



ezHedge Optimization

October 2007

Introduction

When Kase and Company, Inc. first introduced ezHedge, we set forth with the intention of reoptimizing the program after some experience was gained with it. The purpose for reoptimizing is not to curve fit the model to specific conditions, but rather to adjust the variables of the model, taking into account new data, as well as to improve the optimization methodology as experience dictated. The first optimization was completed in April of 2006 upon the launch of the ezHedge, which we are now designating as ezHedge_2006. This review of the variables and reoptimization was completed in October 2007 and is referred to as ezHedge_2008.

New Criteria for ezHedge_2008 Reoptimization

The differences between ezHedge_2008 and the original optimization are as follows:

Price Versus Percent

The biggest adjustment in the reoptimization was viewing results in terms of price versus percent of price. In the first optimization of ezHedge a \$2.00 gain would be viewed as better than a \$1.00 gain. But if the \$2.00 gain took place when the market was \$10.00, and the \$1.00 gain took place when the market was \$4.00, the first gain would equate to 20 percent and the second to 25 percent of the underlying price. So the reoptimization was based on percentages of underlying price to account for the upward bias over time that could have distorted some of the earlier results given the strong bull markets in recent years.

Ten Year versus Life of Contract

Rather than optimizing the model over life of contract, only the most recent 10 years were used, though results for life of contract are presented in the final output tables. Because prices more recently have been more volatile as well as at much higher levels, the early years of data were dropped.

Optimized For Minimizing Total Losses, While Maximizing Total Gains

The original optimization minimized the maximum drawdown, while maximizing the cumulative gains. The reality though, is that it is possible to have a result where the maximum single drawdown is low, but the total losses are high, versus one large drawdown but small total losses. The ezHedge_2008 reoptimization focused on minimizing the total losses versus the ezHedge_2006 method of minimizing the largest single drawdown. Maximizing the total gains remained unchanged.

Exclude Unexpired Contracts

Another change in the optimization process was the exclusion of the un-expired contracts. This was done because unexpired contracts which are not yet settled can distort results by giving too much weight to current conditions.

Even though all variables other than point weighting and band settings were tested, only the variables relating to entering and exiting Code RED were changed for the new version. The change sends the model into and out of Code RED sooner.

Below is a comparison of the overall results starting on December 1, 1991, through October 29, 2007, a total of 188 months. The results for ezHedge_2008 are compared against ezHedge_2006 as well as a dollar-cost-averaging (DCA) program. Both dollar values as well as the percent of underlying results are shown.

Column Heading Legend

MDD	Max Drawdown	Losing Months	The total number of losing months,
AvgDD	Average Drawdown	% Wins	Percentage of Winning months
Total Losses	The total losses of the simulation	Avg Win	The average win for each winning trade
Total Gains	The total gains of the simulation	Avg Loss	The average loss for each losing trade
Winning Months	The total number of winning months,	W/L	Win to Loss ratio
		CIP	Cumulative In Program

As mentioned earlier the reoptimization focused on cutting total losses, while maximizing total gains. The results show that the new version both cut total losses and increased total gains. The reoptimization also increased other performance factors across the board.

Dollar Values

Run Type	CIP	Total Losses	Total Gains	Winning Months	Losing Months	% Wins	Avg Win	Avg Loss	W/L	MDD	AvgDD
2008	124.3	(47.1)	171.5	134	54	71	1.28	(0.87)	1.47	(29.6)	(4.19)
2006	114.1	(54.9)	169.0	126	62	67	1.37	(0.89)	1.55	(35.8)	(8.94)
DCA	39.6	(71.3)	110.8	100	85	53	1.11	(0.84)	1.32	(39.6)	(6.96)

Percent * 10⁻² of Underlying Value

Run Type	CIP	Total Losses	Total Gains	Winning Months	Losing Months	% Wins	Avg Win	Avg Loss	W/L	MDD	AvgDD
2008	30.9	(12.0)	42.9	134	54	71	0.32	(0.22)	1.45	(4.82)	(1.07)
2006	28.6	(13.6)	42.2	126	62	67	0.34	(0.22)	1.54	(5.15)	(2.21)
DCA	9.7	(16.0)	25.7	103	85	53	0.25	(0.19)	1.34	(4.95)	(1.54)

Coming Out of RED Study

The reoptimization of ezHedge was based on a default start date of January 1, 1998. Hedgers actually using the program would have started on different dates following that time. To test the model's robustness, the new settings were tested using start dates based on each occurrence of coming out of Code RED. Code RED takes place when a series of red dots occur; coming out of Code RED is when the red dots turn to any other color. The table below shows the results of starting a simulation on each of the dates listed below, and the differences relative to the default simulation.

Coming Out of RED Simulation Results in Percent * 10⁻²

Last Date in Code RED	CIP RED Run	CIP Default Run	CIP Diff.	# Diff Months	Average Diff/Mo
02/10/93	1.64	4.58	(2.94)	13	(0.23)
01/20/94	(2.47)	(1.67)	(0.80)	13	(0.06)
06/27/94	(5.18)	(4.76)	(0.43)	17	(0.03)
02/22/95	1.96	(1.29)	3.25	12	0.27
04/22/97	1.03	1.74	(0.71)	13	(0.05)
10/07/98	(0.07)	0.56	(0.63)	16	(0.04)
03/26/99	1.71	2.45	(0.74)	14	(0.05)
02/07/00	7.93	9.17	(1.23)	13	(0.09)
11/05/01	(0.54)	(0.76)	0.22	4	0.05
02/27/02	6.82	5.01	1.81	16	0.11
09/05/02	4.59	6.02	(1.43)	16	(0.09)
12/24/03	0.45	2.41	(1.96)	8	(0.24)
02/15/05	3.74	5.67	(1.93)	10	(0.19)
04/06/06	(2.75)	(0.95)	(1.79)	9	(0.20)
08/15/06	(5.51)	(4.82)	(0.69)	15	(0.05)
10/26/06	(2.10)	(5.73)	3.64	17	0.21
Average	0.70	1.10	(0.40)	13	(0.04)

In 76 percent of the cases, there was a loss compared to the default. On average the difference between the two programs in these cases was \$1.27 cumulatively. In the other 24 percent there was a gain, averaging \$2.23 cumulatively. Overall the result was a cumulative loss of \$0.40 and an average loss per contract of four cents. In all of the cases then, the difference between the coming out of RED simulation and the default simulation is small compared to the default. The "# Diff. Months" column shows how many months were different between the two runs. On average, it only took 13 months, and a maximum of 17 months, for coming out of RED to match the full simulation. So regardless as to the model start date, after no more than about 17 months, the hedges placed will probably conform to the optimized settings.

These results from October 2007 were consistent with the first Coming Out of Red study that was done on ezHedge in April 2006.

Accumulation Cap Study

The table below shows the results of an Accumulation Cap Amounts (AccCap) study. Normally, up to 100 percent of volume may be hedged when coming out of red, or reversing out of accumulating cyan dots. This study was performed to see what would happen if a lesser amount was allowed when coming out of an accumulation period. The tables show that whether measuring by Dollar values, or Percent Underlying value, the accumulation cap results in a negligible difference. As in the previous optimization, setting the cap at 100 percent yields the best results, both in minimizing Total Losses and maximizing Cumulative-In-Program.

Dollar Value Results (Based on One mmBtu/month in Program)

AccCap	CIP	Total Losses	Total Gains	Winning Mos	Losing Mos	% Wins	Avg Win	Avg Loss	W/L	MDD	AvgDD
100	124.3	(47.1)	171.5	134	54	71	1.28	(0.87)	1.47	(29.6)	(4.19)
90	124.3	(47.2)	171.5	134	54	71	1.28	(0.87)	1.47	(29.6)	(4.19)
80	124.1	(47.3)	171.4	134	54	71	1.28	(0.88)	1.46	(29.7)	(4.20)
70	123.4	(47.7)	171.1	134	54	71	1.28	(0.88)	1.44	(30.0)	(4.24)
60	121.8	(48.4)	170.2	134	54	71	1.27	(0.90)	1.42	(30.4)	(4.30)
50	120.2	(49.0)	169.2	134	54	71	1.26	(0.91)	1.39	(30.8)	(4.70)
40	118.7	(49.6)	168.2	134	54	71	1.26	(0.92)	1.37	(31.5)	(4.78)
30	117.1	(50.3)	167.5	133	55	70	1.26	(0.92)	1.38	(32.5)	(4.44)
20	115.4	(51.0)	166.5	132	56	70	1.26	(0.91)	1.38	(33.3)	(4.15)

Percent * 10⁻² Underlying Values Results

AccCap	CIP	Total Losses	Total Gains	Winning Mos	Losing Mos	% Wins	Avg Win	Avg Loss	W/L	MDD	AvgDD
100	30.9	(12.0)	42.9	134	54	71	0.32	(0.22)	1.44	(4.82)	(1.07)
90	30.9	(12.0)	42.9	134	54	71	0.32	(0.22)	1.44	(4.82)	(1.07)
80	30.8	(12.0)	42.9	134	54	71	0.32	(0.22)	1.44	(4.82)	(1.07)
70	30.8	(12.1)	42.8	134	54	71	0.32	(0.22)	1.43	(4.82)	(1.07)
60	30.5	(12.1)	42.7	134	54	71	0.32	(0.22)	1.42	(4.82)	(1.08)
50	30.3	(12.2)	42.5	134	54	71	0.32	(0.23)	1.40	(4.81)	(1.18)
40	30.1	(12.3)	42.3	134	54	71	0.32	(0.23)	1.39	(4.80)	(1.19)
30	29.9	(12.3)	42.2	133	55	70	0.32	(0.22)	1.41	(4.78)	(1.09)
20	29.6	(12.4)	42.0	132	56	70	0.32	(0.22)	1.43	(4.79)	(1.01)

Comparison of Open Contracts

As mentioned earlier, the new optimization excluded the unexpired contracts. However, when considering the open contracts, the results of ezHedge_2008 are still better based on current market prices. The table below shows the hedge prices of the ezHedge_2008 alongside the hedge prices of the previous model. There were 18 months in the evaluation and for 15 of those months, the new model has a lower hedge price, and in three months the same price. Overall, ezHedge_2008 had a hedge price that was an average of \$0.03 lower than ezHedge_2006. This means that, whatever the expiration price turns out to be, the new model will still have a better mark-to-market (MTM) versus the old settings.

Open Contract Comparison of Hedge Prices

Contract	Model 2008	Model 2006	Diff	Contract	Model 2008	Model 2006	Diff
Dec-07	10.9	11.0	(0.05)	Sep-08	7.85	7.88	(0.03)
Jan-08	11.4	11.4	(0.10)	Oct-08	7.98	7.98	0.00
Feb-08	11.4	11.5	(0.10)	Nov-08	8.95	8.95	0.00
Mar-08	10.6	10.7	(0.04)	Dec-08	9.60	9.60	0.00
Apr-08	8.03	8.08	(0.05)	Jan-09	9.56	9.56	(0.01)
May-08	7.61	7.66	(0.05)	Feb-09	8.93	8.95	(0.02)
Jun-08	7.79	7.81	(0.03)	Mar-09	8.68	8.70	(0.02)
Jul-08	7.77	7.79	(0.02)	Apr-09	7.83	7.85	(0.02)
Aug-08	7.77	7.83	(0.06)	May-09	7.86	7.86	(0.01)

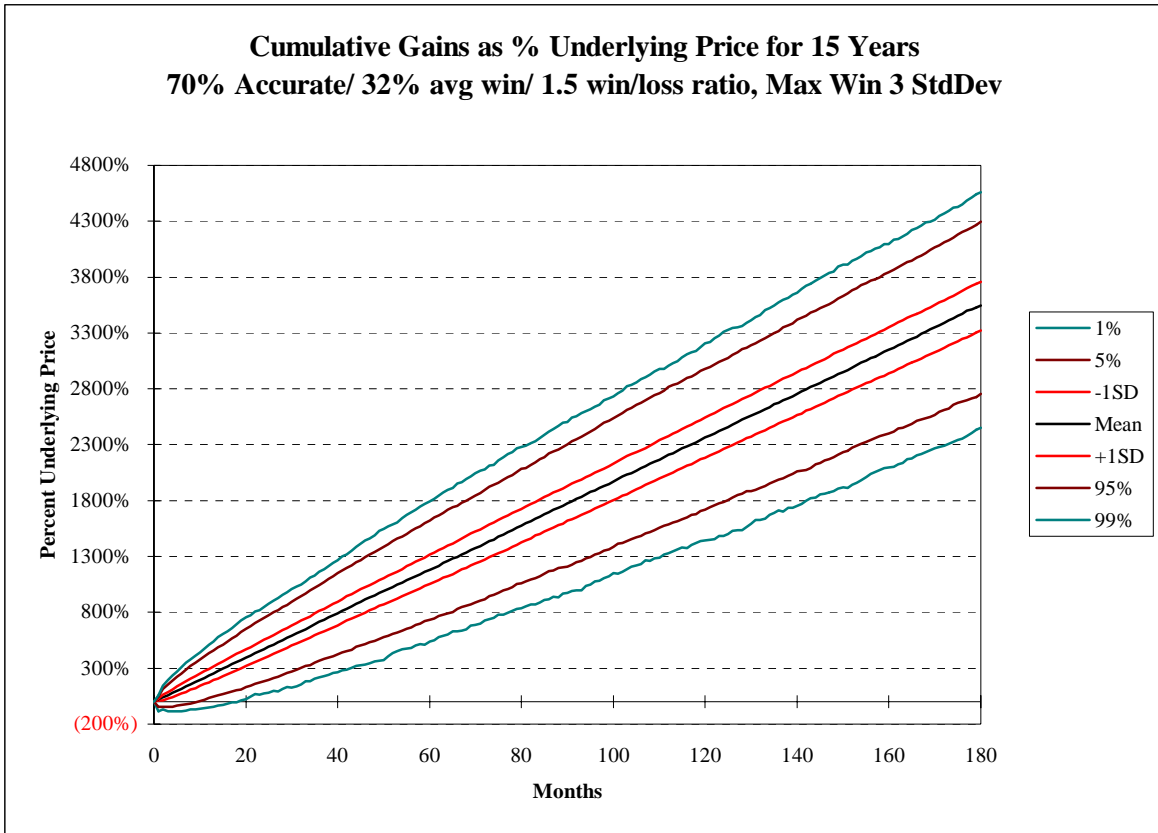
Monte Carlo Simulation

Based on the percentage of winning months and the average win and loss, a Monte Carlo simulation was run, giving a projected profit/loss percentile graph over the next 180 months. A Monte Carlo simulation is a random walk from a given starting point. In this case, the walk was along the Cumulative-In-Program, where each step taken was one trade. Each step, the value added to the CIP was selected randomly, and can be considered the MTM of that trade. The random selection of the MTM of each trade was biased, based on statistics found in the ezHedge simulation, shown below.

Monte Carlo Settings

Win Mean	0.32	Loss Mean	0.22	Max Loss Factor	3
Win StDev	0.28	Loss StDev	0.15	Max Win Factor	3
Win Probability	70%				

First, a trade was chosen as Winning or Losing, with a 70 percent chance to be a winning trade. Then the value of the trade was randomly selected, from a Gaussian Distribution with the mean and standard deviation listed in the table above. This provided trade values consistent with the trade values found in the simulation based on actual data. The trade values were bound at three standard deviations from the given mean. One set of 180 trades, one random walk, counted as one run, and there were 5500 runs compiled in the data below.



The chart above plots the CIP of the 180 months, as a percent of underlying value, against the number of trades. As seen in the table, while a little jumpy, overall, the model will probably continue to bring in gains. Even in the 1st percentile, which had the smallest gains per trade, the curve eventually turns upward, and the gains are realized after about the 20th month. Note that the chart shows percentiles of the 5500 runs, each of which has a distinct gain and loss profile. This data is available on CD upon request, and can be examined to understand maximum drawdown and outlier behavior.