SOLACTIVE
German Index Engineering

WHAT GOES DOWN, MUST COME UP! INVESTIGATING COMPANIES WITH NEGATIVE BOOK VALUE

White Paper

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EXECUTIVE SUMMARY

In this white paper, we attempted to study the historical behavior of US companies with negative book value (i.e., with total liabilities greater than total assets). We discovered that the market capitalization of companies with negative book value was more than USD 1.28 trillion as of April 30, 2019. A periodically rebalanced universe of companies with negative book value, outperformed the broader US equities over the period from November 30, 1998, to April 30, 2019. Therefore, they are not insignificant any longer to be disregarded by academics and practitioners alike.

HIGHLIGHTS

Within the universe of companies that had reported negative book value at least once between November 30, 1998, and April 30, 2019, we observed that

- approximately 55% of the companies subsequently reported positive book value within one year after declaring negative book value
- companies with smaller market capitalization outperformed those with larger market capitalization
- companies with higher ability to manage short-term obligations, as measured by the current ratio (defined as current assets / current liabilities), outperformed those with lower ability
- a periodically rebalanced strategy comprising of smaller stocks with higher current ratio generated an annualized excess total return of 4.9% over the broader US equities

INTRODUCTION

Book value reflects the accounting value of a company to its ordinary shareholders. Given publicly-traded companies' limited liability structure, a shareholder's payoff function would resemble that of a call option holder on the assets of the company with a strike price equal to the nominal value of its debt. In other words, theoretically, the shareholder's value should be strictly non-negative. Therefore, the fact that these companies are sometimes omitted by both academic and practitioners alike should come as no surprise to well-versed market participants.

Nevertheless, if we consider value premium to be derived from a company's distress risk, then the returns of the companies with negative book value should be disproportionally higher than their positive book value counterparts as, in theory, they are more susceptible to this risk factor [1].

In this paper, we attempted to study the historical performance of US companies with negative book value relative to the broader US equities, as well as to identify the factors that drive the performance of companies with negative book value.

NEGATIVE BOOK VALUE UNIVERSE

We formed the negative book value universe in two steps. First, we took all the companies with negative book-value per share (BVPS) headquartered and incorporated in the US and listed on NYSE and/or NASDAQ. Second, we excluded the companies ranking within the bottom 2.5% by cumulative market capitalization coverage from step one, to avoid the inclusion of very small companies with incomplete accounting information.

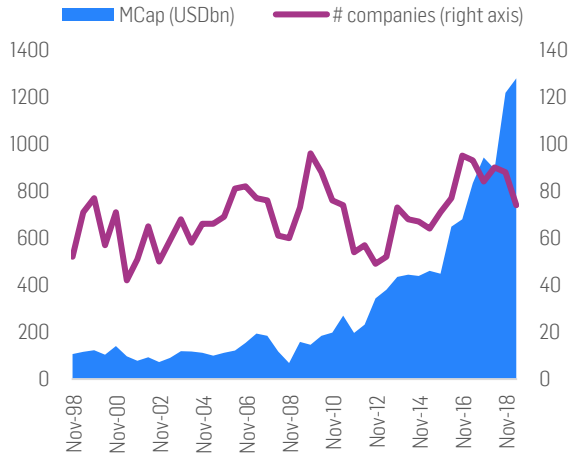
REBALANCING AND RETURNS

Throughout the paper, we rebalanced the negative book value universe as well as corresponding portfolios on the last trading day of May and November with selection date as of the end of April and October each year. We lagged the book value per share (BVPS), and other fundamental data by three months from the selection date to avoid data backfill bias. We used monthly stock returns from November 30, 1998, to April 30, 2019, for all of our back-tests.

UNIVERSE CHARACTERISTICS

The past decade witnessed an exponential growth in the market capitalization of companies declaring negative book value. The cumulative market capitalization of companies in the negative book value universe was approximately USD 1.28 trillion as of April 30, 2019 (see Exhibit 1). The top 5 largest companies in our universe as of November 30, 2018 were Home Depot, McDonald's, Phillip Morris, AbbVie, and Colgate Palmolive.

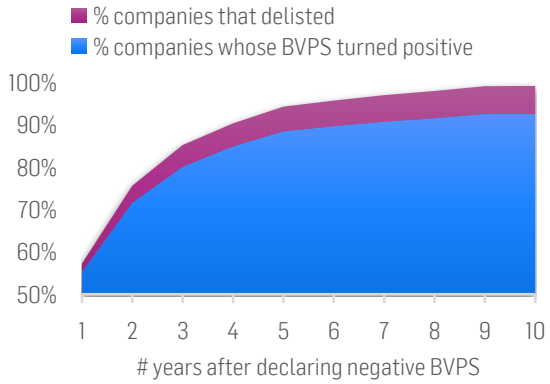
Exhibit 1: Market Capitalization Of Companies In The Negative Book Value Universe



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019. Chart is provided for illustrative purposes.

Based on our empirical investigation, the majority of the time, negative book value did not lead to the inevitable death of a company. Our historical analysis showed that between November 1998 and April 2019, there were more than 1,200 instances, 40% of which were repeat occurrences, when the companies in our negative book value universe reported negative book value at some point in time in their annual report. Out of these, approximately 55% subsequently reported positive book value within one year after declaring negative book value. Moreover, within 10 years, more than 90% subsequently reported positive book value. Less than 10% of the firms delisted after 10 years of reporting negative book value (see Exhibit 2). Since we rebalanced the universe periodically, survivorship was not a major issue in our back-tests.

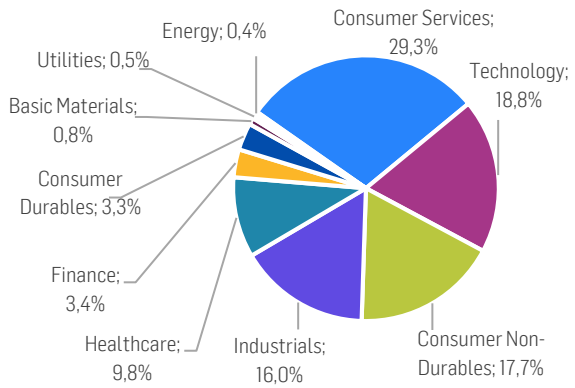
Exhibit 2: Percentage Of Companies From The Negative Book Value Universe Which Subsequently Declared Positive Book Value Or Got Delisted



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019. Chart is provided for illustrative purposes.

The Consumer Services, Technology, Consumer Non-Durables, Industrials, and Healthcare sectors jointly represented more than 90% of the negative book value universe averaged over the entire back-tested period (see Exhibit 3). One of the reasons is that companies in these sectors spend heavily on R&D and/or advertising. Under GAAP, they are not able to capitalize these value-adding expenses, which leads to a suppression in their book-value [2].

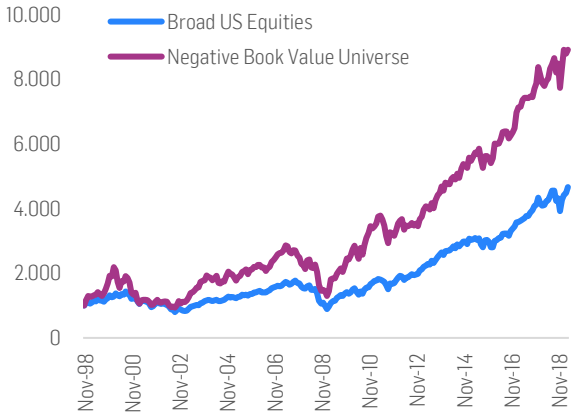
Exhibit 3: Average Sector Exposure Of The Negative Book Value Universe



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019. Chart is provided for illustrative purposes.

The periodically rebalanced negative book value universe outperformed the broader US equities over the back-tested period (see Exhibit 4). The annualized excess total return of the negative book value universe over the broader US equities was approximately 3.5% over the back-tested period. Although its volatility was also higher (see Exhibit 10)

Exhibit 4: Historical Market Capitalization Weighted Cumulative Total Return Performance



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019 in USD. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

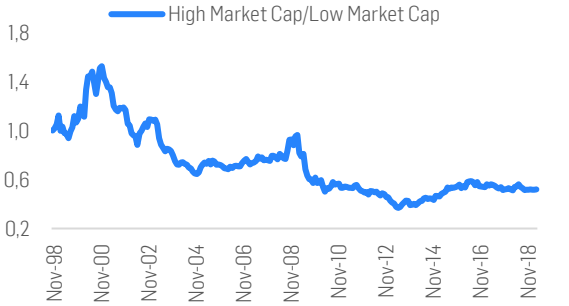
All these observations lead us to conclude that the negative book value universe is not insignificant any longer to be disregarded by academics and practitioners alike.

SIZE MAKES A DIFFERENCE

We dissected the negative book value universe into two halves by market capitalization. The upper half (High MCap) consisted of companies with relatively larger market capitalization within each sector to avoid sector bias. The rest of the companies formed the lower half (Low MCap).

The periodically rebalanced negative book value companies with smaller market capitalization outperformed those with larger market capitalization over the back-tested period (see Exhibit 5).

Exhibit 5: Historical Equal Weighted Cumulative Relative Total Return Performance Of Portfolios Based On Market Capitalization



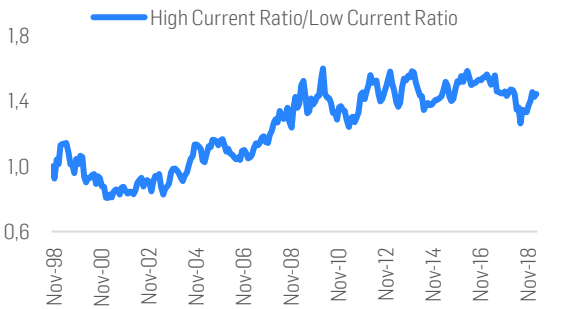
Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019 in USD. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

LIQUIDITY MATTERS AS WELL

We also divided the negative book value universe into two halves by the current ratio, defined as current assets over current liabilities. This indicator is a well-known liquidity ratio and measures a company's ability to handle short-term obligations. The upper half (High CR) consisted of companies with relatively higher current ratio within each sector, and the rest of the companies formed the lower half (Low CR).

The periodically rebalanced negative book value companies with higher ability to handle short-term obligations, as measured by the current ratio, outperformed those with lower ability over the back-tested period (see Exhibit 6).

Exhibit 6: Historical Equal Weighted Cumulative Relative Total Return Performance Of Portfolios Based On Current Ratio



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019 in USD. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

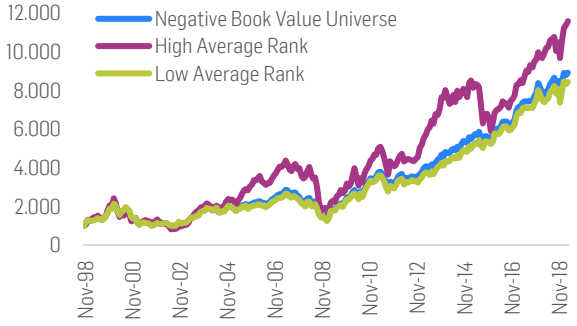
COMBINING SIZE AND LIQUIDITY

Since we discovered that current ratio and size were important drivers of returns historically for companies with negative book value, we combined them and studied their effect on historical performance characteristics.

We first calculated sector relative market capitalization and current ratio ranks respectively for each company in our negative book value universe. While ranking, companies with smaller market capitalization were rated better than others within their corresponding sector. Similarly, companies with a higher current ratio were rated better than others within their respective sector. Second, we took an average of the two ranks and separated the universe into two halves based on their average rank. The upper half (High AR) consisted of companies with relatively better average rank within each sector, and the rest of the companies formed the lower half (Low AR).

The result of this combination was as expected. The periodically rebalanced negative book value companies with better average rank (i.e., smaller companies with higher current ratio) outperformed the rest over the back-tested period (see Exhibit 7). However, the strategy's volatility was also higher (see Exhibit 10).

Exhibit 7: Historical Market Capitalization Weighted Cumulative Total Return Performance Of Portfolios Based On Average Rank By Market Capitalization And Current Ratio



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019 in USD. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

HISTORICAL TURNOVER

We also noticed that the historical average annualized one-way turnover of the market capitalization weighted portfolio with better average rank (i.e., smaller companies with higher current ratio) was 114% over the back-tested period. The high turnover was not surprising as we discovered earlier that more than 55% of the companies which declared negative book value subsequently reported positive book value within one year after declaring negative book value.

The annualized excess total return of the market capitalization weighted portfolio of smaller companies with a higher current ratio over the broader US equities was approximately 4.9% over the back-tested period. The high degree of excess total return demonstrates that the high turnover cost would not have been detrimental to the extent of eroding the strategy's entire historical excess return.

BASKET TRADABILITY

For long only investment mandates, we also analyzed the portfolio size, that could be fully replicated starting from a 100% cash position, under a broad assumption that about 5% of a stock's daily traded value could be purchased on a single day without causing a significant impact to its price. As of April 30, 2019, it would have required 5 days to fully replicate the market capitalization weighted strategy, with high average rank, having USD 25 million of assets under management (AUM). In the same 5 days, the market capitalization weighted negative equity universe itself could have been replicated, with AUM of USD 0.5 billion. These cases were evaluated by extrapolating the daily traded value of stocks to be equal to their average daily traded value over the last six months ending on April 30, 2019.

CONCLUSION

In this paper, we attempted to study the historical behavior of US companies with negative book value.

We discovered an exponential growth in the market capitalization of the companies declaring negative book value. We also found that the majority of the companies that reported negative book value subsequently declared positive book value within one year. The bulk of these negative book value companies belonged to the Consumer Services, Technology, Consumer Non-Durables, Industrials, and Healthcare sectors.

Over our back-tested period from November 30, 1998, to April 30, 2019, a periodically rebalanced universe of negative book value companies outperformed the broader US equities. Historically, market capitalization and a company's ability to manage its short-term obligations played a vital role in the performance of such companies. Within the periodically rebalanced universe of companies with negative book value, companies with smaller market capitalization and/or higher ability to manage short-term obligations, as measured by current ratio, outperformed other companies.

Finally, we also evaluated that a portfolio strategy based on negative book value companies with smaller market capitalization and/or higher current ratio would have generated a high turnover, but this would not have been detrimental to the extent of eroding the strategy's entire historical excess return. To reduce portfolio turnover, or to increase portfolio capacity, including companies with low positive book value and similar risk/return profile into our universe could be a possibility.

All these observations lead us to conclude that the negative book value universe is not immaterial any longer to be ignored by market participants.

REFERENCES

[1] Deep into Negative Territory: Who Negative Book Equity Stocks Are and Their Risk-Return Implications – Auckland Center for Financial Research

https://acfr.aut.ac.nz/__data/assets/pdf_file/0003/30000/403278.pdf

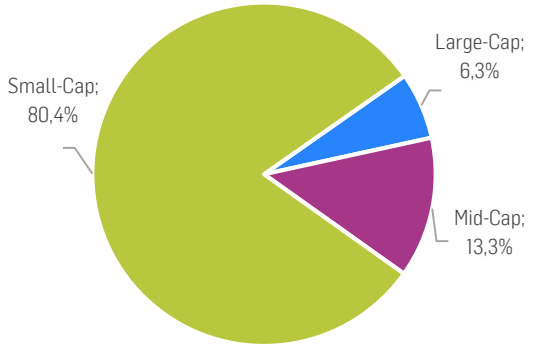
[2] Negative Equity, Veiled Value, and the Erosion of Price-to-Book – O'Shaughnessy Asset Management

https://www.osam.com/pdfs/research/44_Negative_Equity_Veiled_Value_and_the_Erosion_of_Price-to-Book-April-30-2018.pdf

APPENDIX

Small-cap companies represented more than 80% of the negative book value universe in terms of the number of companies averaged over the entire back-tested period (see Exhibit 8). We defined the size segments based on the companies' cumulative market capitalization rank within the broad US universe at each selection date. The top 70% were classified as large-cap. The next 15% were categorized as mid-cap and the last 15% were grouped into small-cap companies.

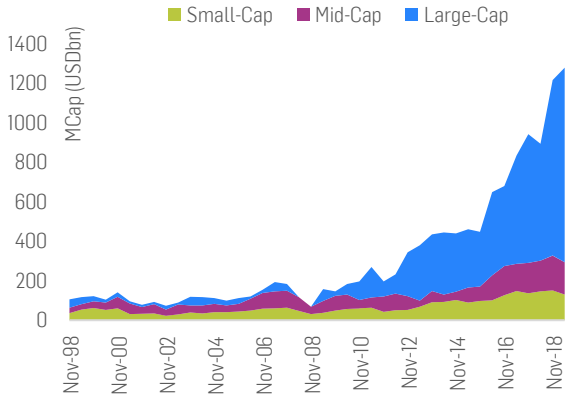
Exhibit 8: Average Percentage Companies In Each Size Segment Of The Negative Book Value Universe



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019. Chart is provided for illustrative purposes.

In terms of market capitalization, the large-cap segment was most dominant and grew exponentially over the past decade (see Exhibit 9).

Exhibit 9: Market Capitalization Of Companies In The Negative Book Value Universe



Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019. Chart is provided for illustrative purposes.

The periodically rebalanced negative book value companies with better average rank (i.e., smaller companies with higher current ratio) outperformed the broad US equities on an absolute, as well as risk adjusted basis, over the back-tested period (see Exhibit 10).

Exhibit 10: Historical Market Capitalization Weighted Total Return Performance

Performance Statistic	Broad US Equities	Negative Book Value Universe	High Average Rank	Low Average Rank
Annualized Return	7.8%	11.3%	12.7%	11.0%
Annualized Volatility	15.1%	21.0%	26.2%	20.7%
Risk Adjusted Return	0.52	0.54	0.49	0.53

Source: Solactive and FactSet. Data from November 30, 1998 to April 30, 2019 in USD. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

DISCLAIMER

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