Wounded Wolves: Turnaround Stocks Quant Screening Backtesting

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Turnaround investing is the process of looking for investment opportunities in down-and-out companies that are poised to experience a financial recovery. investors willing to invest in these stocks could fall victim of two main risks: Cost of opportunity and downside risk. The current analysis backtests a proprietary turnaround screening criteria based on proprietary, practitioner and scholar research sources. Bloomberg, Python and R have been used for the backtesting and output analysis. The screened universe of companies is comprised of more than 9,000 stocks from the US, UK and European developed markets for the period 2003-2015 with only 215 shortlisted using six-month screening rebalancing periods and taking into consideration survivorship bias. The main conclusions extracted from the analysis are: i) more than half of the screened companies below to sectors with significant business cyclicality, ii) long term turnaround investors can pocket over+15% annualised returns for holding periods, yet short term turnaround investors able to identify repeatedly new turnaround opportunities to replace old positions can maximize annualised returns to levels beyond +25% CAGR, iii) Cost of opportunity and bankruptcy are the most important risks, iii) the turnaround strategy distribution of returns contains a significant "fat tails" or "tail risk" effect that invalidates the use of popular risk measures such as standard deviation for risk management purposes, iv) conclusions about the turnaround strategy capacity to generate alpha are similar to the ones drawn from total return analysis: cumulative alpha increases with time whereas annualised alpha exhibits a diminishing return profile as time passes v) alpha is high and significant with both long term and short term turnaround investors outperforming local benchmarks by double-digits, vi) return and risk-reward ratio analysis suggest short term traders should bias their trading books towards cyclical turnaround stories whereas long term investors can afford some more defensiveness in their portfolios, and finally vii) a stop-loss portfolio management discipline boosts the success rate of a turnaround strategy and reduces inherent behavioural biases.

Introduction: What are turnaround stocks?

Turnaround investing is the process of looking for investment opportunities in down-and-out companies that are poised to experience a financial recovery. A company must acknowledge and identify its problems, consider changes in management, and develop and implement a problem-solving strategy. In some cases, the best strategy may be to cut losses by liquidating the company rather than trying to turn it around.

Institutional investors focused on deep-value or turnaround stories are very often corporate finance specialists and law practitioners, which it makes sense as these troubled companies are usually involved in private negotiations or bankruptcy situations (chapter 11 or/and 7). More importantly, it takes a medium-to-long term investment horizon for those investors that become shareholders to monetize their plays as they prefer to enter in the trade very early, which exposes them to two main risks: cost of opportunity and downside risk.

In this way, turnaround plays aka deep-value stories, self-help picks or, as I love to call them, wounded wolves, are among the most profitable strategies among value investors; mind you, investors willing to invest in these stocks could fall victim of two main risks:

1. *Cost of opportunity:* the cost opportunity is crucial as more often than not wounded companies take more than expected to heal and reflect such improvement in their stock price.
2. *Downside risk:* entry point miscalculation is one of the most frequent mistakes in unexperienced investors. An impatient investor recklessly looking for deep-value picks might commit a grievous mistake when entering too early into a troubled company and, eventually, suffer significant losses that undermine absolute returns and the risk-reward contribution for the portfolio.

Both risks will be discussed later in this document as we answered several questions related to a turnaround screening approach and its backtesting analysis.

Turnaround Stocks: Research Literature findings

Scholar and practitioner literature is substantial but not as vast as for other topics or so-called valuation or trading anomalies. A summary of the most ground-breaking works is shown in the table below. Multiple authors have delved deeply upon several dimensions of the turnaround effect such as the management role, recovery stages, leading or financial ratios recovery indicators. The most remarkable insights are shown right below:

- Bibeault (1982) identifies two type of strategies in corporate recoveries: firstly, 'Emergency' strategies aimed at addressing financial crises and ensure a positive cash flow and, secondly, 'stabilization' plans to streamline and improve the company's core operation.
- Weiss(1990) and Morse & Show (1988) spot that from a 95% of companies emerging from Chapter 11 with reorganization plans, only 5% were eventually liquidated; and 60% of those emerging from Chapter 11 with reorganization plans, 7% merged with other companies and 15% were eventually liquidated.
- Multiple authors have been in post-recovery key leading indicators or turnaround factors. For instance, an increase in the debt-to-assets ratio and decreases in the debt-to-equity ratio and higher levels of short term liquidity were significant indicators of successful reorganization. Other factors were healthy cash-flow generation recovery, increasing inventory turnover and a remarkable boost in the rate of investment, whilst market share also grew. Conversely cost-to-sales and value-added decreased.
- Few studies have been able to touch the management role due to data scarcity. However, recent studies like Ellis (2012) shown that turnaround specialists hired as CEOs are able to deliver significantly positive abnormal returns and, most importantly, outperform the returns associated with announcements of other CEO successions. Firms that hire turnaround specialists reduce operating scale and show significant improvement in operating performance much more significantly and quicker than those that keep their managements or hire new ones with no turnaround experience whatsoever.

That said, one of the best research pieces is related to dividend omission (Buland and Subramanian, 2008) and will be discussed in the next paragraph. A comprehensive list of turnaround-related scholar and practitioner research is displayed in the next table:

Year	Author	Topic
1982	Bibeault	2_stage model of turnaround
1990 - 1977 - 1984 - 1990	Gilson - Warner - Altman - Weiss	median cost of restructuring debt
1990 ,1988	Weiss - Morse & Show	Turnaround Events: Liquidation
1989, 1990	Gilson, John and Lang	Turnaround Events: Private Agreements
1990	Gilson	Turnaround Events: Private Agreements
2004 - 1995 - 1983	Routledge and Gadenne - Hotchkiss - White	Turnaround Factors
1976	Schendel, Patton and Riggs	Turnaround Factors
1976	Schendel and Patton	Turnaround Factors
1980	Hofer	Turnaround Factors
1984 - 1999 - 2006	Slatter - Slatter and Lovett - Slatter, Lovett and Bar	Turnaround Factors
1990	DeAngelo and DeAngelo	Turnaround Factors: Dividends
2008	Buland and Subramanian	Turnaround Factors: Dividends
1989	Jensen	Turnaround Factors: Leverage
1993	Ofek	Turnaround Factors: Leverage
1985 - 1992	ubatkin & Chung - Castrogiovanni, Baliga & Kidwe	Turnaround Factors: Management
1980 - 1981	Whetten - Staw	Turnaround Factors: Management
1994	Ofek	Turnaround Factors: Management
1993	Schreuder	Turnaround Factors: Management
1976 - 1983 - 1983 - 1986	Starbuck - Cameron - Mohrman and Mohrman -	Turnaround Factors: Management
1991	Friedman and Saul	Turnaround Factors: Management
1977 - 1978 - 1985	Hedberg and Jonsson - Starbuck - Ford	Turnaround Factors: Management
2012	Ellis	Turnaround Factors: Management
1983	Hambrick and Schecter	Turnaround Strategies
1986	O'Neill	Turnaround Strategies
1995	Arogyaswamy, Barker III and Yasai-Ardekani	Turnaround Strategies
1993	Schreuder	Turnaround Strategies: Industry
1992 - 2006	Robbins and Pearce - Smith and Graves	Turnaround Strategies: Retrenchement
1974 - 1976 - 1983 - 1984	n - Schendel & Patton - Hambrick & Schecter - R	Turnaround Strategies: Retrenchement
1994	Barker and Mone	Turnaround Strategies: Retrenchement
1978	Bulow and Shoven	Turnaround: Stakeholders
1980, 1983 and 1989	White	Turnaround: Stakeholders
1983, 1989	White	Turnaround: Stakeholders
1989 - 1990 - 1989 - 1990	Kaplan, - Smith - Baker & Wruck - Kaplan & Stein	Turnaround: Stakeholders
1993	Ofek	Turnaround: Stakeholders
1985	Tushman and Romomelli	Turnaround: Stakeholders

Screening Criteria: Dividend Omissions as Leading Indicator

Buland and Subramanian (2008 and 2012) identified dividend omission events as a key point for successful turnaround stories. Dividend omissions act as a kick off point in a change corporate behaviour and can be easily measured quantitatively. The main takeaways extracted from these two authors research papers as it follows:

- Companies considered are only those omitting completely their dividend rather than cutting it partially. Only corporates with more than 10-year dividend track record are considered. In other words, firms for whom the dividend cut is a remarkable event.
- Authors called 'resumers' to those firms dividend-omitting firms that eliminated their debt overhang which gave them the financial flexibility to pursue valuable investment opportunities. On the other hand, the authors named 'non-resumers' to those stocks with persistent debt overhang, low investment and, eventually, continued to underperform their industry peers.
- Dividend resumers Stock price declines the day of omission as nobody expected this to occur, yet non-resumers stock price can bounce (investors were expecting it already).
- Resumers profitability improves after dividend omission, yet non-resumers remain non-profitable or stagnant. A 10% increase in profitability increases the likelihood of resumption by 42% within three years from the omission date.
- Resumers debt overhang is reduced after dividend omission, yet non-resumers continue indebted.
- Resumers CapEx increases after dividend ommission, yet non-resumers cannot invest in CapEx
- Resumers Cash ratios improve (e.g. Cash ratio) contrary to non-resumers
- Resumers pre-omission dividend yield was at a very high level (above 85th percentile) with no other omission dividend episodes ever happened before.
- Resumers that provide no reason for dividend ommission or with a "growth" explanation (new high-growth project) are rewarded above the average resumer stock.
- Management turnover also plays a role: management change after the omission reduces the likelihood of being a resumer by 10% with resumers more likely to retain managers. Comparing this insight with other authors research, we conclude that management changes before dividend omission are prone to take on board most of the times turnaround specialists that execute brave decisions such as omitting dividends. A good management team takes the right and brave decision to cut/omit dividend and is not only a shareholders-friendly lame duck.
- Idiosyncratic risk measured by Fama approach – discounting size, style and market effect - increases prior to the dividend omission whereas it's reduced after the dividend event.
- Three years after the dividend omission there's no clear top line sales growth differences between resumers and non-resumers thus is financial flexibility what explains resumers outperformance.

Our "Quantamental" approach combining quantitative and fundamental reasoning is helpful to reduce a preliminary human bias to shortlist popular stories, summarize numerically tons of past research insights and optimize the amount of time allocated to identify turnaround candidates.

In this way, our quantitative screening criteria is based on proprietary, practitioner and scholar research insights with a thorough description provided underneath:

- Only Developed Market Stocks (US, Europe and UK).
- Market Cap above 600 Mill USD and daily average trading volume over 1 mill USD.
- Depressed profitability levels: EBIT Margin below 5-year average. 10YR and 5YR EBIT Margin Percentile below historical and relative levels to peers.
- Sustainable long term business: Long term ROCE above WACC including a 10-year span when possible to measure franchise's economic value added generation.
- Dividend cut: looking for recent negative dividend per share growth. Companies with dividend omission (100% cut in dividends) are scored higher.

- Change in Management: CEO, COO and CFO replacements.
- Depressed ROCE compared to Industry and historical median: ROCE below 5-year average and below peers.
- Operating momentum: recent improvement on EBIT Margin on a QoQ (Quarter-over-Quarter and YoY (Year-over-Year) basis.
- Significant underperformance: more than 25% underperformance compared to MSCI World index.
- Capital structure healing: net increase in the number of outstanding shares and balance sheet positive developments (Debt-to-EV change).
- Safe short term credit status: improvement in Interest coverage, Net Debt-to-EBITDA and Debt-to-Equity on an absolute and relative basis to peers.
- Valuation cheapness: EV-to-Sales (trailing 12-month and 10-year average) and normalized DCF (discounted Cash Flow). Bottom-line multiples such as EV-to-EBITDA not used very often as most companies might be experiencing losses, yet percentile analysis performed using EV-to-EBITDA and Price-to-Earnings when a stock is not a loss-maker.

Backtesting Analysis

Bloomberg and Python have been for this quantitative screening backtesting analysis while utilizing R and Shiny web development tools for data analysis purposes. The screened universe of companies is comprised of more than 9,000 stocks from the US, UK and European developed markets for the period 2003-2015 with only 215 shortlisted using six-month screening rebalancing periods. Total returns (capital appreciation plus dividends) and dividends are assumed to be reinvested when received. Survivorship bias is taken into account as there are several stocks filing for Chapter 11 and 7 that yield a completely loss of invested capital in the analysis.

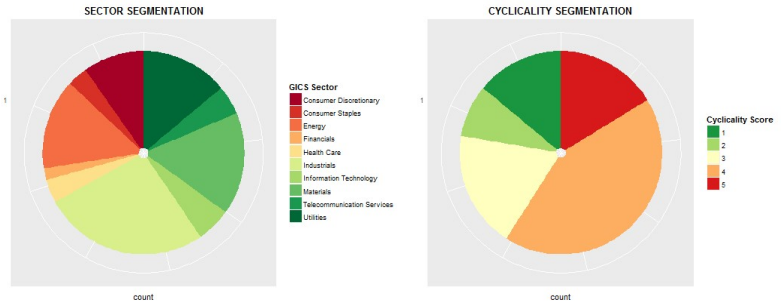
The objective of the following analysis is to obtain a preliminary set of insightful conclusions answering key questions that can help both smart-beta investors eager to discover strategies to be applied using a top-down approach as well as more bottom-up biased stock pickers seeking new screening methods to optimize their candidate shortlisting process:

- *What type of companies are more prone to meet the screening criteria?*
- *Which is the best investment horizon range for a turnaround investor?*
- *What are the risks a turnaround investor faces when implementing the strategy?*
- *Is the turnaround strategy providing significant alpha?*
- *Are there any specific sectors or cyclicality levels where the strategy is more profitable?*
- *What is the best allocation from a risk-reward and win ratio standpoint?*
- *What's the Bayesian probability of ending a trade with positive P&L when the first six months the position is underwater?*

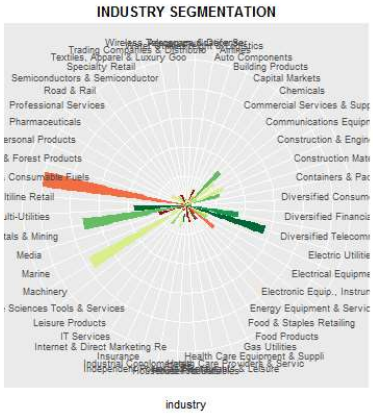
What type of companies are more prone to meet the screening criteria?

According to our screening results, turnaround plays are not occurring uniformly across the board. Corporate within particular sectors and industries are more frequently tagged as turnaround plays following our criteria whereas others have minimum presence in this specific strategy.

An illustration of this is very easily detected when checking the pie charts below about Sector and Cyclicality Score breakdown. More than half of our screened companies below to sectors with significant business cyclicality bias whereas less than one quarter of the sample belongs to more defensive groups (Consumer Staples, Healthcare, etc). Hence, a first conclusion about this is that an investor narrowing his portfolio to a turnaround strategy is to bear a huge cyclical bias.

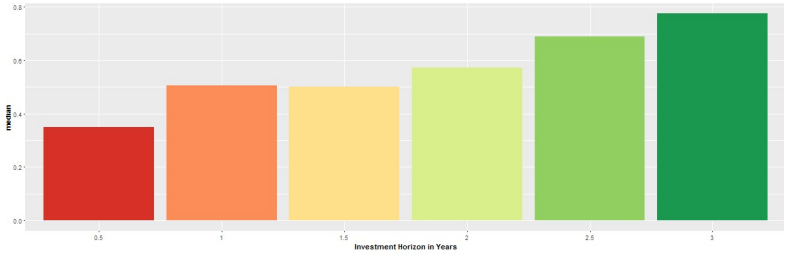


Digging deeper into our screened sample yields further insights at a sector level in line with our cyclicality observations from the previous paragraph: stocks belonging to Industrials, Materials and Energy sectors are more than four times more likely to be picked than those from sectors such as Consumer Staples, Telecommunications, IT or Healthcare. Slicing and dicing by industry provide more detail granularity highlighting Consumable Fuels, Metals & Mining and Machinery as shown in the chart below:

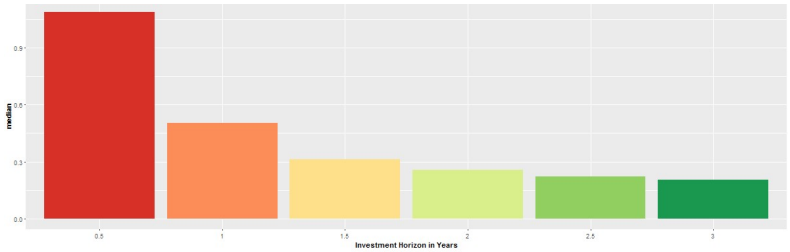


Which is the best investment horizon range for a turnaround investor?

Total returns for six different investment horizons are considered spanning from six months to three years. On the one hand, turnaround stocks cumulative return profile is mainly positively correlated with the investment horizon. In other word, there's no downside risk for being late in the trade. That said, there's a clear stale mate period between 1 year and 1.5 years that probably is related to early-stage investors locking up profits and closing positions while new investors buying into the recovery story enter, for which reason supply meets demand and the stock returns are flattish.



After this first event occurs, one can observe a diminishing return profile as we step forward the investment horizon scale. The chart below points out this effect more clearly using normalized annual returns named as CAGR (compounded annual growth rate). The reader can interpret this diminishing CAGR as speed of returns: the higher the CAGR, the more efficient is the capital allocation as the sooner an investor can obtain returns in the short term. The main conclusion here is that early investors maximize annualised return whereas late investors obtain still significant returns at the expense of waiting more than 1.5 years holding the shares.

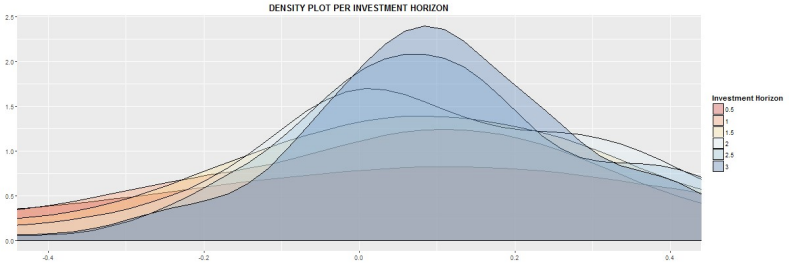


To sum up, long term turnaround investors can pocket +15% CAGR for holding periods above 1.5 years yet short term turnaround investors able to identify repeatedly new turnaround investments to replace old stories can maximize CAGR to levels above +30% CAGR.

What are the risks a turnaround investor faces when implementing the strategy?

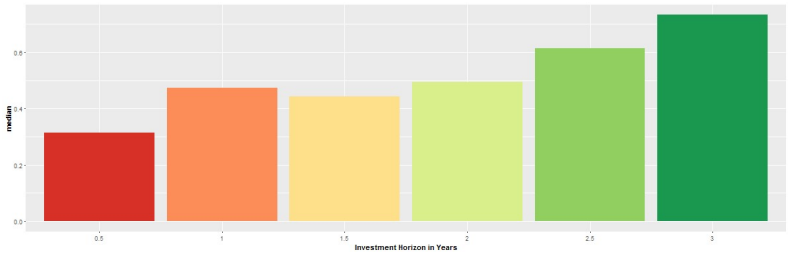
Cost of opportunity risk is important as mentioned in the earlier question for those investors willing to deliver annualised returns above 15%. However, a paramount risk that overshadows any other is bankruptcy or a chapter 11 filing situation that confirms a company has not been able to weather the storm not even omitting the whole dividend. The graph underneath shows that this risk is not negligible and that it actually happens even when stock met some sanity checks from our criteria:

Chapter 11 and bankruptcy situations are not a one-off or rate event in our sample as the chart below illustrates. In fact, the distribution of CAGR returns for the different investment horizons is highlighting significant negative skew (average below median) and negative kurtosis across all the horizons. Investment holding periods below the 1.5 year threshold are the most exposed to “fat tails” or “tail risk”. In other words, short term turnaround investors are more likely to bear bankruptcy risk than long term investors. Because of this “tail risk” feature, popular risk measures such as standard deviation are not recommended to be used when assessing a turnaround strategy risk profile as volatility will underestimate downside risk significantly.

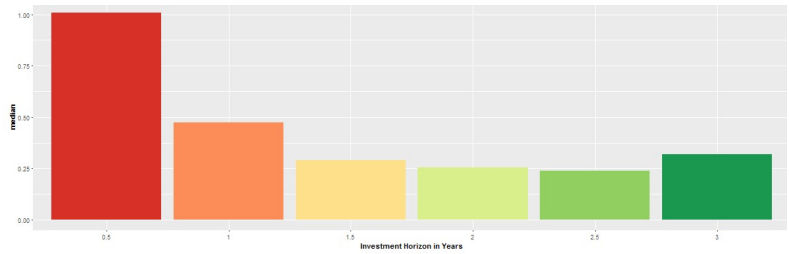


Is a turnaround strategy providing significant alpha?

Conclusions about total cumulative alpha and CAGR alpha are similar to the ones drawn from our analysis on absolute returns. Alpha is calculated using every stock local stock exchange market as benchmark i.e. American stock alpha is tantamount to the different between the stock return and the benchmark return for a particular investment horizon. In this way, cumulative alpha also increases with time, experiencing a slight correction between 1 year and 1.5 year holding periods as explained before.



Moreover, CAGR alpha (annualised alpha) also exhibits a diminishing return profile as time passes: long term turnaround investors might outperform local benchmarks by approximately 25% (holding period between 1.5 years and 3 years) whereas a short term investor with one year horizon can reap an exceptional CAGR alpha near +50%.

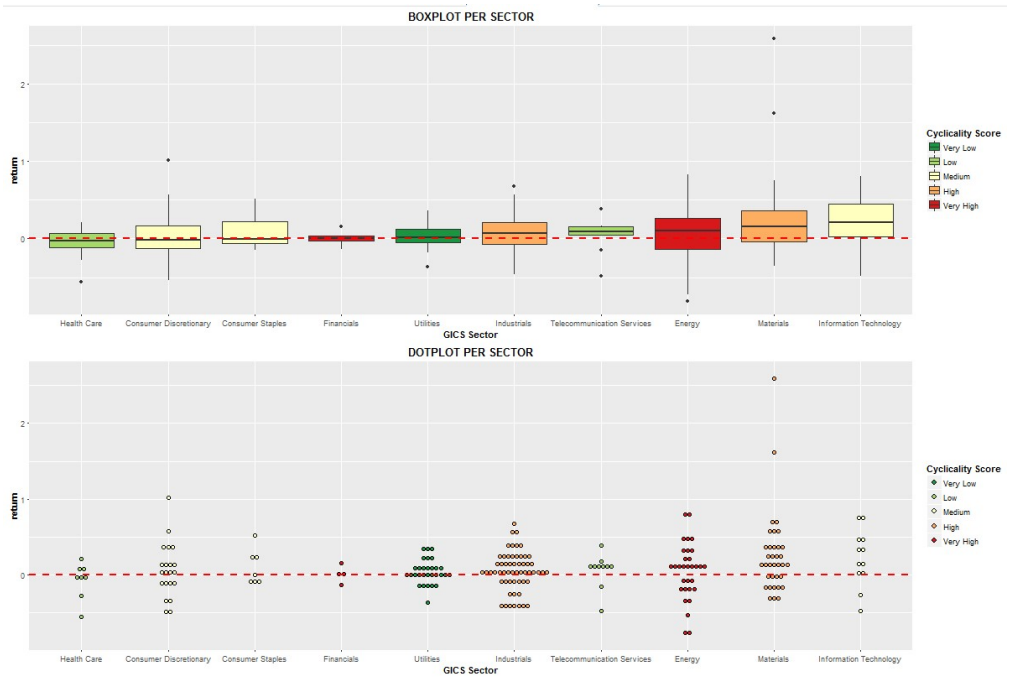


The turnaround strategy also passes the net return acid test: the high-performance results and low rebalancing assumption (six months) yield significant performance results even when assuming 400 bps annual charge for trading fees and bid-offer spread costs.

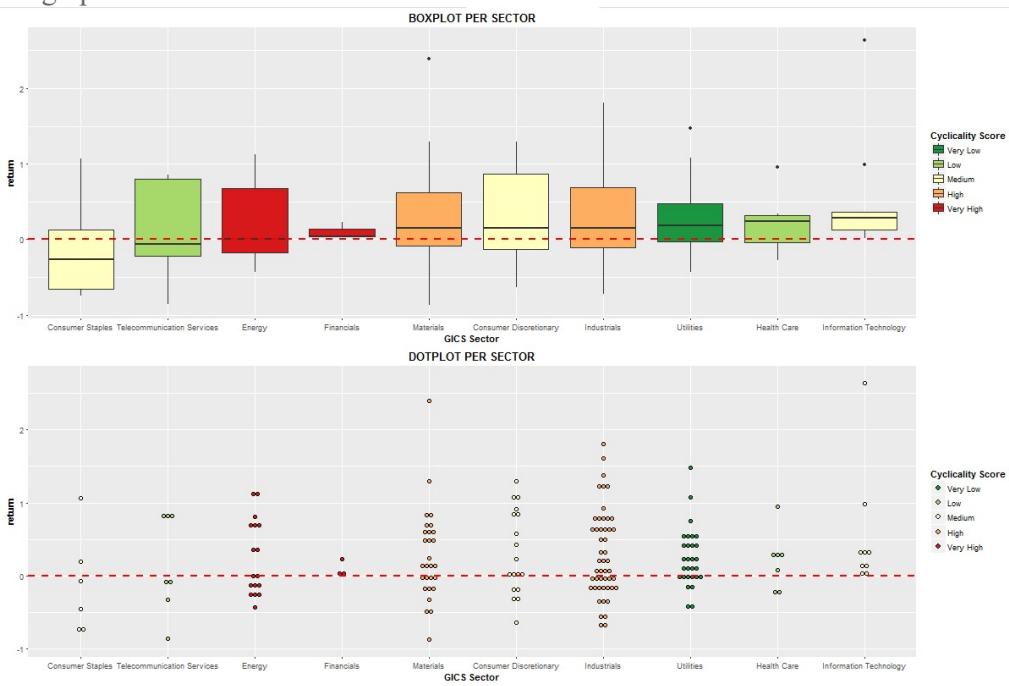
Are there any specific sectors or cyclicality levels where the strategy is more successful?

Sector selection optimization should also be complemented with the type of investor picking turnaround stocks. In this way, we assume 6 months and 2-year investment horizon as a good proxy for short term and long term investors, respectively. We analyse total return performance statistics using boxplots arranging sector according to the highest median:

- *Short Term Investors*: there seems to be a clear cyclical bias in the best performing group: IT, Materials, Energy, Telecommunications and Industrials. However, a gentle reminder must be made about the small representativeness of both Telecom and IT as mentioned in our earlier comments about the sector segmentation of the shortlisted stocks.



- *Long Term Investors*: the opposite behaviour seems to happen when expanding an investor holding period: IT, Utilities and Healthcare become top performers while only Industrials seems to be holding up well.



We could say that short term traders should bias their trading books towards cyclical turnaround stories whereas long term investors can afford some more defensiveness in their portfolios. Nonetheless, it's probably misleading to claim upon such relationship due to both the spurious number of stocks in some sectors and the lack of a clear hegemony among top performers of either defensive or cyclical sectors when switching investment horizons.

Moreover, we have only considered one dimension (returns) whereas ignoring other important key metrics related to risk and risk-adjusted returns. The next question will shed light on these other important features in order to achieve a more reliable conclusion.

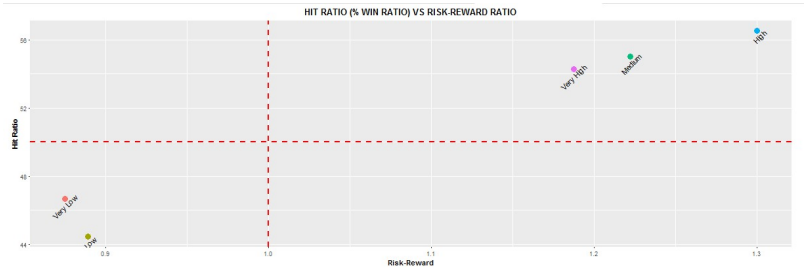
What is the best sector allocation from a risk-reward and win ratio standpoint?

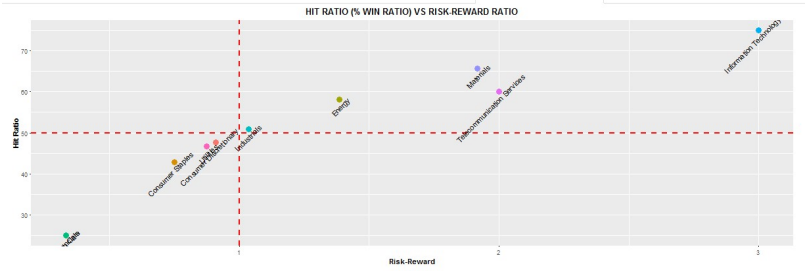
Returns are paramount for any investor regardless its specific investment horizon. Mind you, a great investor is always mindful upon both risk management and the means to attain his return targets. Therefore, risk metrics assessment is essential when judging an investor performance; however, popular measures such as standard deviation or shape ratio are not suitable due to the "fat tail" features mentioned earlier with other measures such as hit ratio (win ratio), risk-reward ratio, downside ratio or maximum drawdown entering the scene.

The scatterplots below show hit ratio (percentage of outperforming stocks) information on the y-axis and risk-reward data on the x-axis. Risk-reward has been calculated as the average return of the stocks with positive alpha divided by the absolute value of stocks with negative alpha. An investors willing to maximize its hit ration while obtaining a good return per unit of risk incurred should pay attention to the upper-right area of the plot.

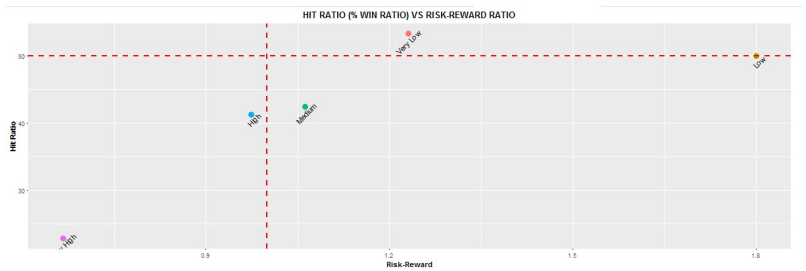
Once more we split our average investors in two classes: short term investors with average holding period of six months and long term investors with average holding period of 2 years:

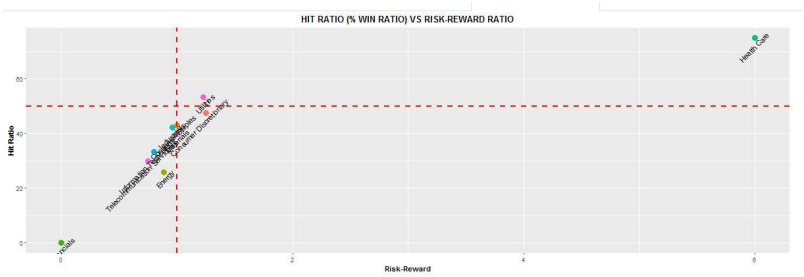
- *Short Term Investors*: the first panel shows how cyclical turnaround stocks score high when considering short investment horizons. The second panel shows more granularity by sector: Materials seems to be best among cyclical stocks.





- *Long Term Investors*: defensive stocks seem to be the dominant force in line with the previous question preliminary findings: Utilities and Healthcare are two only sectors on the upper-right zone when considering a 2-year holding period. That said, defensive turnaround plays for long term horizons seem to have a much poorer hit ratio vs risk-reward profile in the long term than cyclical stocks did have in the short term.





What's the Bayesian probability of ending a trade with positive P&L when the first six months the position is underwater?

Overoptimism is one of the most dangerous behavioural biases in finance. Investors are reluctant to sell losing trades hoping a low probability turnaround is coming. Bad luck, macro conditions and a myriad of other excuses are set forth by them to refrain from closing their position. Overoptimism comes hand-to-hand with other biases such as cognitive dissonance (self-denial when material evidence against the initial thesis exists) and confirmation bias (empathy gap aka falling in love with the stock).

A good way to test if it makes sense to exit an unsuccessful trade is to analyse what happens with our turnaround strategy during the first 6 months and compare to future results. Bayesian probability theory is very helpful here: Bayesian inference is a method of statistical inference in which Bayes' theorem is used to update the probability for a hypothesis as more evidence or information becomes available:

$$P(A \mid B) = \frac{P(B \mid A) \cdot P(A)}{P(B)}.$$

This is

$P(A \mid B)$ the (conditional) probablility of event A under the condition that B occurred
$P(B \mid A)$ the (conditional) probablility of event B under the condition that A occurred
$P(A)$ the *a priori* probablitiy of event A
$P(B)$ the *a priori* probablitiy of event B

The questions to be answered is: What's the probability to end up a trade with positive return when the first six months the trade are negative? Applying the Bayes theorem to our dataset is straightforward as it shown in the table below:

1. Negative total return (first six months): probability of ending with a positive return for each investment horizon assuming the stock total return is negative during the first six months.
2. Positive total return (first six months): probability of ending with a positive return for each investment horizon assuming the stock total return is positive during the first six months.
3. Positive start – negative start: difference between 2 and 1 that aids to visualize whether or not the initial condition is really a game-changer in terms of winning probability.

scenario	prob_1y	prob_1.5y	prob_2y	prob_2.5y	prob_3y
negative total return (first six months)	0.148	0.19	0.176	0.197	0.211
positive total return (first six months	0.549	0.542	0.507	0.514	0.535
positive start - negative start	0.401	0.352	0.331	0.317	0.324

The main takeaway is that bad starts tend to have a low probability of success: less than 20% in all the holding periods except for the 3-year horizon. This is particularly underwhelming when compared to the probability of success of good starts: more than 30% difference in terms of probability between good starts and bad starts probabilities.

However, when considering only negative bad starts as those where a stock is in negative territory is unfair. For instance, the stock can have a bad start due to broad market conditions or simply being down only by 2%, which is not very significant. The table below filters out this effects considering stocks falling

below 15% a bad start (first row) and those falling less than 15% or in positive territory as a good start (second row):

scenario	prob_1y	prob_1.5y	prob_2y	prob_2.5y	prob_3y
negative total return (first six months)	0.021	0.028	0.042	0.049	0.063
positive total return (first six months	0.676	0.704	0.641	0.662	0.683
positive start - negative start	0.655	0.676	0.599	0.613	0.62

The results are now even more staggering with a turnaround probability below 7% for good starts and a probability difference between good and bad starts of more than 60% across investment horizons. The lesson to learn here is that a 15% stop-loss level for turnaround stocks during the first six months of trading will boost the success rate of a turnaround strategy. Hence, turnaround investors should bear in mind implement a disciplined stop-loss policy in order to enhance their performance metrics.

Summary and Conclusions:

Turnaround investing is the process of looking for investment opportunities in down-and-out companies that are poised to experience a financial recovery. investors willing to invest in these stocks could fall victim of two main risks: Cost of opportunity and downside risk.

The quantitative screening criteria is presented in this document is based on turnaround stocks insights from proprietary, practitioner and scholar research sources. Among them, the work if Buland and Subramanian (2008 and 2012) is highlighted as they identified dividend omission events as a key point for successful turnaround stories. Dividend omissions act as a kick off point in a change corporate behaviour and can be easily measured quantitatively.

The objective of the analysis is to answer questions related to key performance metrics linked to turnaround stock plays:

- *What type of companies are more prone to meet the screening criteria?*

More than half of the screened companies below to sectors with significant business cyclicality bias whereas less than one quarter of the sample belongs to more defensive. Hence, an investor narrowing his portfolio to a turnaround strategy is to bear a huge cyclical bias.

- *Which is the best investment horizon range for a turnaround investor?*

Long term turnaround investors can pocket +15% CAGR for holding periods above 1.5 years yet short term turnaround investors able to identify repeatedly new turnaround investments to replace old stories can maximize CAGR to levels above +30% CAGR.

- *What are the risks a turnaround investor faces when implementing the strategy?*

Cost of opportunity risk is important as mentioned in the earlier question for those investors willing to deliver annualised returns above 15%. However, a paramount risk that overshadows any other is bankruptcy as it occurs even when a stock meets some sanity checks from our criteria. In addition, the distribution of CAGR returns for the different investment horizons is highlighting significant negative skew (average below median) and negative kurtosis across all the horizons. Because of this “tail risk” feature, popular risk measures such as standard deviation are not recommended to be used when assessing a turnaround strategy risk profile.

- *Is the turnaround strategy providing significant alpha?*

Conclusions about total cumulative alpha and CAGR alpha are similar to the ones drawn from our analysis on absolute returns: cumulative alpha increases with time; yet CAGR alpha (annualised alpha) also exhibits a diminishing return profile as time passes. Overall, long term turnaround investors might

outperform local benchmarks by approximately 25% (holding period between 1.5 years and 3 years) whereas a short term investor with one year horizon can reap an exceptional CAGR alpha near +50%. The strategy also passes the net return acid test: the high-performance results and low rebalancing assumption (six months) yield significant performance results even when assuming 400 bps annual charge for trading fees and bid-offer spread costs.

- *Are there any specific sectors or cyclicality levels where the strategy is more profitable?*

The initial conclusion is that short term traders should bias their trading books towards cyclical turnaround stories whereas long term investors can afford some more defensiveness in their portfolios. However, this analysis ignores other important key metrics beyond returns related to risk and risk-adjusted returns that are answered in the next question.

- *What is the best allocation from a risk-reward and win ratio standpoint?*

When studying hit ratio vs risk-reward for both short term and long term holding periods, we confirm that short term traders should bias their books towards more cyclical companies where long term investors might prefer some more neutral-defensive bias. That said, defensive turnaround plays for long term horizons seem to have a much poorer hit ratio vs risk-reward profile in the long term than cyclical stocks did have in the short term.

- *What's the Bayesian probability of ending a trade with positive P&L when the first six months the position is underwater?*

The lesson to learn here is that a stop-loss level like 15% for turnaround stocks during the first six months of trading boost the success rate of a turnaround strategy. Hence, turnaround investors should bear in mind implementing a disciplined stop-loss policy in order to enhance their performance metrics.

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