. This study conducted a nonsystematic review on the development different models related to financial distress and observed that which models used which technique and what factors (variables) have been incorporated. Moreover, this study highlighted main features and also criticized drawback of each model. As discussed earlier that every company wants to grow, but this growth must be rational and sustainable. If growth is not sustainable then it may lead towards financial trouble. Therefore, this study suggests that if sustainable growth rate (SGR) will be incorporated in prediction modeling than accuracy of models can be improved.

Keywords-- Nonsystematic review, financial distress, financial sustainability, sustainability growth rate (SGR)

I.   INTRODUCTION

Financial distress is always an undesired situation for firm and it can have a negative impact on both firm itself and the global economy (Rafiei, Manzari, & Bostanian, 2011). The recent global financial crisis has led several enterprises to the financial distress in USA, European and Asian countries (World Bank, 2010). Financial distress and bankruptcy issue is a core area of corporate finance. Theories related to capital structure (e.g. agency theory and trade-off theory) highlight the importance of financial distress or bankruptcy costs. Moreover, there are several models related to prediction financial distress have been also developed by researchers. In this regard, Fitzpatrick (1932) carried out research on bankruptcy prediction. Later on, Beaver (1966b) and then Altman (1968) developed models by using financial ratios and significantly contributed in the area of financial distress prediction.

The aim of every manager is to keep the firm's growth in order to increase the value of the firm (Ashta, 2008). However, growth must be sustainable in order to get benefits for long term. Financial sustainability is an integral part of corporate sustainability and it is defined as a long-term compatibility between the revenue growth and

established operational and financial plans. Therefore, it is necessary for companies to sustain its self for the long-term and company should trade-off between high growth and high financial risk. Uncontrollable revenue growth may lead a corporation to financial distress. To test the financial sustainability of firm, sustainable growth rate (SGR) formula is very useful measure. The concept of sustainable growth was developed by Robert C. Higgins in 1977 and extended for continues time framework (Higgins, 1977a, 1981). According to Higgins, sustainable growth rate (SGR) is a maximum growth of revenue (in percentage), that the firm can sustain (self-finance) without altering any of its both financial and operating ratios and without releasing its new shares. SGR formula is formulated by comprising four accounting ratios, profit margin *PM* (net income after tax/revenue), assets turnover *AT* (revenue/assets), Financial Leverage *FL* (net assets/book value of equity) and earning retention ratio *ERR* (retained earnings / net income after tax).

II.   THEORIES IN VIEWPOINT OF FINANCIAL SUSTAINABILITY AND FINANCIAL DISTRESS

Mostly, theories related to financial distress and bankruptcy are addressing the balance sheet decomposition and cash management issues (Gillani, Ramakrishnan, Raza, & Ahmad, 2018).Main back draw of these model is that these theoretical models only give us information about change in capital structure design but not tell us any reason behind this change. For example, if any business takes more debt as compared to equity potion, in this situation there is only two possibilities either company is taking debt for supporting its growth or trying to pay its obligation. But theocratical models do not provide any kind of information. These models tell about only change in capital structure. Therefore, theoretical model of financial distress are not suitable predictors (Adrutdin et al., 2018; Afzal, Ahmad, Qureshi, Zaman, & Khan, 2014; A. Ahmad, Irshad, & Qureshi, 2016; M. H. B. H. Ahmad, Sarmin, & Qureshi, 2018; Alamer, Salamon, Qureshi, & Rasli, 2015a, 2015b; Ali M., 2018; Ali, Qureshi, & Mustapha, 2019; Ashfaq M, 2018; Baharum, Venkatesan, Raidzuan, & Qureshi, 2018).

Although cash management theory explains the reasons of financial distress but despite of theoretical reasoning, there also many other factors that might effect financial condition and lead towards financial distress (Aziz and Dar, 2004) Moreover, in comparison with other model (statistical and artificial intelligence models) theoretical model have been less used in prediction studies (Booth, 1983). Current study contains theories related to corporate finance, corporate governance and corporate sustainability which address debt taking behavior of firms and chances of financial distress (Bhatti, Sami, & Qureshi, 2018; Bibi, Iftikhar, Qureshi, Khan, & Zaman, 2013; Dawi, Jusoh, Nor, & Qureshi, 2016; Haider, Shah, Abbas, Qureshi, & Lumpur, 2016; Harasis A. A., 2018; Hishan et al., 2018, 2019; Ibrahim, Khan, Ramli, & Qureshi, 2019; Iftikhar & Qureshi, 2014; Iftikhar, Shahid, Shahab, Mobeen, & Qureshi, 2016; Iqbal, Agha, Nabi, Ali, & Qureshi, 2017; Irfan A., 2018; Irfan, Rasli, Sulaiman, Sami, & Qureshi, 2019; Irum et al., 2018; F. Jamil, Ismail, Mahmood, Khan, & Siddique, 2015; F. Jamil et al., 2016; R. A. Jamil et al., 2012; A. Khan et al., 2014; Khan F Khan Q, 2018; M. I. Khan et al., 2014; N. U. Khan, 2014; N. U. Khan, Qureshi, Rasli, & Ahmad, 2015; N. U. Khan, Rasli, & Qureshi, 2017; Latif, Ismail, Nazri, Nor, & Qureshi, 2018; Latif, Ismail, Nazri, Nor, Qureshi, et al., 2018; Lim et al., 2018; Mahdin, Raidzuan, Baharum, Qureshi, & Hanif, 2018; Mansoor Nazir Bhatti Amran Rasli, 2018; Muhammad Ashfaq Rabeatul Husna Fadillah Ismail Sobia Irum, 2018; Muhammad, Mansoor, Aamir, & Khalid, 2014

2.1 Static Trade-off Theory

For the purpose of comprehend the issue of financial distress, it is necessary to understand the capital mixture selections. This issue has been confusing for academics to establish the optimal capital structure and what mixture of debt and equity should be appropriate. In this esteem, since Modigliani and Miller (1958), this topic has been extensively debated in literature. According to this theory, interest is tax treated as deductible expenses, therefore companies rise debt in capital structure for the purpose of receiving tax benefits. In addition to this, the rise their debt employment means the increase in worth of business. However, this debt deployment is beneficial to a specific level but if firm goes outside this level then it can feel financial burden. Therefore, trade-off theory proposes that while taking capital structure choice, company must do adjustment by taking both tax benefits and cost of financial distress where these both factors are tradeoff. Several studies have been carried out in this support that moderate borrowing save from taxation but on the other side of picture it can also lead into financial distress. However, few empirical evidences do not support theory, for instance Kester (1986) uncovered a different aspect, he argued that if return on assets is high as compared to interest on debt. So, the most important variable for setting debt ratio is that how much return on investment (Nor et al., 2018; Qureshi, 2012; Qureshi, Awan, et al., 2016; Qureshi, Bhatti, Rasli, Yasir, & Zaman, 2014; Qureshi, Elashkar, et al., 2019; Qureshi, Hassan, Hishan, Rasli, & Zaman, 2017; Qureshi, Iftikhar, Abbas, et al., 2013; Qureshi, Iftikhar, Bhatti, Shams, & Zaman, 2013; Qureshi, Iftikhar, et al., 2015; Qureshi, Janjua, Zaman, Lodhi, & Tariq, 2014; Qureshi, Khan, & Zaman, 2012; Qureshi, Khan, Zaman, & Khaqan, 2014; Qureshi, Khan, Rasli, & Zaman, 2015; Qureshi, Khan, Bhatti, Khan, & Zaman, 2012; Qureshi, Md. Rasli, Jusoh, & Kowang, 2015)

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2.2 Signaling Theory

Signaling theory was introduced by Ross, Westerfield, and Jordan (2008) this theory argued that there is existence of asymmetric information between management and investors. As per signaling theory, once business implements aggressive debts taking approach then a good signal prevails in the marketplace that business's administration is so assured that it can make enough cash flows to cover both current and future debts, hence decisively investors feel that company is enough capable and financially strong. In contrast, if company reduces its debt portion in capital then investors may take as a sign that company is unable to make interest payment that's why it is avoiding debts, eventually market perceive a negative signal. Therefore, likelihood of default is a key feature of signaling theory. In addition to that this theory is correct only when organization of firm utilizes funds proficiently, on the other side if firm fails to do so then this unfavorable situation may lead firm towards financial distress and other bankruptcy costs. Furthermore, in normal business practices , the creditors are happy and feel comfortable with management policy specially when firm is in good financial health but financial distress may give birth a conflict between shareholders and creditors (Raza, Ramakrishnan, Gillani, & Ahmad, 2018; Qureshi, Qayyum, et al., 2019; Qureshi, Rasiah, et al., 2019; Qureshi, Rasli, et al., 2015; Qureshi, Rasli, & Zaman, 2014, 2016; Qureshi, Rustam, Rustam, Umar, & Zaman, 2012; Qureshi, Rustum, Rustum, Omar, & Zaman, 2013; Qureshi, Saleem, Abbas, & Qasuria, n.d.; Qureshi, Zaman, & Bhatti, 2011a, 2011b; Qureshi, Yusoff, Ahmed, Isa, & Imran, 2017; Qureshi, Yusoff, et al., 2019; Qureshi & Zaman, 2011; Qureshi M. I Bhatti M. N & K., 2011; Rahim N. S. A., 2019; Rajeh, Alamer, Salamon, Qureshi, & Rasli, 2015; Rashid M., 2019b, 2019a; Rashid,

Tasmin, Qureshi, & Shafiq, 2017; A. Rasli, Jusoh, & Qureshi, 2017; A. M. Rasli, Norhalim, Kowang, & Qureshi, 2014, 2015; A. M. Rasli, Qureshi, Isah-Chikaji, Zaman, & Ahmad, 2018; Safdar, Awan, Ahmed, Qureshi, & Hasnain, 2016; Sami, Jusoh, Mahfar, Qureshi, & Khan, 2016; Sami, Jusoh, Md Nor, Irfan, Irum, et al., 2018; Sami, Jusoh, Md Nor, Irfan, & Qureshi, 2018; Sami, Jusoh, & Qureshi, 2016; Shafiq & Qureshi, 2014;.

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2.3 Stewardship Theory

Stewardship theory of corporate governance is a substitute of agency theory. This theory is based on the core idea that management should protect the long-term stakeholders' interests rather than its own short term self-interested.   Hernandez defined the term stewardship as the degree to which a single willingly overturns his or her individual interest to act as shield of others (stakeholders) long-term welfare. This theory is also applicable on emerging concept of corporate sustainability. For protecting and facilitating concern of all stakeholders. Furthermore, current theory push administration for not only implement due diligence but also stands accountable and ready for improvement in both financial and non-financial factors. However, administration is not directed and directed that how these factors can be upgraded. This study includes corporate governance as non-financial and financial sustainability as financial factor.

2.3 Stakeholder Theory

Stakeholder theory talks about both organizational management and business ethics which are suggested by Hannan and Freeman (1984). According to this theory, the firms should not only work for profit maximization but also the interest of other stakeholders (internal and external) should be equally protected. According to Latief, Syed, and Syed (2014) the stakeholders can be classified into two categories internal stakeholders e.g stockholders, directors and staffs and external stakeholders e.g. sellers, creditors, clients, government authorities and association. Financial sustainability is a common part of both 1) shareholder theory and 2) stakeholder theory. However, shareholder theory focuses only on wealth maximization and argues that investment in non-financial sustainable activities e.g. ecological, governing and social can make divergence. On the other side the stakeholder theory intends that management should also participate and emphasis on environmental and communal activities because interest of all stakeholders should be protected and this is for the betterment of firm own larger interest (Clarkson, Overell, & Chapple, 2011).

III.   MODELS FOR FINANCIAL DISTRESS MODELS

In past default predictions have been done by several researchers by using different models but these can be classified into three main classifications. These are (1) statistical models (2) theoretical models (3) artificial intelligence models. In term of predictive quality, these models can be compared with each other. As far as statistical models are concern, they are types of either univariate or multivariate additionally, they emphasis on indication of default, when data is generally acquired from financial statements. Secondly, theoretical models are dissimilar from the statistical models in such a way that these models only focus the qualitative aspect of default reasoning. In addition to that usually, these are multivariate in nature and use the statistical procedure to give a qualitative support to theoretical reasoning. lastly, artificial intelligence models predict the event more accurately

as compared to all and these models are constructed based on machine learning. By nature, these are generally multivariate, and these models use data which is collected from financial statements.

4.1 The Statistical Models

In early stage of default prediction, the researchers used statistical models. Initially studies opted univariate analysis. After that, investigators opted multivariate methods for refining prediction accurateness. FitzPatrick (1932) was first, who practiced conventional financial ratio by taking of paired sampling technique of both distressed and non-distressed companies. After this, Beaver (1966a) broadly studied of inequitable supremacy of financial ratio, which supports for uncovering of distressed and non-distressed firms. The key feature of univariate is that it accounts only one case of any single firm at a time. Hence, categorization can be made for only one ratio at a single period.

Furthermore, this modelling deals with single independent variable, for instance in financial distress modeling a single financial ratio can be used in univariate model and it is very easy to handle as compared to other multivariate models. On the other side, its easy handling becomes its drawback because univariate model usually gives puzzling and contradictive arrangement outcomes for unlike financial ratios of the same business. For instance, categorizing of same firm which have a poor profitability and at the same time it also has above average liquidity, so this situation would be very confusing (Cascio et al., 1997). To apprehend the financial position of a company is a difficult job and it is quite tough to explain the financial status of any firm by using single ratio. So, it is required to include additional ratios for explain the financial condition in better way (Edmister, 1972). In order to resolve this drawback, Altman expended it into multiple discriminant analysis (MDA). MDA is generally used to classify one observation into several sets based on their specific features. The key benefit of MDA method is dealing with cataloging issue is concurrently examining its whole factors (Altman, 1968). A sample size of sixty-six manufacturing companies were equally distributed into defaulted and non-defaulted groups, twenty years data was composed from period 1946 to 1965. Out of many, twenty-two potential ratios had been estimated, furthermore, these were classified into 05 different main ratios which named as 1) profitability, 2) liquidity 3) solvency 4) leverage and 5) activity ratios. Conclusively multiple discriminants were used by Altman (1968).

$Z = (0.12) X1 + (0.14) X2 + (0.033) X3 + (0.006) X4 + (0.999) X5$

Where

X1 = working capital / total assets ratio

X2 = retained earnings / total assets

X3 = earnings before interest and taxes / total assets

X4 = market value of equity / book value of total debt

X5 = sale / total asset $\qquad$ Z = index (Z score)

Altman's Z score model stipulated prediction two years before financial failure. According to this model there are three types of zone. First zone consists, if Z score is more than 2.99 then it is considered in non-bankruptcy zone. Secondly, If Z score comes between range of 1.81 to 2.99 it is the zone of inexperience and finally if Z score comes less than 1.18 then it is vulnerability situation for firm, and it can be treated as bankruptcy zone. Though the discriminant analysis is extensively used, but there are few drawbacks linked with its suppositions. MDA needs three basic suppositions. First, independent variable should be in multivariate and must be normally distributed

(Richardson and Davidson, 1984) but realistically this assumption is overlooked which may reason of major biasness (Deakin, 1972, 1976; Eisenbeis & Avery, 1972). The second supposition talks about variance-covariance matrices, these must be identical in both bankrupt and non-bankrupt groups. The last supposition is that the preceding of likelihood of default and the misclassification.

Logit (Probit) analysis is an alternative method for prediction and it is a main statistical method that is used by many researchers in bankruptcy studies. Ohlson (1980) presented logit technique by adding firm-related determinants. Current study detected that methodical power of any particular model varies on the accessibility of information. Logit regression can predict bankruptcy before 01 and 02 years before outcome (bankruptcy) and its accurateness is 96.1% and 95.5% respectively. Moreover, YU et al. (2008) claimed that logistic regression is more capable than neural network and other computer based programmed.

Logistic regression model can be expressed as below

$$P(x) = 1 / [1 + e - (bo + b1 \cdot X1 + b2 \cdot X2 + \ldots + bn \cdot Xn)]$$

Where P(x) = probability of default,

bn = coefficients of each independent variable

Xn = value of each independent variable

4.2 Theoretical Models

Theoretical models of financial distress are related to financial distress and bankruptcy are addressing the balance sheet decomposition and cash management issues. Main back draw of these model is that these theoretical models only give us information about change in capital structure design but not tell us any reason behind this change. For example, if any business takes more debt as compared to equity potion, in this situation there is only two possibilities either company is taking debt for supporting its growth or trying to pay its obligation. But theocratical models do not provide any kind of information. These models tell about only change in capital structure. Therefore, theoretical model of financial distress are not suitable predictors. Unswerving with this restriction, Moyer (1977) discussed that such decomposition methods are not suitable predictors for bank defaults.

Although cash management theory explains the reasons of financial distress but despite of theoretical reasoning, there also many other factors that might effect financial condition and lead towards financial distress (Aziz and Dar, 2004) Moreover, in comparison with other model (statistical and artificial intelligence models) theoretical model have been less used in prediction studies (Booth, 1983). Current study contains theories related to corporate finance, corporate governance and corporate sustainability which address debt taking behavior of firms and chances of financial distress.

4.3 Artificial Intelligence Models

These models have been developed by using information relating to computer science and machine learning. These models include several methods such as recursive partitioning (Fryman, Altman & Kao, 1985) , neural network (Tam & Kiang, 1992) , rough sets (Dimitras et al., 1999) and support vector machines (Martens et al., 2007). Firstly, the recursive partitioning procedure are famous as decision tree. Frydman et al (1985) is pioneer who used applied this method in default prediction area. After this study, numerous research studies applied this method for instance Carter and Catlett (1987), Messier Jr and Hansen (1988), Pompe and Feelders (1997) and

Gepp et al. (2010). It is very illustrious method for both categorization and prediction. When we do comparison with other data mining and statistical techniques, the major advatntage of decision tree is it signifies rules of categorization in such a simple way that it can be easily understandable (Breiman et al., 1984; Hand et al., 2001)

Artificial Intelligence Networks (ANN) works as similar as human brain works like human brain makes decision on the basis of neurons networks ANN takes decision on the basis of output given by several nodes (Balcaen and Ooghe, 2006). In 1990 this method was first timed adopted for financial distress prediction procedure later on many commercial banks and landing intuitions have started this method on commercial scale. the main benefit of neural network (NN) models is that these models are very flexibility while dealing with data moreover, these models have ability to interact not only with non-linear functions but also with complex data. In addition to that, unlike MDA, these techniques they have capacity to handle the missing data (Shachmurove, 2002). Support vector machines (SVM) are based on organized learning techniques and connected with learning processes that evaluate data for categorizing distressed firms vs. non-distressed firms. In recent past several researches have been applied the SVM to predict financial distress (Chen, Härdle, & Moro, 2011).

IV. MODEL FOR FINANCIAL SUSTAINABILITY

Financial sustainability (FS) is an integral part of corporate sustainability. Financial sustainability is defined as; it is long-term compatibility between the growth of revenue and established operational and financial plans. Therefore, it is necessary for companies that they should not only sustain for the long-term but also trade-off between high growth and high financial risk. Uncontrollable revenue growth may drag corporations towards financial distress. To test the financial sustainability of firm, sustainable growth rate (SGR) formula is very useful measure.

5.1 Robert C. Higgins's Model

According to Higgins (1977b), the sustainable growth rate (SGR) is a highest growth of income (%), which the firm can sustain (internally finance) without altering any of its financial and operating ratios and without allotting new shares. He developed SGR by comprising four accounting ratios, profit margin *PM*, assets turnover *AT,* Financial Leverage *FL* and earning retention ratio *ERR*. In other words, SGR formula is a just simple function of all these ratios as discussed above.

$$SGR\ (\%) = PM \times AT \times FL \times ERR \qquad (1)$$

In the Du Pont Analysis, the return on equity is simply the product of net profit margin, total asset turn over and equity multiplier (Mubeen, 2017). Therefore, above Higgins SGR formula (1) can be simplified as

$$SGR\ (\%) = (PM \times AT \times FL) \times \quad ERR$$

or

$$SGR\ (\%) = \qquad ROE \qquad \times \qquad ERR \qquad (2)$$

Where

ROE = Return on Equity

ERR = Earnings Retention Ratio

Higgins' (1977) growth model (1) can also be mathematically derived as

$$SGR = \frac{ERR \times ROE}{1 - (ERR \times ROE)} \tag{3}$$

Where

ERR= Earnings Retention Rate

ROE = Return on Equity

5.2 Van Horn's Model

J. C. Van Horne (1988) also developed another popular sustainable growth rate model. Later on, he improved his model (2008). This model comprises the sale performance, financing ability and dividend policy of the firm. In other words, according to this model, SGR is the maximum annual percentage in the sale that can be achieved based on targeted operating, debt and dividend-payout ratio (Amouzesh, Moeinfar, & Mousavi, 2011). Van Horne's model is the qualitative description, which is a variance of the sale income, i.e. SGR or ΔS/S.

$$SGR = b(NP/S)(1+D/E)/(A/S)-b(NP/S)(1+D/E) \tag{4}$$

Where

b = Earnings retention rate (1-b is dividend payout ratio)

NP/S = Net profit margin

D/E = Debt to equity ratio

A/S = Asset turnover

Both Higgins (1977b) and Van Horne (1988) models are widely used by managers and researchers for the purpose of computing sustainable growth rate. Fonseka, Constantino García Ramos, and Gao-liang Tian (2012) investigated that Higgins SGR when used as continues and the dichotomous variable is more affected by variation in financial characteristics than Van Horne' model. Moreover, both models give approximately same results while considering the firms having most common financial characteristics. However, in case of highly profitable companies, Higgins model computes high SGR than Van Horne's model, but in case of high leveraged firm Van Horne's models computes high SGR than Higgins model. According to Fonseka (2011) difference between both models' calculation is less than 4%, so both models are equally good for managers and researchers to use.

V.   CONCLUSION

There is rich literature available on financial distress and its prediction models. In past mostly researchers developed models on the basis of different financial ratios, corporate governance indicator, and macro-economic variables. From model point of view most of researcher either used statistical models (MDA and Logistic) or machine learning model (artificial neural networks). While developing prediction models this point has been ignored that either firms were financial sustainable or not. Although, prime objective of any firm is to earn profit and grow but this desired growth should be in sustainable manner. So in future, there is need to incorporate financial sustainability factor in developing model.

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