A Useful Perspective for Evaluating The Risk and Creditworthiness of Private Companies

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This paper offers a fresh perspective from which to gauge the ongoing viability of a firm. While investors, lending institutions and trade creditors share common concern with respect to risk, they differ according to both the time horizon and their interest in the ongoing viability of the firm. Using a synthetic credit score and the time tested Altman's *Z*-score, this paper presents both measures along a simple X, Y axis plot that aims to provide a perspective of risk that is both straightforward and intuitive.

Introduction

Lenders, investors and trade creditors agree that assessing the ongoing viability of any firm with which they intend to conduct business is important for a variety of reasons. Lenders wish to be certain that their loans and interest will be repaid in a timely manner while investors require a viable company in order to exit the investment profitably. On the other hand, trade creditors want to know that they will be paid in full and within the terms of their purchase agreement.

While each of the three share common concern for the ongoing viability of the firm, they differ with respect to the time horizon with which they are concerned. The lender for example is concerned with firm viability within the time horizon of the loan agreement which may or may not be short in duration. The lender may be concerned with allocating scarce resources to develop client relationships that offer the prospect of doing business over the long term in order to maximize customer lifetime value. Similar to the lender, the investor is often interested in viability over a longer time horizon and indeed may be concerned with *improving* long term firm viability in order to maximize the firm's value upon exit. In slight contrast, the trade creditor is often concerned with a shorter time horizon that may depend on the value-at-risk that begins with the execution of the contract and ends on the payment date.

To meet the individual needs of their respective environments and associated time horizons, analysts choose from a wide variety of useful and well known risk evaluation measures. Examples range from simple working capital ratios designed to gauge the firm's ability to meet short term debt obligations such as the current ratio and acid ratio to efficiency oriented measures such as the cash to cash cycle. Some risk analysts prefer insight into cash flow metrics such as free cash flow and operating cash flow while still others use a combination of metrics from which to formulate their opinion of the firm's ability to remain a going concern. Indeed, most would agree that no single metric, regardless of the level of sophistication can provide the necessary insight suitable for every situation.

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Measuring and improving creditworthiness is not limited to investors, lenders and trade creditors alone. Indeed, company CEOs and CFOs concerned with growing credit facilities, sustaining growth and maximizing firm value know well the importance of maintaining sharp performance with respect to each metric for which they will be measured against. Accordingly, managerial focus on key performance metrics become vital elements of corporate strategy since failure to do so impacts the availability of funding and ultimately the cost of capital.

While time horizons associated with lenders, investors and trade creditors vary, it could be argued that each should be concerned with the long term viability of the firm. Not unlike the trade creditor, the lender may be chiefly concerned with the firm's ability to repay the loan under immediate consideration however it may be shortsighted for the lender to overlook the lifetime value of the customer with the prospects of a growing long lasting relationship. A reasonable approach to measuring creditworthiness therefore is one that reflects both a short and long term look at financial performance to compliment the immediate time horizon. Ideally, such a measure, or combination of measures reflect the firm's ability to meet both short and long term obligations coupled with the probability of default.

Measures that reflect short and long term viability

One measure that reflects intrinsic viability is the *Z*-score. The *Z*-score is a multivariate equation first developed by Edward Altman, a renowned Professor at New York University's Stern School of Business. The *Z*-Score is used most often to determine the company's likelihood of bankruptcy. Academic literature shows that the *Z*-score provides an accurate indication of default up to two years prior to distress and subsequent failure (Altman, 2000). Developed in 1968, the *Z*-score is used around the world by financial professionals to measure the degree of financial distress. First developed for public companies, the *Z*-score is widely accepted among academics and practitioners alike to be the empirical standard by which other distress models are compared. The *Z*-score has gained widespread recognition as a reliable predictor of bankruptcy with statistically significant accuracy levels of 93.9% within one year of default (Altman, 2000).

While the *Z*-score was first developed to predict corporate bankruptcy, the measure has gained widespread recognition as a useful tool for the purpose of credit risk analysis and often serves as a guidepost for turnaround managers with the aim of returning the firm to solid financial footing. More recently, the *Z*-score is gaining popularity as a key performance indicator[1]. Indeed, history and the literature show the *Z*-score to be a reliable indicator of financial distress. Accordingly, it only makes sense to apply managerial focus to the underlying drivers of the *Z*-score in order to optimize the financial well being of the firm.

1 The *Z*-score plays an integral role in purpose driven Corporate Performance Management systems such as ClearFinancials® strategic management framework.

The *Z*-score contains five variables discriminately weighted according to their statistical influence on financial distress. Upon examining each of the five ratios, we find that they indeed touch most every aspect of the company in one form or another.

1) Working Capital
2) Total Assets
3) Retained Earnings
4) EBIT
5) Equity Value
6) Total Liabilities
7) Net Sales

The *Z*-Score defined here represents the model used to evaluate a manufacturing oriented private company. The model contains one additional variable and different coefficients than a private non-manufacturing company and different coefficients than those used for the purpose of evaluating a public company.

Mathematical Expression:

$$Z = \frac{NWC}{TA}(.717) + \frac{RE}{TA}(.847) + \frac{EBIT}{TA}(3.107) + \frac{BE}{TL}(.420) + \frac{S}{TA}(.998)$$

Where:

Z = Z-score
NWC = Net Working Capital
RE = Retained Earnings
TA = Total Assets
EBIT = Earnings Before Interest & Tax
BE = Book Value of Equity
S = Sales

The first term in the equation addresses the relationship between working capital and total assets that illustrate the percentage of the firm's assets that are freely engaged to support operations. The second term of the equation is represented by the ratio of retained earnings compared to total assets which indicate the relative percentage of assets that are financed internally with profits resulting from operations. The third term of the equation represents the percentage of EBIT to total assets and illustrates pretax earnings compared to assets with respect paid to the degree of leverage and the fourth part of the equation compares the book value of equity to total liabilities. This ratio explains the relationship between debt and equity, a major component of risk.

Making the most of the *Z*-score

While the *Z*-score is a discrete measure representing one moment in time, it is known to be a relevant indication of firm viability. However considerable power and insight can be gained by evaluating the *behavioral trend* of the *Z*-score[2]. That is, the direction and slope of the *Z*-score over time may theoretically provide more insight into firm viability than one discrete measure of the score itself. Put simply, a low but steadily inclining *Z*-score provides more useful information than one specific snap shot in time. Indeed, such a scenario provides some indication of the position of the firm in the subsequent period for which the analyst is concerned. For example, a trailing twelve month or twelve quarter *Z*-score trend line provides the analyst with powerful insight into the likelihood-of default that may exceed the single moment in time snapshot that pays no respect to the direction or the trajectory of company performance.

The Synthetic Score

To contrast or perhaps compliment the *Z*-score, a synthetic credit score can be constructed following a widely known process based upon the interest coverage ratio (Damodaran, 2006). The rating process is often used to assign a default premium to bonds with a rating that ranges from D, likely to default, to AAA, unlikely to default. For example, a firm that generates an interest coverage ratio between 3.50 and 4.00 is assigned a credit rating of BB+ and assigned a typical default spread of 2.0%, which is added to the risk free rate of return. Stated plainly by McKinsey & Company's Koller, Goedhart and Wessels (2005:486), "A credit score based upon interest coverage is a "straightforward indicator of a company's ability to comply with its short-term debt service obligations". While the synthetic credit score is embraced as a meaningful tool with respect to its ability to measure default risk, the measure is a snapshot in time and lacks important information regarding the direction and trajectory of firm performance. Once again, a trailing twelve month, or twelve quarter synthetic trend line arguably represents a considerable improvement over a single snapshot in time since it provides meaningful insight into both the direction and the trajectory of performance, in this case, the firm's ability to generate sufficient earnings to cover interest obligations.

A useful methodology that provides insight into both measures

While both the synthetic credit score and the Altman Z-score provide meaningful and robust insight into firm viability, each is distinct in the information they provide. On one hand, the synthetic credit score provides relatively short term insight into firm viability while the *Z*-score provides insight into operational performance that extends from working capital efficiency to managerial policy as it relates to capital retention, providing a longer term look at viability.

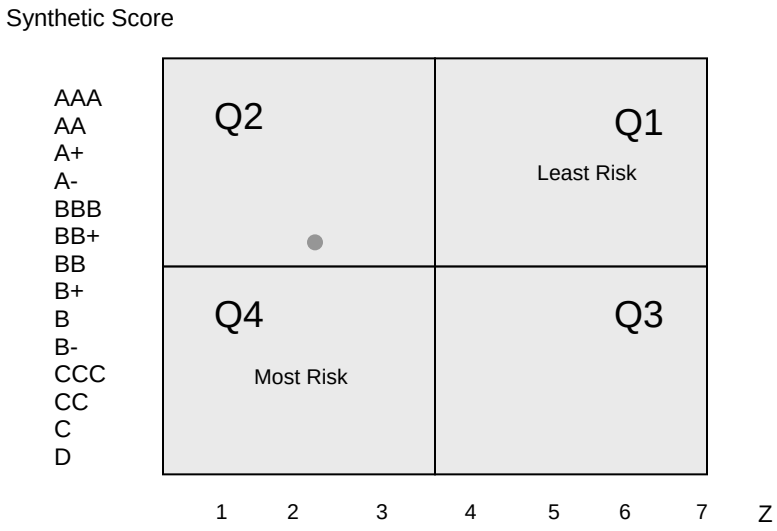
Plotting both measures on a four-quadrant X-Y chart provides a perspective of firm viability that is both informative and highly intuitive. Perhaps the greatest strength of this approach lies in that it illustrates both measures in relation to one another without combining the measures into one

2 This point noted previously by Calandro (2007)

composite measure which would in effect obscure important information provided by both measures. Figure 1 represents a four quadrant chart marked Q1, Q2, Q3 and Q4 with the synthetic credit score represented by the Y axis and the *Z*-score on the X axis.

Figure 1

Synthetic Z Plot



Methodology used to construct X & Y data points

The synthetic credit score is represented by alphabetical letters as illustrated in Figure 1 that correspond and fall within a specific range determined by the firm's interest coverage ratio. The synthetic score is a continuous value that falls within one of fourteen categories. The *Z*-score is represented by a continuous value. Each increment of the *Z*-score corresponds to two ranges of the synthetic score.

For example: Consider a Z score of 1 that intersects with the synthetic scores D and C. Both measures are widely known to be exceptionally risky. As a second example, consider a *Z*-score of 2.75 that intersects with B and B-. Once again both measures are known to be *uncertain*. With respect to the corresponding S&P rating for example, Patel and Vlamis (2006) refers a score of B to represent ongoing uncertainty. Likewise, Calandro (2007) states in essence that a *Z*-score less than 2.99 represents risk of financial distress and Altman (1968) shows that 2.99 represents the top end of the "Gray Area". Accordingly, both measures, a *Z*-score of 2.75, like the synthetic score of B can be interpreted as risky and uncertain. Likewise, a *Z*-score of 5 that intersects on the plot with A and A+ pose less cause for concern with respect to default. To be clear, the point of positioning the *Z*-score and the Synthetic score in this manner in no way implies that both measures are in any way equal for they represent entirely different measures of risk. Rather, it illustrates that both measures represent similar scale from high to low risk and can be presented in a practical manner along the X and Y axis.

At a glance, the Synthetic *Z*-plot provides a relational perspective between the synthetic credit and the *Z*-score that presented together provide meaningful information with respect to the underlying risk and financial performance of the firm. If the analyst agrees that the synthetic score represents a shorter term horizon than the *Z*-score, and since both measures differ with respect to the information that each provide, the four quadrants represent specific characteristics of company performance that each speak to the degree of risk in the context of time.

Interpreting the Synthetic *Z*-plot

Interpreting the synthetic *Z*-plot is straightforward and intuitive. Put simply, the higher and further the firm is located to the right of the chart, the *lower* the risk. On the other hand, the lower and further the firm is located to the left, the *higher* the risk.

Q1

Of the four quadrants represented in the synthetic *Z*-plot, firms occupying quadrant one present the least exposure to risk. Indeed, Q1 firms exhibit a relatively strong ability to cover current debt obligations and especially so if located in the upper level of the quadrant. Additionally, quadrant one firms' represents a low probability of default indicated by a minimum *Z*-score of 3.5. Further, it would follow that the firm's ability to generate a relatively strong synthetic score is likely due to the prudent management of net working capital, retained earnings to assets, EBIT, retained earnings and asset turnover indicated by a high *Z*-score.

Q2

Firms that lie in quadrant 2 are likely to be strong short term risk however their long term outlook depends upon how closely the firm lies to the Y axis. A firm that lies in quadrant two located close to the vertical center line likely represents a good risk both short and long term.

Q3

Firms that lie in quadrant three offer a strong long term outlook provided that the firm can adequately cover shorter term obligations which in this quadrant may be questionable.

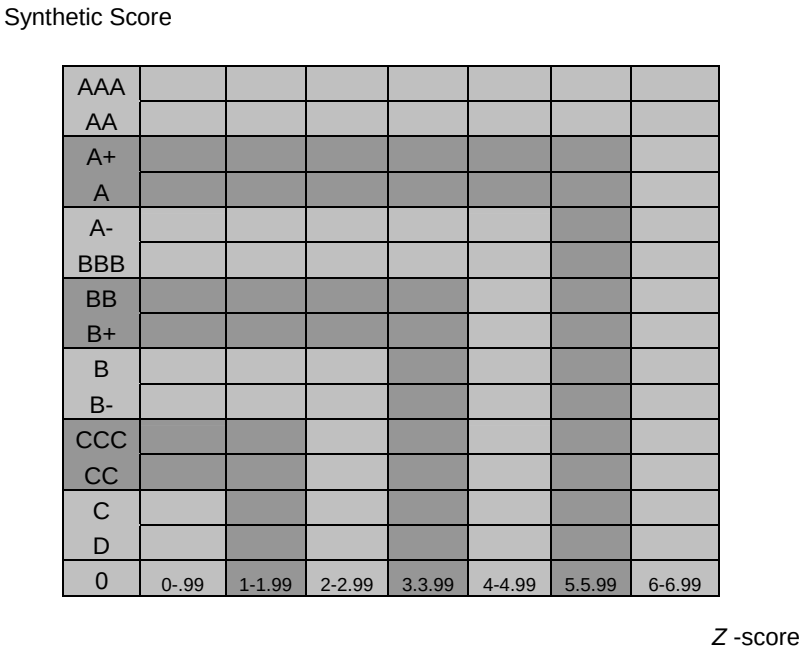
Q4

Opposite of quadrant one, firms that lie in quadrant four represent the highest risk and may represent considerable risk both short and long term.

Breaking it down further

While positioning the firm in one of four separate quadrants sheds at least some light on risk, further partitioning the quadrants enables an algorithmic approach that more accurately assigns terminology in order to describe the firm more succinctly. Figure 2 represents a basic X, Y chart with a synthetic credit score that ranges between D and AAA, and a Z-score that ranges from < 0 to 7. Each position of the chart represents the firm's location with respect to the synthetic credit score and their Z-score.

Figure 2



Each position on the *Z*-plot is assigned a description based upon the short and long term risk outlook of the firm using taxonomy presented in Figures' 3 and 4.

Figure 3

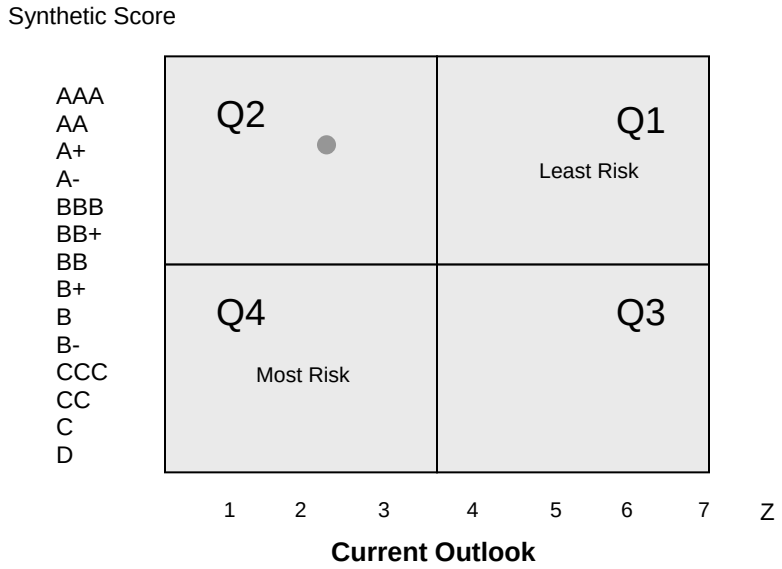
	Synthetic Score
AAA	Exceptionally Strong
AA	Excellent
A+	Very Strong
A	Good
A-	Adequate +
BBB	Adequate
BB	Adequate -
B+	Moderate Risk
B	High Risk
B-	Very High Risk
CCC	Vulnerable to Default
CC	Likely to Default
C	Very Likely Default
D	Extremely Likely to Default

Figure 4

Z-Score	Outlook
< 1.1	Distressed
1.11 - 2.6	Highly Uncertain
2.61 - 2.99	Uncertain
3.0 - 3.99	Not at Risk
4.0 -4.99	Strong
5.0-5.99	Very Strong
> 6.0	Exceptionally Strong

For example, Figure 5 illustrates a firm exhibiting interest coverage of 8.2 and earning a synthetic credit score of A+ and a *Z*-score of 2.75 and can be assigned a **"Very Strong"** short term outlook and an **"Uncertain"** long term outlook.

Figure 5



Synthetic A+ Represents a **"Very Strong"** Short Term Outlook
Z-score 2.75 Represents an **"Uncertain"** Long Term Outlook

While the hypothetical company presented in Figure 5 does not reside in the *least* risk quadrant, the *Z*-plot offers a two dimensional presentation of both measures in relation to one another along with a feel for where the company lies with respect to the highs and lows of both measures. In other words, this company is likely a good risk short term as evidenced by the synthetic score of A+ however is perhaps uncertain long-term as illustrated by the *Z*-score.

Drilling into both the *Z* and the Synthetic Score for additional insight

The ninety-eight position *Z*-plot provides meaningful information with respect to the firm's short and long term outlook. Indeed, the synthetic credit score provides a look at the firm's ability to cover debt obligations while the *Z*-score provides insight into the economic performance engine that generates earnings and cash flow necessary to repay trade creditors, lenders, investors and other company shareholders. While the Synthetic *Z*-Plot arguably provides a meaningful perspective with respect to creditworthiness, certain locations on the plot may warrant further analysis. To be sure, a firm that exhibits low short term risk but high long term risk may cause concern for lenders or investors with a long time horizon in mind. In such cases, insight into both the direction and the trajectory of the *Z*-score may provide the analyst with information to help determine whether the *Z*-score is declining, inclining, stable or volatile.

Conclusion

This paper offers a practical approach to gauge the risk of the firm from the perspective of the lender, investor or trade creditor. The methodology put forth makes use of two well known measures of risk. Indeed, both the synthetic credit score and the Altman *Z*-score are widely known to be excellent measures of risk that have stood the test of time and have undergone rigorous academic review. The approach presented here makes no attempt to combine or modify the synthetic score or the *Z*-score since that would obscure the very information that each measure provides. Rather, the objective of this paper is to present both measures in relationship to one another in order to provide the analyst with a perspective that is both meaningful and intuitive in the context of both *short* and *long* term risk.

Reference List

Altman, E.I. (1968) 'Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy' *The Journal of Finance,* (23) 4, pp. 598-609.

Altman, E.I. (2000) 'Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta® models' adapted from, 'Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy' *The Journal of Finance*, September 1968.

Calandro, J. (2007) 'Considering the utility of Altman's Z-score as a strategic assessment and performance management tool' *Journal of Strategy & Leadership* (35) 5, pp. 37-43

Damodaran, A. (2006) 'Damodaran on Valuation, Security Analysis for Investment and Corporate Finance', Second Edition. Hoboken. Wiley.

Koller, T., Goedhart, M. and Wessels, D. (2005) 'Valuation, Measuring and Managing the Value of Companies', Fourth Edition. Hoboken. Wiley.

Patel, K. and Vlamis, P. (2006) 'An Empirical Estimation of Default Risk of UK Real Estate Companies' *The Journal of Real Estate Finance and Economics*, (32) 1, pp.21-40