

# The Dynamic Z-score

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## ABSTRACT

This article suggests that the time tested Altman Z-score, originally designed to predict corporate default represents considerable value when used as a corporate performance metric if measured continuously as opposed to one moment in time<sup>1</sup>. Indeed, one could reason that if the measure has merit as a predictor of default, then it only make sense to manage the underlying drivers in order to optimize the ongoing viability of the firm. Used in this manner, this article argues that the Z-score should be considered more often in the corporate performance management setting. In addition, the article highlights the significance of the measure when crafting loan covenants to compliment other measures that are perhaps shorter term in nature. A generic framework is provided that illustrates the relationship of underlying drivers that contribute to the score, representing at least one approach to managing firm viability as a component of corporate strategy.

## Introduction

In September 1968, The Journal of Finance published a paper authored by Edward I. Altman that introduced the world to the Altman Z-score, a technique designed to predict corporate bankruptcy<sup>2</sup>. Over the past forty years, scores of academics and practitioners have put the Z-score to test under a wide range of industries and economic environments. During that same timeframe, many new methodologies were put forth that challenged the Z-score as the premier indicator of corporate distress however few, if any, came close to the accuracy of the Z-score as a predictor of corporate default within a two year time horizon. Indeed, the Altman Z-score has stood the test of time while undergoing the rigor of academic scrutiny and has secured its place in corporate finance history.

## Much more than a predictor of corporate default

While few can challenge the merit of the Z-score, its value extends well beyond predicting corporate bankruptcy<sup>3</sup>. Since the reliability of the Z-score as a predictor of corporate default is so well documented, this article asks why the measure is not used more often as a part of loan covenants, earn-out agreements and management incentive programs. The answer to this question may be due in part to the difficulty of assembling the data necessary to make the Z-score practical and therefore relevant in the corporate setting. Producing a monthly Z-score for example requires collecting *trailing* twelve month data for each of the underlying ratios that make up the score. While such a task was perhaps difficult in the early years of the Z-score, advances in software and the availability of data make it relatively easy to unlock the value of this important metric today.

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1 This point raised previously by Calandro (2007)

2 Altman (1968) introduces the Z-score as a predictor of corporate bankruptcy

3 This point made clear by Carton and Hofer (2006)

### **Unlocking the power of the Z-score as a performance metric**

In the banking relationship, monitoring a dynamic trend of the Z-score arguably aligns the interests of the company's management team and shareholders with those of the lender. Clearly, if the principal concern of the lender is the ongoing viability of the firm, then why not focus managerial activities on measures that support firm survival? Setting minimum performance expectations for the five underlying ratios of the Z-score for example can only serve to shore up the future outlook of the firm. In contrast however, lenders often tie covenants to relatively short sighted measures such as interest coverage and fixed charge coverage ratios that have little to do with building a going concern. Moreover, it could be argued that covenants designed to limit management spending and especially those focused on short term earnings hinder rather than support management activities that drive long term firm value. If the purpose of the covenant is to ensure firm viability, monitoring a monthly Z-score compared to a minimum planned threshold for the measure would seem to make perfect sense.

### **Why the Z-score works**

It is little wonder that the Z-score is such an effective indicator of corporate distress. A close examination of the Z-score reveals that it touches virtually every aspect of firm performance in one form or another. Each constituent component underlying the Z-score explains a distinct albeit different perspective of financial performance. The Z-score illustrated in Figure 1 contains five variables discriminately weighted according to their statistical influence on financial distress.

**Figure 1**

#### **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

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

The Z-Score equation presented in Figure-1 represents the model used to evaluate a manufacturing oriented private company. The model contains one additional variable and different coefficients than that of a private non-manufacturing company and different coefficients than those used for the purpose of evaluating a public company.

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. The fifth and final term of the equation reflects the efficiency with which the organization turns assets into revenue that ultimately leads to income.

### **Making the most of the Z-score**

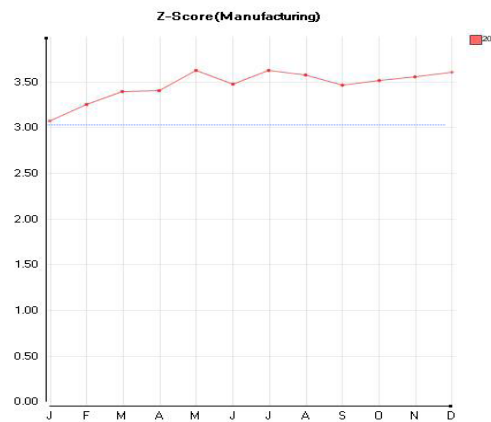
The Z-score is a discrete measure that represents one moment in time. However considerable power and insight can be gained by evaluating the *behavioral trend* of the Z-score (Carton and Hofer, 2006). That is, the direction and slope of the Z-score versus time provides more insight into firm viability 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 since it provides insight into the future direction of the firm. A recent study performed by Carton and Hofer (2006) for example demonstrates that observing the change to the Z-score provides five times more information than when compared to a snapshot of one moment 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 updated each month provides the analyst with powerful insight into the likelihood-of default that may far exceed the single moment in time snapshot that pays no respect to either the direction or the trajectory of company performance.

### **Utilizing the Dynamic Z as a corporate management metric**

Aligning the organization to achieve or maintain the optimal Z-score is straightforward when using budget-modeling software that solves for the performance of the underlying drivers necessary to achieve the required Z-score. Ideally, each of the five measures vs. plan become a component of the relevant stakeholder's personal dashboard, mobilizing and directing management focus to metrics that support firm viability. Figure 2 represents a budget vs. plan performance chart for each of the five underlying performance drivers of the Z-score. Achieving the minimum performance indicated by the blue line of the underlying drivers ensures that the company will operate above the budgeted Z-score. As demonstrated by Carton and Hofer (2006) and more recently by Calandro (2007), the Z-score is both significant and valuable with respect to its robust ability to explain financial performance.

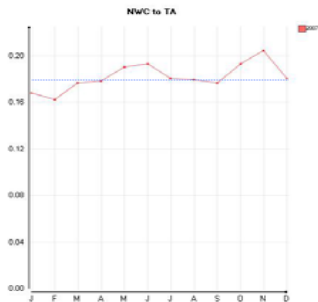
Figure 2

**Z-score Trend**  
Rolling Trailing Twelve



The BUDGET produces the minimum monthly performance necessary to operate the company above the blue line, in this case, a Z-score that insures the company remains in the 'Safety-Zone'.

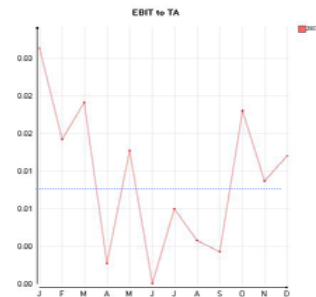
NWC ~ Total Assets



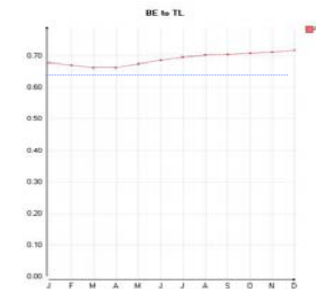
RE ~ Total Assets



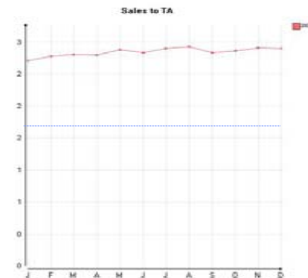
EBIT ~ Total Assets



EQUITY ~ Total Assets

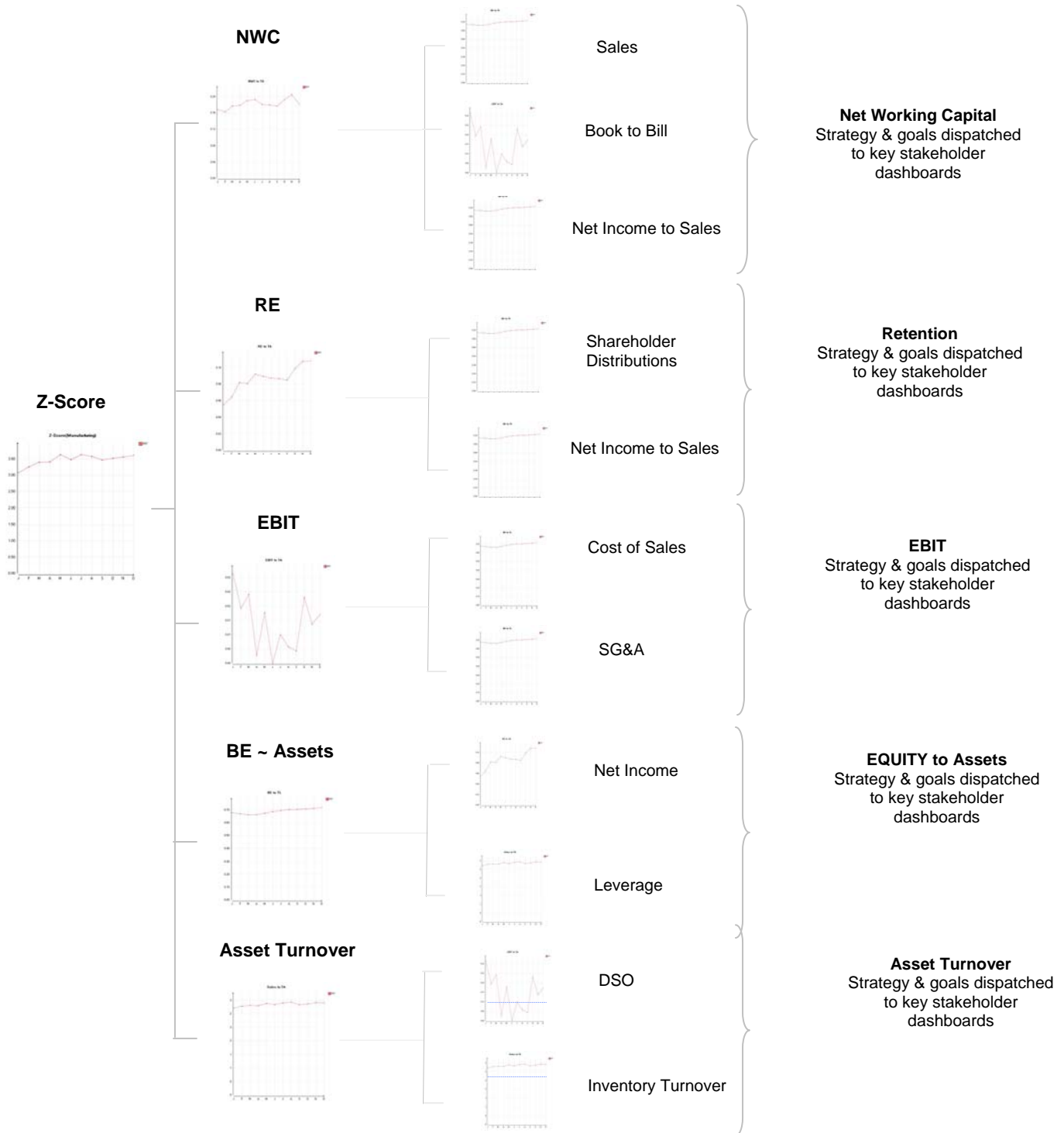


Asset Turnover



Managing each of the five variables to the blue PLAN line will produce the minimum expected Z-score, in this case the corporate objective. Ideally, each of the five measures vs. plan are displayed as a component of the relevant stakeholder's personal dashboard.

In addition, each constituent part of the Z-score illustrated in Figure 2 depends upon underlying variables of their own. Once again, the budget determines the minimum performance of the underlying drivers indicated by the blue line. Accordingly, each of the five variables deserves a performance strategy complete with a minimum level of expected performance dispatched through key stakeholder dashboards that can be monitored and managed on a monthly basis<sup>4</sup>. Performance of the underlying variables interconnect and roll-up to contribute to the corporate Z-score.



<sup>4</sup> It is important to note that such modeling is best done within the context of other important financial objectives since applying focus to one specific measure may adversely impact another.

## Conclusion

This article makes no attempt to change or combine the Z-score with other measures for the literature clearly demonstrates its merit as a predictor of financial distress (Altman, 2000). Rather, this article seeks to put forth a simple example that serves to illustrate the ease of incorporating it into the strategic management framework as a powerful performance measure. Upon considering the general acceptance of the Z-score among practitioners and corporate managers as a performance management tool, Calandro (2007:38) states, "Though the Z-score model has been a well accepted financial distress model for almost four decades, strategists generally haven't discovered its potential as a performance management tool". Since the immense value of the Z-score as a performance metric is well documented by Carton and Hofer (2006), Calandro (2007) and others, it would seem plausible that at least part of the barrier is related to the availability of data necessary to express the measure in motion. Fortunately, recent advances in performance management software not only provide a means to capture contemporary data, they provide a framework from which to manage the underlying drivers of the Z-score in a manner that unlocks the value of this powerful measure.

## 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
- Carton, R.B. and Hofer, C.W. (2006) 'Measuring Organizational Performance: Metrics for Entrepreneurship and Strategic Management Research' Northampton. Edward Elgar Publishing Limited