

Investment Opportunities in Zombie Stocks?

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Abstract

Abstract: Recently, several well-known companies have seen their stock prices drop by more than 85% from their 52-week high. Articles appearing in the financial press label these securities as zombie stocks and warn investors to avoid them. We look at the profitability of investing in zombies by constructing portfolios of stocks that have dropped by 80 or 85% from their 52-week high and measure the returns over holding periods of 1, 2, 4, 12, or 24 weeks. Preliminary evidence in this paper suggests that investing in zombie stocks is advantageous in up markets. Overall, we can say that the best strategy – as measured by higher risk adjusted return ratio--is to (1) select securities with 85% or higher price drops and current prices between \$1 and \$5; and, (2) invest for a 1 or 2-week holding period.

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1. Introduction

From the stock market high reached in October 2007, aggregate stock prices, as measured by the S&P 500, fell nearly 56% by the middle of March 2009. Once labeled as blue chips, firms such as Bank of America, Citigroup and General Motors acquired the moniker *zombie stock*. According to a recent *Wall Street Journal*¹ article, seventy once-respected firms were trading at more than 85% off their 52-week highs and under \$5 a share. During this period, a widely circulated email in the investment community compared investing in eight leading American companies to the cost of lunch or gasoline. “For \$11.50 you can get a modest lunch at a fast food restaurant ... 5 gallons of gasoline ... or buy one share each of eight leading American companies...” At the time, a portfolio consisting of one share each of Citigroup, GM, AIG, Office Depot, Huntington Bank, 5/3 Bank, Ford and Eastman Kodak required an investment of only \$11.06.

Investors do buy these stocks despite almost universal advice to avoid these “portfolio killers”². Historically, investing in stocks that have fallen from grace was referred to as “bottom fishing.” Whether it’s labeled “bottom fishing” or “zombie-embrace,” there were plenty of such stocks to consider after the recent market fall. In this paper we create portfolios of stocks that have significantly dropped from their 52-week high, simulate holding the portfolios for periods of 1, 2, 4, 12 or 24 weeks and calculate returns. Preliminary evidence in this paper suggests that investing in zombie stocks is advantageous in up markets.

2. Literature Review

There may be various investor rationales for investing in stocks with steep losses. Behavioral finance may explain investor attraction to stocks with large price drops. An investor may see a prior high as an anchor: comparing the current low price to a recent high price is taken as evidence of value, making the new price seem like a bargain.³ Alternatively, looking for a reversal could be an explanation for investing in stocks experiencing price drops. This implies a contrarian investment policy and is based on investor overreaction⁴ (short term) or the herding effect. However, as explained by Novy-Marx [2009], a value strategy of investing would subsume contrarian strategies because value strategy returns “contain information relative to the contrarian strategy’s returns while the converse is false.”

¹ “Living Dread: It's a Ghoul's Bet To Wager on Revival in These Stocks. Welcome to Sub-\$5 Zone, Where Firms Often Languish,” *The Wall Street Journal*, February 26, 2009.

² See for example: Portfolio Killers: 8 zombie stocks to avoid Filed under: Ford Motor (F), General Motors (GM), Citigroup Inc. (C), JPMorgan Chase (JPM), Bank of America (BAC), Federal Natl Mtge (FNM), Amer Intl Group (AIG), Wells Fargo (WFC), available on the internet advisory blog, MoneyAdvisor.

³ See, “The Psychology Behind Common Investor Mistakes” Douglas Van Eaton, *Psychology/Sentiment* 07/03/2005.

⁴ Studies contributing reversals to overreaction include Daniel, Hirshleifer and Subrahmanyam (1998) and Hong and Stein (1999).

Empirical results, from momentum studies such as Jegadeesh and Titman [1993], suggest that losers continue to tumble; therefore investing in zombie stocks would not be a good strategy. Indeed, researchers, including Hong, Lim and Stein [2002], and Jegadeesh and Titman [2001], report negative momentum for low-priced stocks. In general, from a behavioral finance theory perspective, investors sell winners too soon and losers too late, to avoid the regret of foregoing a capital gain or recognizing a capital loss. Therefore, market prices take a bit longer to reveal the true value of the stock; the momentum continues upward for winning stocks and downward for losing stocks.

An interesting twist on momentum theory may be the Attention Hypothesis offered by Barber and Odean [2008] which suggests that investors buy attention-grabbing stocks. The 52 week highs/ lows are widely reported in the financial press and available to investors. George and Hwang [2004] compare momentum strategies (price changes) with absolute price level strategies. Stocks are ranked, both by returns and by nearness to 52-week highs for months t-6 to t-1. The strategy is to invest in the top 30%, financed by shorting the bottom 30% and then to hold the portfolio for six months. They report that using absolute price levels, or investing in stocks near the 52-week high, is the best strategy. The authors replicated their model, using nearness to the 52-week low instead of the 52-week high and found insignificant results. But, recent papers suggest that there may be trading opportunities around low stock prices. For example, Mizrach and Weerts [2009] report, “Traders should not, as we show, short stocks hitting new lows. There are strong persistent reversals with significant risk-adjusted returns on long positions for up to 6 days following an n-day low.” Also, Novy-Marx [2009] finds that “momentum derives primarily from past performance at intermediate horizons, not recent past performance.” And, Sturm [2008] reports that portfolios formed “from lows appear to capture a momentum effect in the market.”

This paper adds to the momentum/behavior discussion by researching the profitability of investing in zombie stocks, as defined by those stocks experiencing a substantial drop in stock price. Although zombie stocks are frequently associated with an 85% drop in value, we also consider stocks that experienced price drops of 70, 75, 80 and 85% from a 52-week high. We apply these strategies for stocks selling at a price greater than or equal to \$5 and stocks selling between \$1 and \$5. To date, we are unaware of studies focusing on this specific topic.

3. Data And Portfolio Construction

3A. Data

We obtain stock price data from Zacks Investment Research and create the portfolios by using the Research Wizard to (1) screen stock prices, as described below, and then (2) back-test the constructed portfolios. The database includes US stocks listed on the NYSE, AMEX and NASDAQ. The data available for this study begins December 17, 1999 and continues through July 24, 2009. During this nearly 10-year period the market witnessed the dot-com bubble, the September 11 attacks and the recent sub-prime financial crisis, all of which created zombie stocks. The Zacks Research Wizard software conducts the back-testing and provides information on the different back-tested strategies.

The Zacks Investment research database has been used in Barber et al [2001] and recently in Tziogkidis and Zachouris [2009]. Consistent with the latter study, we eliminated thinly traded stocks by screening for and then removing stocks with low liquidity. Stocks with low trading volume, defined as less than 50,000 shares during the preceding 20 trading days were eliminated. The portfolios were formed by choosing from the top 95% of companies as defined by market value.⁵

3B. Portfolio Construction and Back-testing

The profitability of zombie stock investing was tested by constructing portfolios of stocks experiencing substantial declines in value, from 70 to 85%, from their 52-week high. The 52-week high was chosen because prior studies document the importance of this reference point to investors. See, for example, George and Hwang [2004] or Huddart, Lang, and Yetman [2008] which report that volume is higher when the stock price is above the 52-week high or below the 52-week low, “suggesting that the prior extremes are salient in decision-making.”

Portfolios were formed with a one, two, four, twelve, or twenty-four week holding period. For example, the first 1-week 85% drop portfolio is formed on December 17, 1999 by finding all stocks that are trading at 85% of the look-back 52-week high. At the end of one week, December 24, 1999, the return is calculated, and a new portfolio is formed, which may include stocks selected during the prior week. This process continues weekly, until July 24, 2009. Table 1 discloses the number of periods for each holding pattern. Also given is the number of up and down markets for each type of holding period. Although the percentage of up markets varies by the length of the holding period, the variation is low with the highest number of up markets appearing with the 24 week holding period, at 55%, and the lowest number occurring with the two-week holding period, at 50%.

Holding period	Number of periods	Number of up/down markets	Testing period
1 week	502	262/240	12/17/99 – 07/24/2009
2 weeks	251	126/125	12/17/99 – 07/17/2009
4 weeks	125	67/58	12/17/99 – 06/19/2009
12 weeks	41	22/19	12/17/99 – 02/27/2009
24 weeks	20	11/9	12/17/99 – 09/12/2008

The last decision variable was the price level. Institutional investors, particularly mutual funds, are reluctant to buy stocks whose price has fallen below \$5. Therefore, the first set of portfolios included stocks that had dropped 80 or 85% from the 52-week high but still had a stock price greater than \$5.00. The second set of portfolios contains stocks that experience the price decline

⁵ We also constructed portfolios using a 99% screen for market value and the results were essentially the same. For presentations purposes, we report only for the 95% screen.

but traded between \$1 and \$5. We placed a lower limit of \$1 to avoid stocks that would be delisted. Evidence suggests that reversals are more likely for stocks with low institutional holdings (McLean [2009]); creating duplicate portfolios based on price is therefore consistent with prior research.

As expected the number of zombies varies considerably by year, depending on market conditions. Figures 1 and 2 provide a summary by stock price level and the percentage of 52-week high for the average number of zombies per year. The pattern for both price levels is similar: There are more zombie stocks in 2000-2002 and 2008-2009. Also, the 2008-2009 financial crisis created more of the deeply discounted zombies (price between \$1 and \$5).





4. Portfolio Returns

As explained in the portfolio construction section, portfolios were constructed for price drops varying from 70 to 85%. An initial screen of the back-tested results suggests that the excess return (over the benchmark – the S&P 500 index) for portfolios consisting of 70 or 75% price-drops provide, on average, lower returns than the 80 or 85% price drops. Therefore the discussion below focuses only on portfolio strategies which invest in stocks with 80 or 85% drops from their 52-week highs.⁶

The returns to the various portfolios are summarized in Tables 2 through 4, with the results for the higher priced stocks, those with prices larger than \$5, appearing in Table 2. An analysis of win ratios, and returns by win and loss stretch appear in Table 5 and 6. For each Table, the results are shown by panels: Panel A provides results for an 80% drop, while panel B displays the results for the 85% drop. Finally, in Table 7 an analysis of risk versus return, as captured by the information ratio, is presented.

⁶ For example, the returns for the 1-week, 2-week, 4-week, 12-week, and 24-week portfolios for the 70% stock price drop from the 52-week high and having a current price less than \$5 are 22.9%, 14.6%, -2.4%, -10.3%, -21.2% respectively. These are less than those results reported in Table 3, panel B: The one-week holding period annualized compounded return for an 85% drop in price is 77%.

4A. Impact of Price Levels:

We compared the portfolio returns for stocks priced between \$1 and \$5 and above \$5 by looking at:

1. The total compounded returns for the entire period, (Tables 2 and 3);
2. The compounded return during up and down market – as measured by the absolute increase or decrease of the S&P 500 - (Tables 2 and 3);
3. The percentage turnover (Tables 2 and 3);
4. The mean weekly excess returns over the S&P 500 (Table 4).

4A1. Return results given price constraint of \$5 or higher

With the larger than \$5 price constraint (Table 2), zombie stocks prove to be a poor investment strategy across all over holding periods. Comparing the portfolio compounded return calculated for the portfolios in column 2 to the matched S&P returns illustrate the inferior returns. In Panel B, we see that the 85% price drop screen accentuate the inferior returns. Columns 4 and 5 compare portfolio returns to the S&P 500 for both up and down markets. The portfolios performance in up markets exceeds that of the S&P in all cases except for the 24-week holding period. However, during down markets, the constructed portfolios greatly underperformed the markets in all cases. In effect, the results displayed in columns 4 and 5 suggest that the zombie portfolios are more risky. The average number of stocks per holding period and the percentage turnover are provided in columns 6 and 7. Across holding periods the number of stocks in the portfolio is fairly stable but the turnover percentage predictably increases as the holding period increases. Stocks could exit the portfolio because of additional price drops placing them outside of the screen (less than \$5) or no longer trading at less than 85% of their 52-week high. As can be seen from column 7, the high turnover would add to the portfolio losses.

4A2. Return results given price constraint between \$1 and \$5

An investment strategy for zombies trading in the \$1 to \$5 range is more profitable. In Table 3, comparing the portfolio returns to the S&P, we see that for the 1-, 2-, and 4- week holding periods the returns from the constructed portfolios exceed the S&P by a wide margin. In a pattern similar to Table 2, the zombie portfolios do well in up markets for all holding periods except the 24-week strategy and underperform the S&P index in all down markets. An intriguing observation, though, is the performance of the 1-week portfolios. The annualized returns for the 80 and 85% drop screens are respectively, 39.6 and 77%. In both cases the average up market return exceeds that of the index (2.8% and 3.9% for the 80 and 85% price drop portfolios), and the average return during the down market is close to that of the market (-0.8% and -.05%). The number of stocks in the portfolio (column 6) indicates a larger portfolio when the price limit is lowered to under \$5. The same turnover pattern emerges—the longer the holding period, the higher the turnover. High turnover, of course, affects trading strategy profits. Consider the most profitable strategy from Table 3, which is the 1-week portfolio holding period where the portfolio consists of stocks that have lost 85% of their value compared to their 52-week look-back price. The average 1-week excess return is 1.8%. The average turnover is 23.1% of 39 stocks or about 9 stocks per week.⁷

⁷ An anonymous reviewer suggested that the results may be heavily affected by the sharp rise in the market after March 2009. To test for this we recalculated the returns, ending the investment period on the last trading day of

Table 2

Returns for *zombie* portfolios constrained by \$5 price or higher requirement. The investing period starts December 17, 1999 through July 24, 2009.

Panel A Stock portfolio created by screening top 95% (measured by market value), current stock price is 80% off the 52-week high.

(1) Holding period	(2) Annualized compounded return	(3) Annualized S&P 500 return	(4) Average excess return up market	(5) Average excess return down market	(6) Average number of stocks in the portfolio	(7) Average % period turnover
1 week	-20.0	-3.3	2.6	-2.5	36	21.4
2 weeks	-24.9	-3.2	4.8	-4.4	36	30.3
4 weeks	-27.3	-3.7	3.7	-5.1	36	40.4
12 weeks	-38.5	-4.4	4.0	-15.6	35	67.2
24 weeks	-45.3	-6.5	-10.4	-21.3	31	80.0

Panel B Stock portfolio created by screening top 95% (measured by market value), current stock price is 85% off the 52-week high.

Holding period	Annualized compounded return	Annualized S&P 500 return %	Average excess return up market %	Average excess return down market %	Average number of stocks in the portfolio	Average percentage turnover
1 week	-32.0	-3.3	2.5	-2.4	18	22.5
2 weeks	-30.9	-3.2	4.8	-4.4	18	31.5
4 weeks	-25.0	-3.7	5.0	-4.3	18	44.4
12 weeks	-37.6	-4.4	5.6	-12.6	18	69.6
24 weeks	-49.3	-6.5	-4.5	-21.8	16	82.5

February 2009. For stocks priced less than \$5, the one- week holding period return for the 80% filter fell from 39.6% to 22.1%; for the 85% filter, the one-week holding period returns fell from 77% to 53.9%.

Table 3						
Returns for <i>zombie</i> portfolios are constrained by a price between \$1 and \$5. The investing period starts December 17, 1999 through July 24, 2009.						
Panel A Stock portfolio created by screening top 95% (measured by market value), current stock price is 80% off the 52-week high.						
(1) Holding period	(2) Annualized compounded return %	(3) Annualized S&P 500 return %	(4) Average excess return up market %	(5) Average excess return down market %	(6) Average number of stocks in the portfolio	(7) Average percentage turnover
1 week	39.6	-3.3	2.8	-0.9	64	20.5
2 weeks	26.5	-3.2	5.8	-2.0	64	30.3
4 weeks	4.0	-3.7	4.2	-0.5	63	41.9
12 weeks	-12.0	-4.4	13.0	-9.2	62	64.9
24 weeks	-32.1	-6.5	-12.0	-12.1	51	82.1
Panel B Stock portfolio created by screening top 95% (measured by market value), current stock price is 85% off the 52-week high.						
Holding period	Annualized compounded return %	Annualized S&P 500 return %	Average excess return up market %	Average excess return down market %	Average number of stocks	Average percentage turnover
1 week	77.0	-3.3	3.9	-0.5	39	23.1
2 weeks	54.1	-3.2	8.6	-1.9	39	33.6
4 weeks	3.3	-3.7	5.9	-1.2	39	45.4
12 weeks	-31.8	-4.4	6.8	-9.8	38	66.0
24 weeks	-47.4	-6.5	-15.4	-16.4	31	88.6

The same results can also be seen in Table 4 where we test to see if the mean weekly excess returns (over the S&P 500) are significantly different from zero.

Holding Periods	85% off the 52-week high		80% off the 52-week high	
	\$1<price<\$5	Price>\$5	\$1<price<\$5	Price> \$5
1 week	1.7655**	0.1320	1.03625**	0.1747
2 weeks	3.3446*	0.2199	1.9446*	0.2629
4 weeks	2.5656	0.6528	2.0096	-0.3816
12 weeks	-0.8756	-2.8292	2.7121	-5.1000
24 weeks	-15.8600	-12.3000	-7.105	-15.3100*

** Significant at 1% level

* Significant at 5% level

5. The Impact Of Winning And Losing Stretches

Tables 5 and 6 compare winning and losing periods (defined as making or losing money on absolute basis), length of winning and losing stretches, and returns during those periods. This data contributes to understanding why zombie portfolios underperform (if the screening price exceeds \$5) or outperform (if the screening price is between \$1 and \$5) the market index. For example, consider the higher than \$5 stock portfolios in Table 5. There are, with one exception, fewer winning periods than the S&P across all holding periods. And, in general, the winning stretch is shorter than the losing stretch; and, the average return during the winning stretch (Column 5) does not offset the average loss during the losing stretch.

In Table 6, however, the results for the lower priced stock portfolio are different. Although the number of winning periods for the constructed portfolios are less than the S&P win ratio; for the one-week portfolios the average winning stretch equals or exceeds the average losing stretch and, more importantly, the average percentage gain more than offsets the average percentage loss. This pattern holds for the 2- and 4-week 80% stock price drop also. For the 85% drop portfolios, in Panel B, the average winning stretch is slightly less than the average losing stretch for the 2- and 4- week portfolio, but the average percentage gain overshadows the average percentage loss.

Table 5 Win/Loss Run Comparison for Stocks with Price Greater than \$5						
Panel A. Stock portfolio created by screening top 95% (measured by market value), current stock price is 80% off the 52-week high.						
(1) Holding period	(2) Winning periods/total periods	(3) S&P 500, win ratio	(4) Average winning stretch	(5) Average Percent win	(6) Average loss stretch	(7) Average percent loss
1 week	238/502	265/502	2.2	7.9	2.5	-6.8
2 weeks	129/251	130/251	2.4	10.5	2.3	-10.7
4 weeks	59/125	68/125	2.3	14.9	2.6	-14.3
12 weeks	16/41	22/41	1.7	24.9	2.8	-25.4
24 weeks	6/20	11/20	1.5	25.6	2.8	-35.7
Panel B. Stock portfolio created by screening top 95% (measured by market value), current stock price is 85% off the 52-week high.						
Holding period	Winning periods/total period	S&P 500, win ratio	Average winning stretch	Average Percent win	Average loss stretch	Average percent
1 week	261/502	265/502	2.7	7.9	2.5	-8.4
2 weeks	131/251	130/251	2.4	11.3	2.2	-11.9
4 weeks	59/125	68/125	2.2	18.4	2.4	-15.5
12 weeks	17/41	22/41	1.8	29.1	2.7	-26.5
24 weeks	8/20	11/20	2.0	32.9	2.4	-45.7

Table 6 Win/Loss Run Comparison for Stocks Priced Between \$1 and \$5						
Panel A. Stock portfolio created by screening top 95% (measured by market value), current stock price is 80% off the 52-week high.						
(1) Holding period	(2) Winning periods/total period	(3) S&P 500, win ratio	(4) Average winning stretch	(5) Average Percent win	(6) Average loss stretch	Average percent loss
1 week	255/502	265/502	2.3	7.4	2.2	-5.6
2 weeks	129/251	130/251	2.3	11.9	2.2	-8.7
4 weeks	63/125	68/125	2.2	15.8	2.2	-12.3
12 weeks	19/41	22/41	2.0	28.3	2.4	-20.6
24 weeks	5/20	11/20	1.3	41.1	3.0	-25.8

Panel B. Stock portfolio created by screening top 95% (measured by market value), current stock price is 85% off the 52-week high.

Holding period	Winning periods/total period	S&P 500, win ratio	Average winning stretch	Average Percent win	Average loss stretch	Average percent loss
1 week	249/502	265/502	2.3	10.0	2.3	-6.4
2 weeks	123/251	130/251	2.3	16.7	2.4	-9.4
4 weeks	61/125	68/125	2.3	19.1	2.5	-13.8
12 weeks	17/41	22/41	2.0	34.0	3.0	-26.7
24 weeks	6/20	11/20	1.5	31.9	3.3	-39.1

6. Volatility Analysis

Table 7 contains a risk/return analysis of the portfolios. We use the information ratio, a variation of the Sharpe ratio, which measures the risk adjusted return earned by the manager. For this purpose, the reward is defined as the average difference between the portfolio’s return and the benchmark (the tracking error), standardized by risk (the standard deviation of the tracking error.) The information ratio (IR) is presented in the following equation:

$$IR = \frac{1}{N} \sum_{i=1}^N \left[\frac{(R_p - R_b)}{\sqrt{\sigma_r^2 (R_p - R_b)}} \right] \tag{1}$$

Where R_p is the portfolio return and R_b is the benchmark return.

The information ratios show that the price range of \$1 to \$5 provides a better risk return profile than the price range greater than \$5. The 85% price drop level provides a better risk return combination. The results show that the shorter the holding period, the higher the risk adjusted returns. This is consistent with our previous findings. Overall, we can say that the best strategy – higher risk adjusted return ratio--is to select securities whose price has dropped by 85% and are trading between \$1 and \$5 and use a 1 or 2-week holding period.

Table 7
Information ratios for the different strategies

Holding Period	85% off the 52-week high		80% off the 52-week high	
	\$1 < price <\$5	Price > \$5	\$1 < price <\$5	Price > \$5
1 week	0.1577	0.0113	0.1353	0.0190
2 weeks	0.1539	0.0146	0.1395	0.0205
4 weeks	0.1415	0.0290	0.1249	-0.0216
12 weeks	-0.0255	-0.0880	0.0982	-0.1898
24 weeks	-0.4596	-0.3142	-0.2153	-0.5439

7. Conclusion

Recently, several well-known companies have seen their stock prices drop by more than 85% from their 52-week high. Articles appearing in the financial press labeled these securities as *zombie* stocks and warned investors to avoid them. There is some prior research documenting reversals for stocks that hit new lows so there may be an opportunity in investing in these *zombie* stocks. In this paper, we explore that opportunity by constructing portfolios of stocks that have dropped by 80 or 85% from their 52-week high and measuring the returns over holding periods of 1, 2, 4, 12, or 24 weeks.

We found statistically significant abnormal returns for shorter holding periods, 1 or 2 weeks, and for portfolios where the initial stock price ranged between \$1 and \$5. The highest return portfolio consisted of stocks that had dropped 85% from their 52-week high where the holding period was one week. From a risk/return perspective, this portfolio also ranked the highest, with the largest information ratio. Preliminary evidence in this paper suggests that investing in zombie stocks is advantageous in up markets. An extension of the paper would be to invest in zombie stocks after steep, market drops.

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