

# Building A Systematic Approach to Identify Stock Sell Signals

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## In Brief

- A systematic model which is separate to security selection models can provide signals of when a stock may be prone to underperform
- The sell signal provides incremental information for MFS Blended Research portfolio managers and encourages them to revisit the holding.
- Reviewing the investment thesis may lead to a hold, sell, reduce or avoid of the stock

Choosing which stocks to buy and when is difficult. Deciding when to sell out of a stock can be equally as difficult and may have a bigger impact on performance.

It is important to emphasize that the stock selection models are designed to rank stocks from best to worst, but the sell model focuses on stocks likely to underperform, using factors that have historically worked on the downside (as opposed to on both sides for the stock selection models).

In this paper, we cover how a sell model fits into the investment process, factors used to construct the model and an example of how it works in practice.

## Introduction to a systematic sell model

To help understand when a security may be worth consideration for selling, the MFS Quantitative Solutions team designed a sell model to evaluate stocks across multiple factors that are specifically focused on downside risk. We believe it is a useful addition to any investment process, especially during challenging macro environments when stocks identified as “at risk” are most vulnerable and likely to underperform or experience a dramatic price decline. It’s worth noting that our sell model is distinct from our stock selection model which uses different factors as inputs, as shown in Exhibit 1.

## Exhibit 1: Factors in our quantitative alpha model

Approx. Weight <sup>1</sup>	Sample Factors	
25%	<ul style="list-style-type: none"> <li>▪ Intangibles / EV</li> <li>▪ Price/Free Cash Flow</li> </ul>	Valuation
40%	<ul style="list-style-type: none"> <li>▪ 9-month less 1-month Price momentum</li> <li>▪ Estimate revisions</li> </ul>	Price & Earnings Momentum
25%	<ul style="list-style-type: none"> <li>▪ Accruals</li> <li>▪ Operating profitability</li> </ul>	Quality
10%	<ul style="list-style-type: none"> <li>▪ Change in net equity issuance</li> <li>▪ Change in leverage</li> </ul>	Sentiment

<sup>1</sup> Factor weights are only an approximation and vary between by region and sector. This example is for illustrative purposes only. No forecasts can be guaranteed.



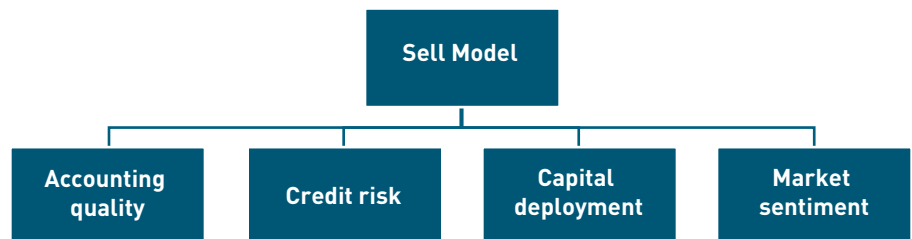
The factors in our quant model are generally seen as alpha generators that have historically worked well at picking both buy and sell ideas. There are, however, some often overlooked factors that have historically had an asymmetric return profile. They have been effective at predicting stocks that will likely underperform but do not necessarily work when selecting which stocks to buy, which makes them generally a bad fit for the stock selection model. After consulting a range of academic, industry and in-house research pieces, we constructed a separate model that effectively incorporates those factors with an asymmetric nature and created a sell signal that is differentiated from our stock selection model.

The sell model can be a useful part of the portfolio construction process for the Blended Research funds. The sell signal can help early identification of potential underperformers. Using such a systematic approach can also help to reduce biases involved in owning a particular stock when it comes to selling some or all of the position. The resulting red flag can be used by portfolio managers to investigate further and decide whether to hold, sell, avoid or limit their position sizes.

## Using asymmetric factors to construct the sell model

Our sell model is comprised of four factor categories, shown in Exhibit 2.

### Exhibit 2: Factors used in systematic sell model



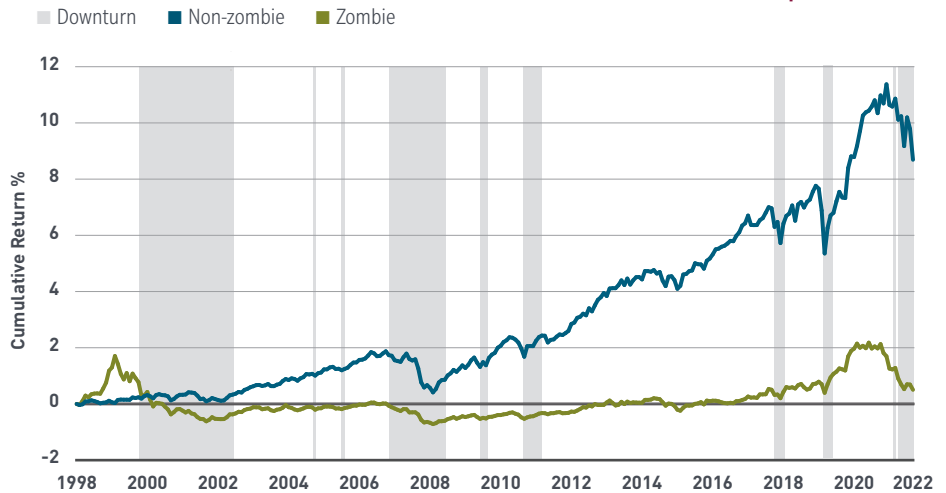
Within each category, stocks are evaluated across multiple factors:

1. **Accounting quality:** identify companies with questionable earnings quality and high likelihood of engaging in accounting manipulation
2. **Credit risk:** identify companies with high leverage and low liquidity, which could lead to higher probability of distress and default
3. **Capital deployment:** assess companies' efficiency of capital allocation. Research shows that over-investment such as M&A and frequency issuing of stock or debt tend to lead to underperformance
4. **Market sentiment:** market reaction such as volatility and short interest is direct indication of investors sentiment towards the stocks



These factors are in either continuous or binary form. They generally belong to a common theme but are distinct and have relatively low correlation. For example, interest coverage ratio is one of the leverage factors in the “Credit Risk” category. It measures a company’s ability to pay back interest expense on its outstanding debt. In previous research, we have looked at companies with low to negative interest coverage ratios (last 12 months earnings before interest and taxes divided by interest expense), defined as “zombie companies,” and their characteristics and performance during various economic cycles. Our research concluded that zombie companies significantly underperformed the rest of the universe, especially during economic downturns and high-rate environments, shown in Exhibit 3. We believe that the interest coverage ratio is a useful component of our sell model and representative of the kinds of factors we use in it. It is asymmetric in the sense that it worked well at predicting losers, but high interest coverage ratio has not necessarily lead to outperformance.

**Exhibit 3: Cumulative Return of Zombie vs. Non-Zombie companies**



Source: Factset. MFS Research.

For the factors we use in the sell model, we rank stocks relative to their peer group, and then use ranks above a certain threshold as a binary value, *i.e.* 1 for those extreme values and zero otherwise. In this way, each factor in the sell model is used as a ‘red flag’. Multiple red flags are an indication of elevated risk in the category. The overall sell signal is an equal-weight aggregate of the four category scores. Stocks with the strongest sell signal would score poorly in two or more categories relative to its sector peer.



### Real-life example of the sell model at index level

Each theme of the sell model produces a score ranging from 0 (best) to 1 (worst). These theme scores are averaged to calculate the overall sell model score. Our research has shown that companies with an overall sell model score of at least 0.5 have historically had materially poor relative returns, so we focus on these as the highest risk stocks, classifying them as 'sell'. Those names generally account for 2-3% of the investable universe. Exhibit 4 shows companies in the bottom 2% of the sell model in the US large-cap universe, as of Q4 2023.

### Exhibit 4: Companies in the Bottom 2% of Sell Model in Russell 1000<sup>®</sup>, As Of Q4 2023

Ticker	Name	Account Quality	Credit Risk	Capital Deployment	Market Sentiment	Sell Score
AFRM	Affirm Holdings, Inc.	0.50	1.00	0.25	0.50	0.56
AGNC	AGNC Investment Corp.	0.50	1.00	0.00	0.75	0.56
AON	Aon Plc	0.50	1.00	0.50	0.50	0.63
APA	APA Corporation	0.50	0.50	0.25	1.00	0.56
APLS	Apellis Pharmaceuticals, Inc.	0.50	0.75	0.25	0.75	0.56
BPMC	Blueprint Medicines Corp.	0.75	0.75	0.25	0.50	0.56
CG	Carlyle Group Inc	1.00	1.00	0.25	0.25	0.63
CYTK	Cytokinetics, Incorporated	1.00	0.75	0.00	0.75	0.63
FAF	First American Financial Corporation	1.00	1.00	0.25	0.25	0.63
FCNCA	First Citizens BancShares, Inc.	1.00	1.00	0.50	0.50	0.75
GTLS	Chart Industries, Inc.	0.50	0.75	0.50	0.75	0.63
LNTH	Lantheus Holdings Inc	0.75	0.50	0.25	0.75	0.56
LW	Lamb Weston Holdings, Inc.	1.00	0.25	0.75	0.25	0.56
MMC	Marsh & McLennan Companies, Inc.	0.50	1.00	0.50	0.25	0.56
MTZ	MasTec, Inc.	0.75	0.75	0.25	0.50	0.56
NCLH	Norwegian Cruise Line Holdings Ltd.	0.50	0.75	0.50	0.75	0.63
NYCB	New York Community Bancorp Inc	1.00	1.00	0.00	0.75	0.69
PTEN	Patterson-UTI Energy, Inc.	0.75	0.50	0.25	1.00	0.63
RYAN	Ryan Specialty Holdings, Inc.	0.00	1.00	0.50	0.75	0.56
U	Unity Software, Inc.	0.75	0.50	0.25	0.75	0.56
W	Wayfair, Inc.	0.50	0.75	0.25	0.75	0.56
WOLF	Wolfspeed Inc	0.75	0.75	0.75	0.75	0.75

\*Sector-relative returns

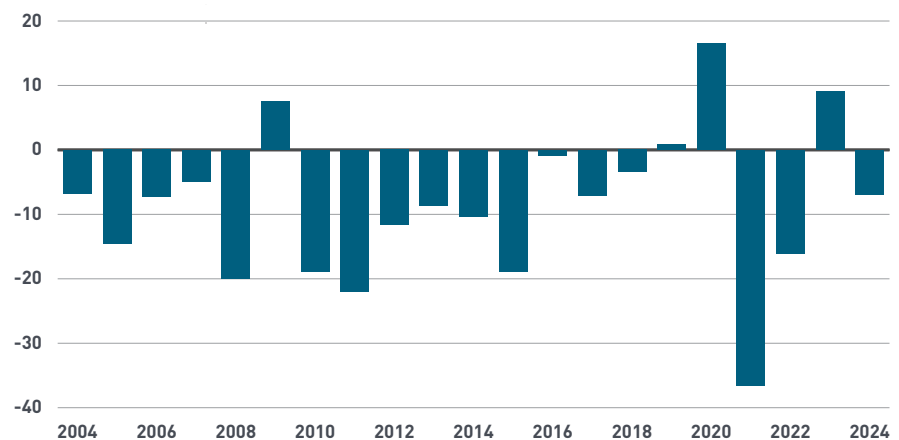
Source for data: Factset.

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Below shows the result of using the rule above over the last 21 years. We use the rule at each year end to create a bucket of 'sell' rated stocks, which we then hold for that calendar year. The return shown for each year is the median sector relative return for the stocks in the 'sell' bucket. On average this has been -8.6% per year, meaning the 'sell' rated stocks have tended to underperform their sectors materially. There have been a few years where the 'sell' bucket went on to outperform peers, most notably 2009 at the end of the Global Financial Crisis, 2020 during Covid, and 2023. These three years were moments where there was a market bottom either at the end of the preceding year (October 2022) or in the first quarter of the year itself (March 2009 and March 2020), followed by a market recovery.

### Exhibit 5: Median Annual Return\* of Stocks Classified as 'Sell' in Russell 1000



\*Return is equal-weighted sector-relative return.  
Source for data: Factset.

### Applying the sell model to portfolio construction

We believe our sell model is a useful risk tool to have in portfolio management. It identifies stocks that are vulnerable and likely to underperform in the next few months. For those stocks, our portfolio managers can choose to keep a closer watch, limit their position size or avoid them entirely. Our research indicates that including the sell model in our portfolio construction process helps us improve portfolio performance and reduce volatility. Risk management is important for active managers; we believe that winning over time by not losing is a way to generate alpha and help investors pursue their long-term goals. ▲

**We welcome the opportunity to discuss our systematic sell model with you. Please contact your MFS representative and we will be happy to help.**



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