

STOCK MARKET DARWINISM



STOXX STRONG BALANCE SHEET INDICES: A FAMILY THAT SELECTS THE FINANCIALLY FITTEST COMPANIES

STOXX Ltd. launched an index family earlier in 2014 that selects companies based on their Altman Z-Score. STOXX Pulse asked Angelika Eibl, senior market development manager at STOXX, to write a commentary about this index family and what it offers investors.



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IT IS NOT THE STRONGEST OR THE MOST INTELLIGENT WHO WILL SURVIVE BUT THOSE WHO CAN BEST MANAGE CHANGE.

CHARLES DARWIN

History holds plenty of examples of successful species that became extinct after failing to adapt to significant changes in their environment. The dodo, for instance, was a friendly flightless bird about three feet tall that was native to Mauritius. After thousands of years of successfully populating a place where he had no natural enemies, the dodo was extinct a mere 60 years after the first Dutch ship reached the island. Being fearless and wingless, the bird wasn't exactly well-equipped to survive the arrival of hungry sailors.

Similarly, some companies are clearly better positioned than others to successfully adapt to an ever-changing market environment. High debt levels don't bode well in the mid and long term, for instance.

Let's look at the example of Arcandor, which prior to its bankruptcy owned Germany's iconic department store chain Karstadt. In 2006, Arcandor raised a

reported 4.5 billion euros through the sale and leaseback of the majority of its properties. Commonly, the idea behind a sales and leaseback is to free up cash from low yielding real estate and invest it at a positive spread into the higher yielding operating business. Yet Arcandor did the opposite, fully financing the majority of its department stores at rapidly increasing rates that soon steeply exceeded the firm's operating margin. By 2008, rents amounted to 15% to 20% of revenue in several major cities¹, or a multiple of the single-digit margins that are common in Germany's fiercely competitive retail market. By December 2008, its total liabilities exceeded its market cap by over 12 billion euros, or 2,300%. In June 2009, Arcandor filed for bankruptcy protection after its request for loan guarantees was rejected by the German government. Arcandor's management made the case that the firm had become a hapless casualty of the credit crunch and the economic contraction, both of which doubtlessly accelerated the firm's downfall. Yet in hindsight, the firm's inapt, possibly reckless financial engineering had been bound to sooner or later cause serious trouble.

Starting from the premise that there should be features that allow investors to systematically and quantitatively discern among companies that are well-placed to survive ever-changing markets versus companies in danger of perishing, Professor Edward I. Altman from New York University's Stern School of Business performed extensive research in the late 1960s². In his pioneering work, he used the technique of linear discriminant analysis to develop a simple yet powerful metric which would gauge a stock's near- and mid-term default risk using readily available data from corporate balance sheets and income statements.

¹ Source: "Club der Millionäre", Der Spiegel, 25/2009

² "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy", Altman (1968)

This metric is called the Altman Z-Score. Popular and widely used among practitioners, the score measures the financial health of a company using the weighted sum of five financial ratios relating to liquidity, profitability, market return, debt and revenues

$$Z\text{-Score}=1.2X_1+1.4X_2+3.3X_3+0.6X_4+1.0X_5$$

where

X_1 = working capital/total assets

X_2 = retained earnings/total assets

X_3 = earnings before interest and tax/
total assets

X_4 = market value of equity/book value
of debt

X_5 = sales/total assets

Altman determined that companies with Z-Scores of 3.0 and higher are very likely to stay in business over a two-year time horizon, whereas companies with Z-Scores of 1.8 and smaller have significant default risk over the same period.³ In between these two values, the lines are blurred and a reliable classification cannot be made.

The model of the Z-Score was originally designed only for manufacturing companies and was later extended to all industries ex financials. That's because Altman determined through quantitative research in the 1960s what the world learned from the media post-2007: financial firms' reporting is prone to hiding meaningful information, such as off-balance sheet activities and refinancing risks. As a result, accounting-

based metrics such as the Z-Score are less reliable, even meaningless when applied to financials.

Altman's research found the Z-Score to correctly predict bankruptcies of non-financials two years before the event in 72% of cases, with an "all-clear" falsely being given in 6% of cases (type II error). Later tests have found the model to even be 80% to 94%⁴ correct in predicting bankruptcy ahead of time. Over time, researchers have further found that the Z-Score not only predicts distress with a high degree of accuracy but is also a useful tool in gauging the likelihood of outperformance of a given stock⁵. Carter and Hofer for instance investigated a variety of common performance metrics and found the Z-Score to provide the greatest relative information about the market-adjusted return to shareholders⁶.

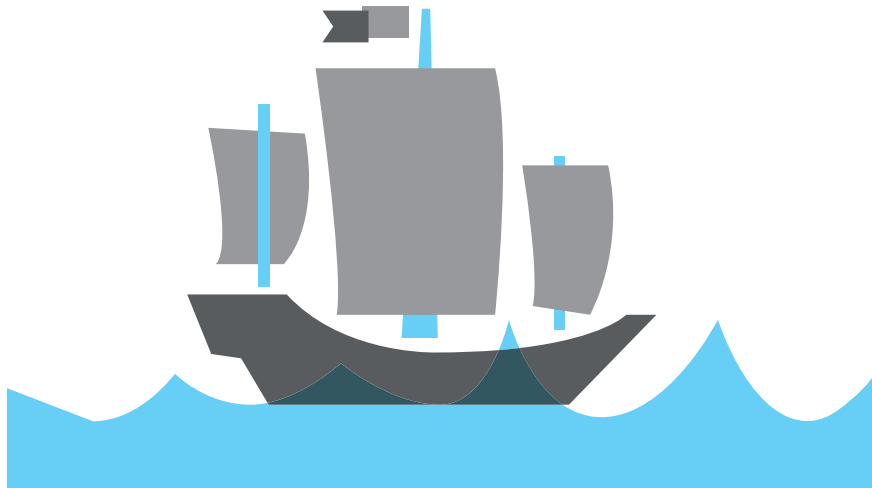
³ For reference: as of June 2008, the ill-fated German retailer Arcandor had an Altman Z Score of -0.1 (Source: Bloomberg)

⁴ "Prediction of Corporate Bankruptcy from 2008 Through 2011", Li (2012)

⁵ "A Study of the Efficacy of Altman's Z To Predict Bankruptcy of Specialty Retail Firms Doing Business in Contemporary Times", Hayes et al. (2010)

⁶ "Measuring organizational performance: Metrics for entrepreneurship and strategic management research", Carton, Hofer (2006)





- » **Broad, liquid representation** of a given market as evidenced by high correlation and low tracking error to the underlying base index
- » **Outperformance** through higher return as well as reduced volatility
- » **Downside protection** through reduced maximum drawdown

In conclusion, we offer to our clients an index family that successfully adopts Darwin's famous principle of the "survival of the fittest" by excluding all but those stocks with the strongest balance sheets as measured by their respective Z-Scores. Empirically, such stocks are more adaptive to ever-changing markets, create excess return and mitigate downside risk. Since the STOXX Strong Balance Sheet index family is broadly diversified and thus representative of the underlying market, it is ideally suited to replace traditional ex financial indices and strategies. In addition, the index family can be used to derive long only, "130-30" or market neutral satellite strategies to produce excess return. <<

Going back to our analogy from evolutionary theory, one can say: a species that due to its high degree of adaptability is particularly likely to persist is likely to do better than other species even in the absence of major environmental changes. This is evolutionary theory at its best. We have found that what holds true in nature applies equally well to the stock market. Through the STOXX Strong Balance Sheet index family, we offer our clients an index methodology that filters out any stocks that are not suited for survival.

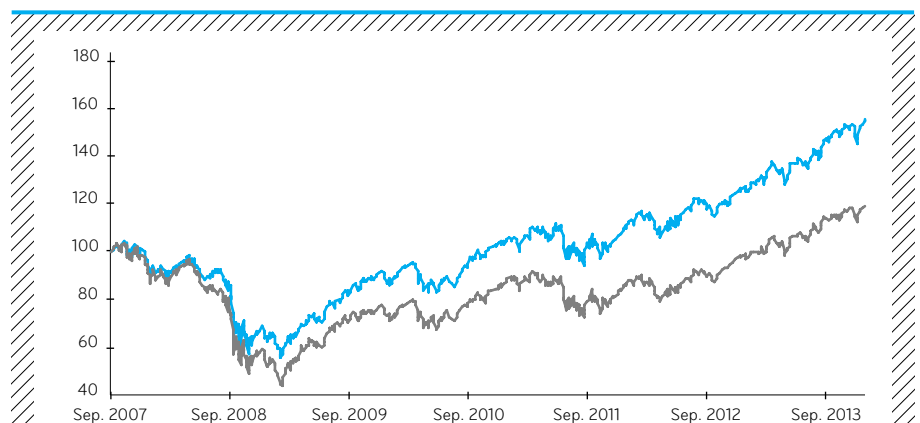
The concept is as straightforward as it is powerful: for a given universe, the pertinent STOXX Strong Balance Sheet Index contains only stocks with a three-year track record of Z-Scores of 3.5 and higher. Financial firms are excluded from the universe. Further, stocks must pass an adaptive liquidity screen (95% of the most liquid stocks in a universe qualify) that has a fixed, region-specific floor of typically around the local currency equivalent of 5 million US dollars in average daily trading volume. There are two index versions: one is weighted by free-float market cap subject to a 10% cap at the component level. The second version is equally weighted. The index is reviewed annually in September and rebalanced quarterly.

The chart and table shows the key figures and return of the STOXX Global Strong Balance Sheet Index versus its benchmark, the STOXX Global 1800. Furthermore, a factor analysis reveals excess returns are most strongly driven

by the overweighting of companies with little leverage. This finding quantitatively confirms the intuition that if there is one thing that limits a company's flexibility to adapt to changes in the market and makes it prone to distress, that is high levels of debt.

True to its premise, the STOXX Strong Balance Sheet Index family succeeds in achieving the following:

STOXX GLOBAL STRONG BALANCE SHEET INDEX OUTPERFORMS BENCHMARK



	STOXX Global Strong Balance Sheet	STOXX Global 1800
# positions	376	1800
FF market cap in USD tn	9.9	32.9
Total no. of defaults	0	11 ¹
Return, annualized	7.0%	2.8%
Volatility, annualized	17.8%	20.1%
Maximum drawdown	-47.7%	-58.2%

Numbers computed using STOXX gross returns in USD over period from Sep. 24, 2007 to Feb. 28, 2014 unless labelled otherwise
¹ General Motors Corp., Arcandor AG, Landsbanki Islands hf., Glitnir banki hf., Kaupthing Bunadarbanki hf., Washington Mutual Inc., General Growth Properties Inc., Lehman Brothers Holdings Inc., Japan Airlines Corp., SINO-FOREST, Elpida Memory Inc.