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EXTREME DISCOUNT SYSTEM

A portfolio strategy for equities designed to find bargain-basement companies.

WHITE PAPER

JB MARWOOD.com

HOW TO BEAT WALL STREET

EXTREME DISCOUNT SYSTEM

INTRODUCTION

The methodology behind the Extreme Discount system came about after acknowledging that cheap value stocks share some very similar characteristics.

I had already spent some time researching my next company to buy when I realised that many of my favourite companies all had very low, single-digit values for several metrics of valuation.

In particular, the companies on my watchlist showed single-digit values for price-to-earnings, price-to-book, price-to-sales and price-to-cash.

I therefore decided to open up the simulator at Portfolio123.com and do some rudimentary testing of single-digit values. To my surprise, initial results for the strategy were actually very good. I therefore decided to explore the strategy further.

Recent research & values

Most of the values used in the Extreme Discount system are based on the relationship between a stock's current price and some other variable; such as earnings, cash, debt, or sales.

There have already been several studies to show that the price-to-earnings ratio is a good indicator towards stock returns, and it has been shown that low PE ratios generally lead to better returns than high PE ratios.

As well, there is now evidence to suggest that a company's cash flow is also a strong indicator to performance.

And, in the paper 'Are Cash Flows Better Stock Return Predictors than Profits?[1]', Foerster et al. argue that firms able to generate strong cash flows perform better than their counterparts.

In this system, the approach used was to filter stocks based on current price-to-earnings, future price-to-earnings, price-to-sales, price-to-book, and price-to-free cash-flow.

The price-to-free-cash-flow ratio in particular is known to be a worthwhile indicator of value whereby a ratio in the low single digits indicates that the stock may be undervalued. The ratio takes into consideration a company's market price to its level of annual free cash flow.

Overall, the price-to-free-cash-flow ratio, is considered a more rigorous metric than the price-to-cash ratio since it takes into account capital expenditures. My own findings seems to back up this statement.

If a stock had all single digits for the above mentioned values it would show up as green in the screener and would therefore be added to the portfolio.

Initial results on a limited stock universe between 2000 and 2005 showed some promising results so more modifications were made and the system was tested more thoroughly in Portfolio123.

TEST ONE

For the first test, I loaded up data for all stocks in the S&P 1500 universe in Portfolio123 between 1/1/2000 and 1/1/2014. This database uses point-in-time data from Compustat so that it is not impacted by survivorship bias.

I then gave the platform the following criteria for buying a stock:

Buy criteria:

- **Market Cap > $100m.**
- **PE ratio < 10 (ttm)**
- **Forward PE ratio < 10 (next fiscal year)**
- **Price-to-sales < 10 (ttm)**
- **Price-to-book < 10 (latest quarter)**
- **Price-to-free-cash-flow < 10 (latest quarter).**

Additional settings:

In addition, the following settings were set up:

Commissions were set at $1 per trade in line with Interactive Brokers and slippage was set at 0.25%. The starting capital was set to $100,000 and each position was given a cash weighting of 5%, allowing a total of 20 positions in total for the portfolio. No leverage or margin was used.

The portfolio was rebalanced every two weeks and sold holdings were allowed to

1 Foerster , Stephen R. and Tsagarelis, John and Wang, Grant, Are Cash Flows Better Stock Return Predictors than Profits? (January 11, 2015).

be re-bought on the rebalance date.

Lastly, a liquidity factor of 5% was used so as not to buy stocks with very low liquidity. In this way, the portfolio was restricted from buying no more than 5% of the average daily volume of the stock.

Sell criteria

Whenever a stock met the buy rules it was added to the portfolio. Stocks were sold whenever the stock met the following sell criteria:

- **Close is more than 25% below its 52-week high (on the rebalance date).**

Or • **PEG > 4 (on the rebalance date).**

Ranking

In addition, the strategy used a ranking methodolgy based on PE ratios to choose between signals. Whenever the portfolio had more buy signals than funds available, the portfolio chose the stock with the lower PE ratio.

Full Portfolio123 rules

General	
Name	Extreme Cheap
Starting Capital	$100,000.00
Benchmark	S&P 500
Commission	1.0 (Flat Fee)
Slippage	0.25% of Total Amt (Fixed)
Transaction Type	Long
Use Margin	No
Management Fee	0.0%
Rebalance Frequency	2 Weeks
Price for Transactions	Next Open
Allow sold holdings to be re-bought at current rebalance	Yes
Transaction Save	Temp
Visibility	Private
Category	Unclassified

Position Sizing	
Type	'% of Market Value'
Ideal Weight New Pos	5
Aprox. Number of Positions	20.0
Max Weight Deviation	30

Universe & Ranking	
Universe	S&P 1500 Index
Ranking System	pe rank 2
Ranking Method	Percentile NAs Negative
Force Weekly Ranks	Yes
Force Positions into Universe	No

Buy Rules (Implicit AND) [copy to screen]	
Liquidity	PctAvgDailyTot(20) < 5
Buy2	mktcap > 100
Buy3	PEExclXorTTM < 10
Buy4	ProjPENextFY < 10
Buy5	Pr2SalesTTM < 10
Buy6	Pr2BookQ < 10
Buy7	Pr2FrCashFIQ < 10

Sell Rules (Implicit OR) [copy to screen]	
X Rank	Rank < 60
Sell2	Close(0)<=(1-25/100)*HighVal(252,0,#high)
Sell3	peg > 4

Stop Loss	
Strategy	None

Hedge / Market Timing DISABLED

Period & Restrictions	
Start Date	01/01/2000
End Date	12/31/2013
Exposure List	None
Restrict Buy List	
Restrict Sell List	
Load Global Restrictions	Yes
Allow Mergers	No

Strategy in plain language

In other words, this is a portfolio system.

The system begins on the 1 January 2000 and the S&P 1500 universe is scanned for buy signals. If a stock meets the buy criteria, the stock is bought and added to the portfolio.

This process is continued every two weeks (the rebalance period) and the portfolio can carry a maximum of 20 positions at one time (5% weighiting). If there is more than one stock meeting the buy criteria, the ranking mechanism kicks in so that the portfolio chooses first the stock with the lower PE ratio.

If an existing position meets the sell criteria, the stock is sold and drops off the portfolio.

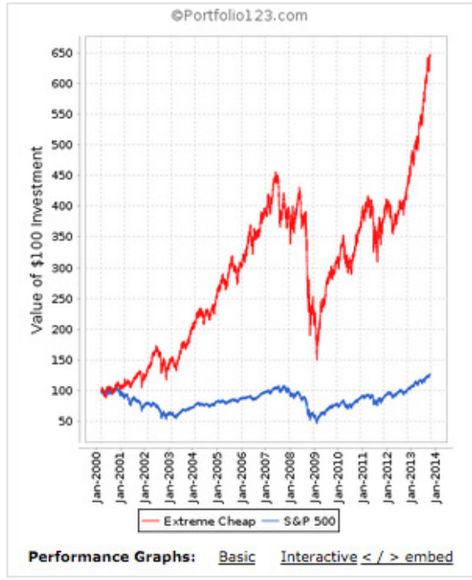
So, if the stock closes 25% or more below its 52-week high **OR** if the PEG is over 4 on the date of re-balance, the stock is sold.

Any stocks that fit the buy criteria on the date of re-balance will be automatically added to the portfolio (if there is room).

Any existing stock that meets the sell criteria AND the buy criteria will not be sold, but the position will be adjusted to reflect the re-purchasing of the stock. All trades are entered on the next day open.

Results

Running this strategy on the S&P 1500 universe of stocks between 1/1/2000 and 1/1/2014 produced the following table of results and equity chart:



General Info	
Inception Date	01/01/00
Last Rebalance Date	12/28/13
Days Since Last Rebalance	403
Rebalance Frequency	2 Weeks
Benchmark	S&P 500
Universe	S&P 1500 Index
Ranking System	pe rank 2

Quick Stats as of 12/31/2013	
Total Market Value (inc. Cash)	$ 636,283.50
Cash	$ 530.21
Number of Positions	20
Total Return	536.28%
Benchmark Return	25.80%
Active Return	510.48%
Annualized Return	14.13%
Annual Turnover	293.94%
Max Drawdown	-67.07%
Benchmark Max Drawdown	-56.78%
Overall Winners	(546/1050) 52.00%
Sharpe Ratio	0.43
Correlation with S&P 500	0.88

The results of test one, as shown above, are reasonable. The annualised return is

14.13% and this is way above the benchmark S&P 500 Index.

However, the drawdown is very large at 67% and this contributes to a Sharpe ratio below 0.50.

TEST TWO

The results of this first test are promising, but there is plenty of room for improvement.

In order to address the problem of the large drawdown I looked more closely at the portfolio holdings and it became clear that there were some potential problems that could be solved.

Too much debt?

First of all, the system seemed to do a good job of finding cheap, undervalued stocks but some of those companies also seemed to have a fair amount of debt, and this could partly explain their relative cheapness.

I therefore introduced an extra buy rule:

- **Current ratio > 1.**

The current ratio is a good indicator of financial strength so eliminating stocks with a current ratio below 1 could be a good move when dealing with contrarian-type stocks.

Strange logic?

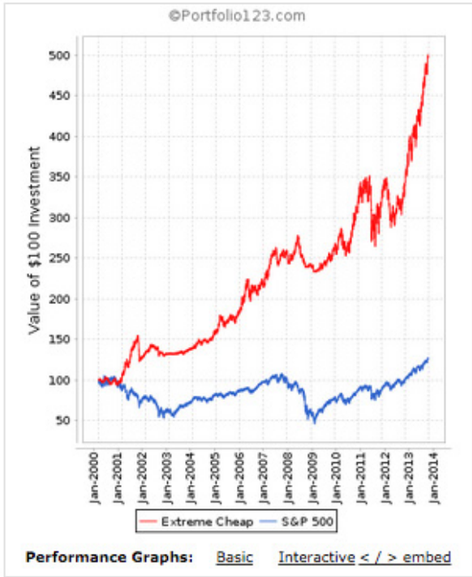
Secondly, it became clear that the portfolio would often purchase stocks only to sell them on the next re-balance date.

In other words, by looking for undervalued stocks, it would also find stocks that had dropped more than 25% below the 52-week high, which was our sell criteria. In order to counter this problem, I created another extra buy rule:

- **Previous close must not be more than 25% below its 52-week high.**

After altering the strategy rules slightly I re-ran the test over the same period and the results are shown on the next page:

Results



General Info	
Inception Date	01/01/00
Last Rebalance Date	12/28/13
Days Since Last Rebalance	403
Rebalance Frequency	2 Weeks
Benchmark	S&P 500
Universe	S&P 1500 Index
Ranking System	pe rank 2

Quick Stats as of 12/31/2013	
Total Market Value (inc. Cash)	$ 498,397.44
Cash	$ 74,073.36
Number of Positions	16
Total Return	398.40%
Benchmark Return	25.80%
Active Return	372.60%
Annualized Return	12.16%
Annual Turnover	100.50%
Max Drawdown	-24.58%
Benchmark Max Drawdown	-56.78%
Overall Winners	(151/311) 48.55%
Sharpe Ratio	0.60
Correlation with S&P 500	0.56

Although the annualised return has dropped, you can see that adding the extra rules has been successful in reducing the drawdown and now the Sharpe ratio sits at a more attractive 0.60. The second rule was the most significant in doing this as it picks out stocks that are still in relative up-trends.

TEST THREE

After more evaluation of results, it became clear that the portfolio strategy in test two was not always operating at it's full capacity. Often, the total number of positions in the portfolio would drop dramatically to 15, 10, even 6 positions.

I therefore decided to test the strategy on a larger database.

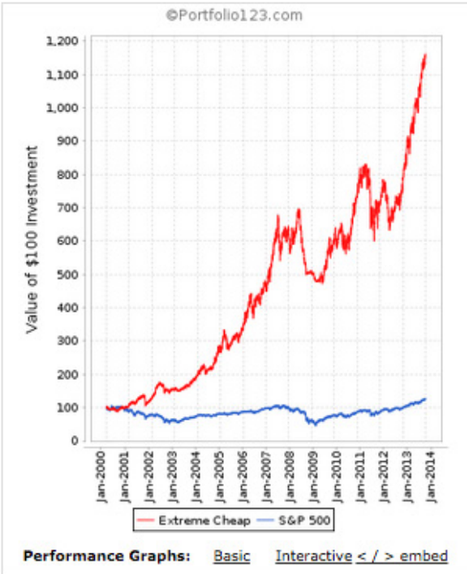
All stocks

The strategy so far, seems to have a knack for finding beaten down, small cap stocks, so a universe like the S&P 1500 might not do the strategy justice.

In the next test, therefore, I kept all settings the same but I altered the trading universe to the All Fundamentals database. This is an extensive universe of stocks on Portfolio123 that contains all companies where there is accurate fundamental data available.

The results are shown on the next page:

Results



General Info	
Inception Date	01/01/00
Last Rebalance Date	12/28/13
Days Since Last Rebalance	403
Rebalance Frequency	2 Weeks
Benchmark	S&P 500
Universe	All Fundamentals - USA
Ranking System	pe rank 2

Quick Stats as of 12/31/2013	
Total Market Value (inc. Cash)	$ 1,145,289.38
Cash	$ 150,627.08
Number of Positions	17
Total Return	1,045.29%
Benchmark Return	25.80%
Active Return	1,019.49%
Annualized Return	19.03%
Annual Turnover	152.78%
Max Drawdown	-32.01%
Benchmark Max Drawdown	-56.78%
Overall Winners	(245/512) 47.85%
Sharpe Ratio	0.85
Correlation with S&P 500	0.61

As you can see from the results of test three, using a larger database helps improves returns by a significant amount.

Annualised return has improved to 19.03%, the drawdown has fallen to -32% and the Sharpe ratio is now 0.85.

Improvements

The returns from the Extreme Discount strategy have greatly improved since the first test and it may be possible to improve even further on these results.

Some things I did try that did NOT help returns include:

Introducing a dividend requirement. The strategy seems to perform better when it can buy dividend as well as non-dividend companies.

Using a stop-loss. Performance seemed to deteriorate with use of a stop-loss.

Some elements that were not tested but might reasonably be expected to improve returns could include:

Introducing a market filter to take the portfolio into cash during poor conditions.

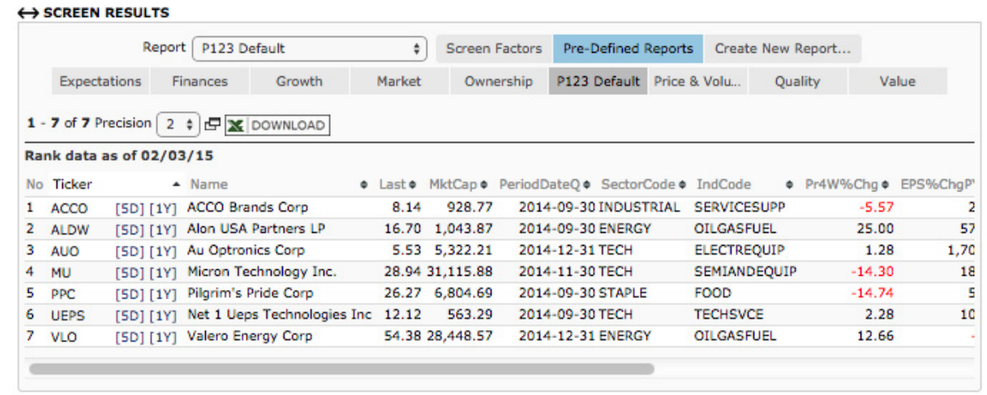
Introducing some level of diversification into the portfolio.

Introducing a minimum threshold for the PE ratio, since ultra low PE's might be unsustainable.

No doubt there are other ways the strategy could be improved but those three areas might be a good place to begin. For now, the results are quite promising.

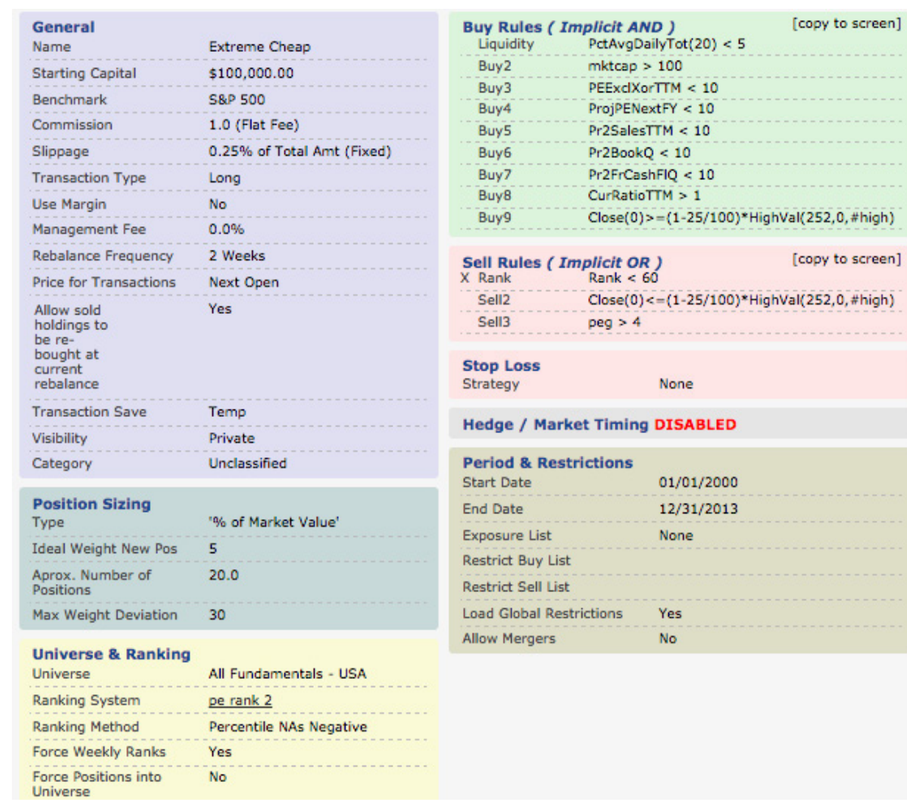
New signals

With Portfolio123 it is easy to load the Extreme Discount strategy into a screener and scan the markets for new signals. As of 4 February 2015, the new signals were as follows:



No	Ticker		Name	Last	MktCap	PeriodDateQ	SectorCode	IndCode	Pr4W%Chg	EPS%ChgP
1	ACCO	[5D] [1Y]	ACCO Brands Corp	8.14	928.77	2014-09-30	INDUSTRIAL	SERVICESUPP	-5.57	2
2	ALDW	[5D] [1Y]	Alon USA Partners LP	16.70	1,043.87	2014-09-30	ENERGY	OILGASFUEL	25.00	57
3	AUO	[5D] [1Y]	Au Optronics Corp	5.53	5,322.21	2014-12-31	TECH	ELECTREQUIP	1.28	1,70
4	MU	[5D] [1Y]	Micron Technology Inc.	28.94	31,115.88	2014-11-30	TECH	SEMIANDEQUIP	-14.30	18
5	PPC	[5D] [1Y]	Pilgrim's Pride Corp	26.27	6,804.69	2014-09-30	STAPLE	FOOD	-14.74	5
6	UEPS	[5D] [1Y]	Net 1 Ueps Technologies Inc	12.12	563.29	2014-09-30	TECH	TECHSVCE	2.28	10
7	VLO	[5D] [1Y]	Valero Energy Corp	54.38	28,448.57	2014-12-31	ENERGY	OILGASFUEL	12.66	-

Full Portfolio123 rules



General	
Name	Extreme Cheap
Starting Capital	$100,000.00
Benchmark	S&P 500
Commission	1.0 (Flat Fee)
Slippage	0.25% of Total Amt (Fixed)
Transaction Type	Long
Use Margin	No
Management Fee	0.0%
Rebalance Frequency	2 Weeks
Price for Transactions	Next Open
Allow sold holdings to be re-bought at current rebalance	Yes
Transaction Save	Temp
Visibility	Private
Category	Unclassified

Position Sizing	
Type	'% of Market Value'
Ideal Weight New Pos	5
Aprox. Number of Positions	20.0
Max Weight Deviation	30

Universe & Ranking	
Universe	All Fundamentals - USA
Ranking System	pe rank 2
Ranking Method	Percentile NAs Negative
Force Weekly Ranks	Yes
Force Positions into Universe	No

Buy Rules (Implicit AND) [copy to screen]	
Liquidity	PctAvgDailyTot(20) < 5
Buy2	mktcap > 100
Buy3	PEExclXorTTM < 10
Buy4	ProjPENextFY < 10
Buy5	Pr2SalesTTM < 10
Buy6	Pr2BookQ < 10
Buy7	Pr2FrCashFlQ < 10
Buy8	CurRatioTTM > 1
Buy9	Close(0)>=(1-25/100)*HighVal(252,0,#high)

Sell Rules (Implicit OR) [copy to screen]	
X Rank	Rank < 60
Sell2	Close(0)<=(1-25/100)*HighVal(252,0,#high)
Sell3	peg > 4

Stop Loss	
Strategy	None

Hedge / Market Timing DISABLED

Period & Restrictions	
Start Date	01/01/2000
End Date	12/31/2013
Exposure List	None
Restrict Buy List	
Restrict Sell List	
Load Global Restrictions	Yes
Allow Mergers	No

Credits:

Foerster , Stephen R. and Tsagarelis, John and Wang, Grant, Are Cash Flows Better Stock Return Predictors than Profits? (January 11, 2015). Available at SSRN: http://ssrn.com/abstract=2472571

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