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Introduction

In this document I will give you my interpretation of the best way to allocate funds between the IMW and GDX robot. Please keep in mind I'm new at this so my tests might contain errors that result in false assumptions. Use the data presented in this document at your own risk.

The test was run in Amibroker. The process goes like this :

- generate equity curve data in Excel
- load that data into Amibroker as a 'virtual' ticker
- repeat for the next system
- run the optimization on the 'virtual' tickers

The data used for this test is based on the gain/loss % of the IWM and GDX robot trades with SL management. To build the equity curves for the robots profit from each trade is re-invested in the next trade or subtracted in case of loss. Also the equity curves are based on closed equity, so no intra trade peaks and valleys are present. This is not a bad thing as is explained here : http://www.automated-trading-system.com/trick-reduce-drawdowns/

Optimization Chart
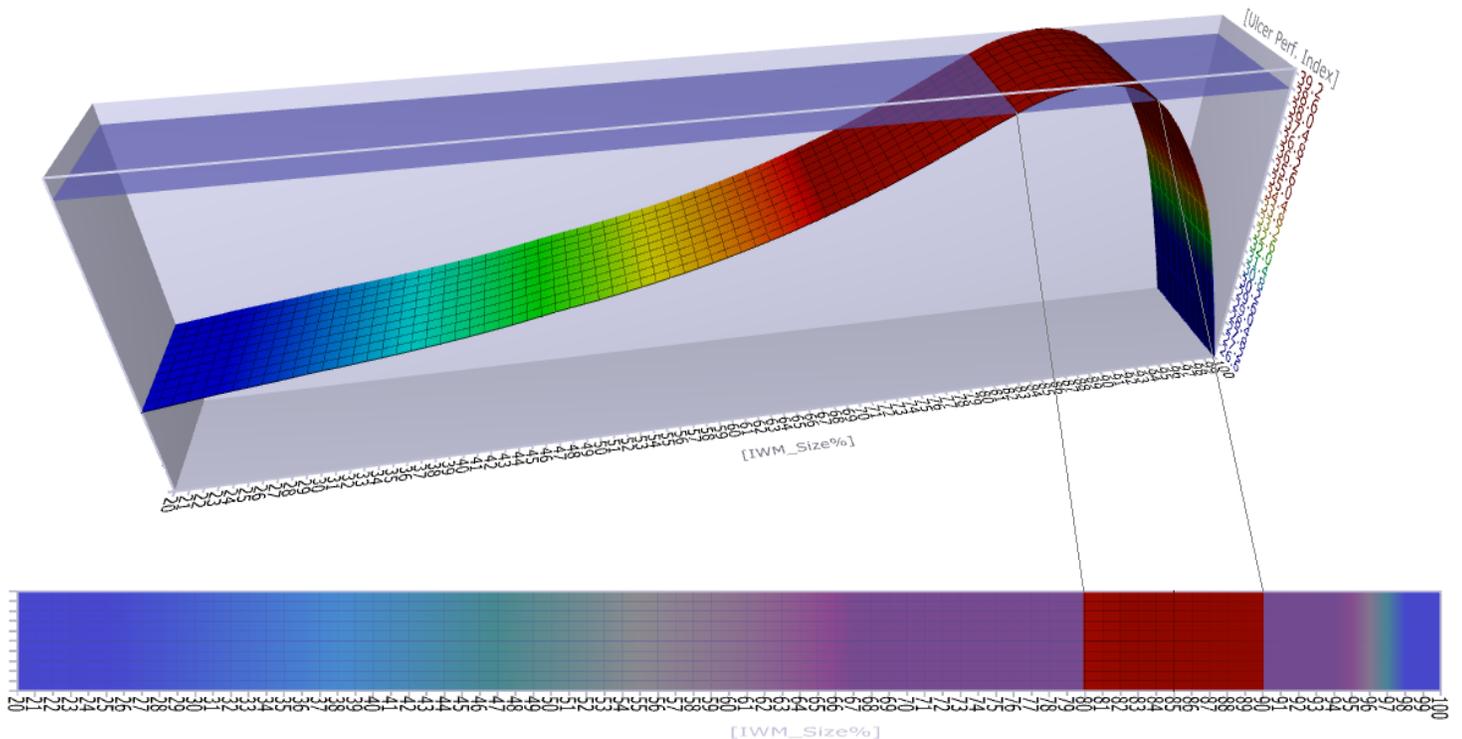
This chart is a visual representation of the optimal allocation between the IWM and GDX robot. The KPI I selected for optimization is the Ulcer Performance Index (UPI). I selected this KPI because it is a good representation of risk versus reward and because it is available as a standard KPI in Amibroker.

$$UPI = \frac{Return - RiskFreeReturn}{ulcer\,index}$$

In technical analysis, the Ulcer Index is a measure of a security's volatility in a downward direction. That is, the Ulcer Index is a measure of the depth and duration of a security's downward trend. The UI is thus a measure of a security's risk. The higher a security's rating on the UI, the more risk it carries. It was designed as a corrective to measurements of standard deviation, which, according to proponents of the UI, does not adequately calculate risk.

More information here : http://www.tangotools.com/ui/ui.htm

As you can see in the chart the optimal zone lies somewhere between 80 to 90% IWM. One might argue that 80% IMW (and thus 20% GDX) is best because to the left of it lies a smooth downtrend while to the right of 90% IMW (and thus 10% GDX) the KPI drops of a cliff. Now I don't know about you, but I don't like to drop off a cliff. So my personal preference based on the set of backtest data we have is 80% IWM to 20% GDX.
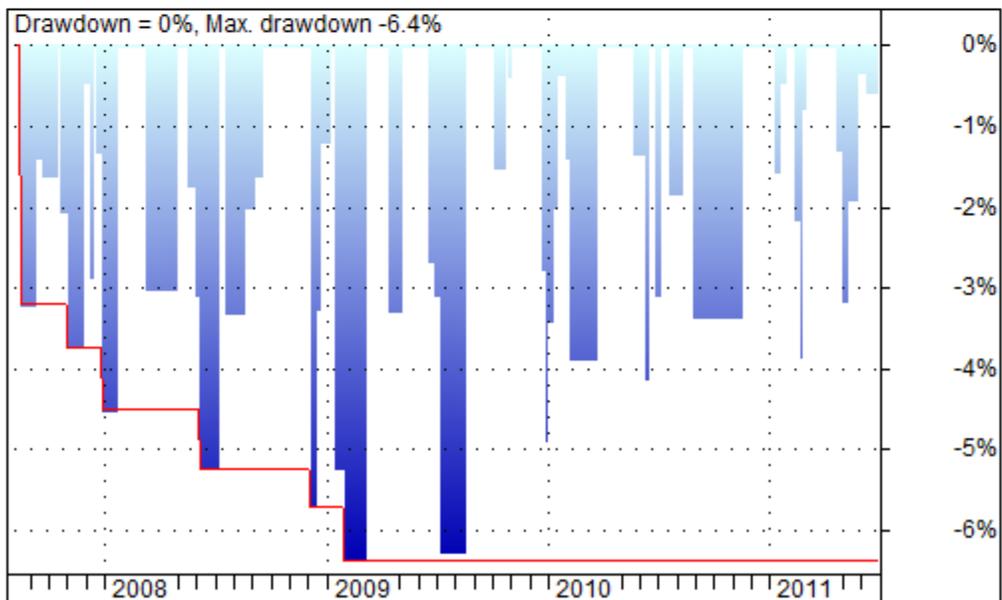
IWM Robot

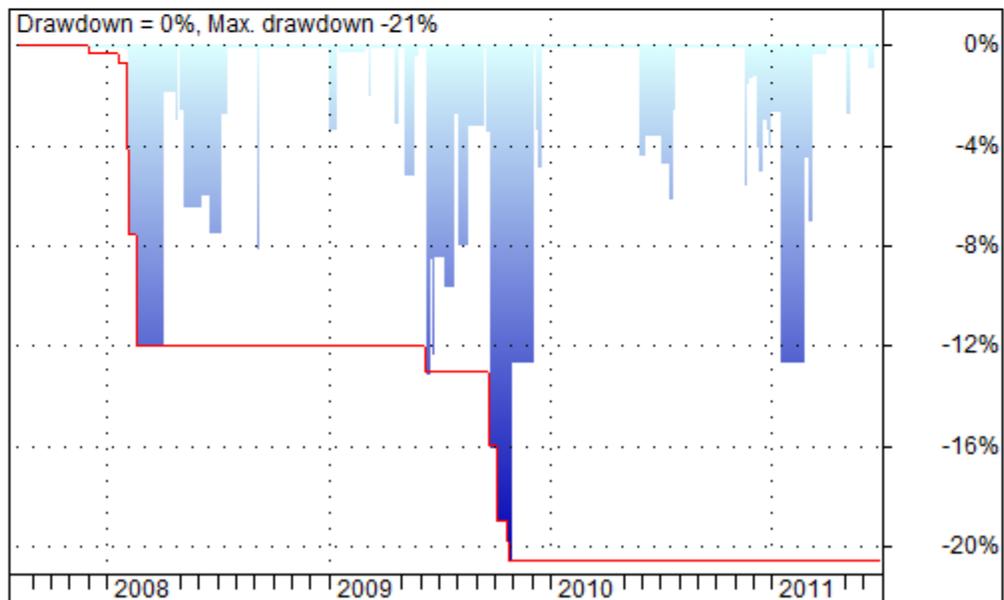|	
Annual Return %	75.53 %
Max. system % drawdown	6.38 %
CAR/MaxDD	11.83
Risk-Reward Ratio	4.20
Ulcer Performance Index	25.82

1. Portfolio Equity
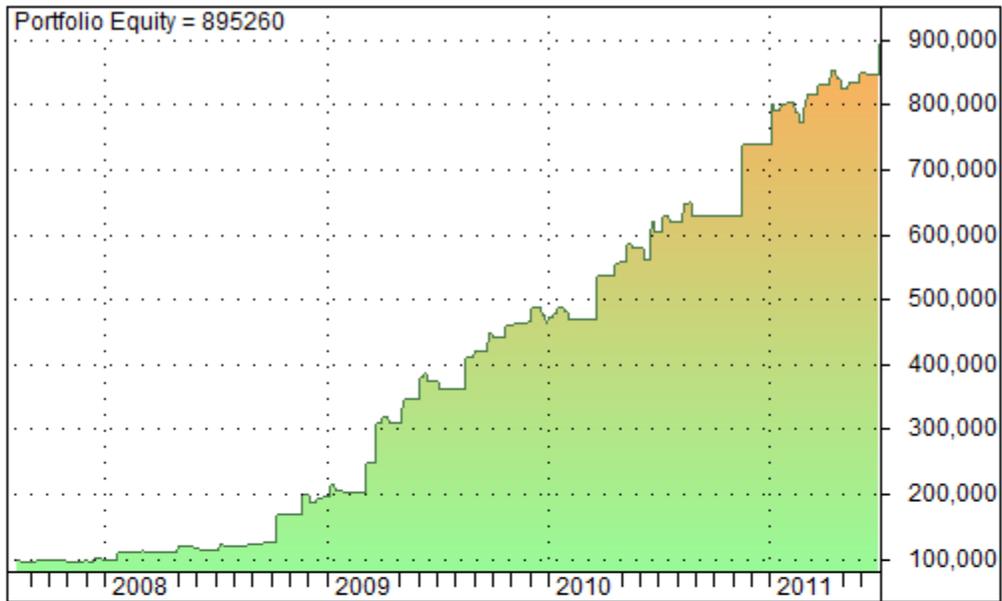
2. Underwater Equity

GDX Robot

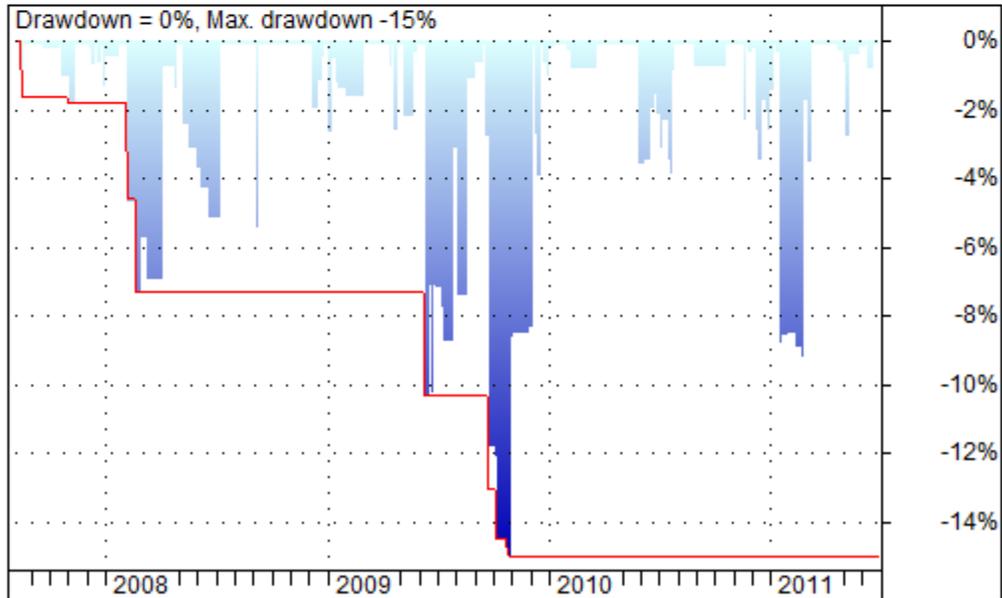|	
Annual Return %	165.90%
Max. system drawdown	20.59%
CAR/MaxDD	8.06
Risk-Reward Ratio	3.63
Ulcer Performance Index	28.68

1. Portfolio Equity
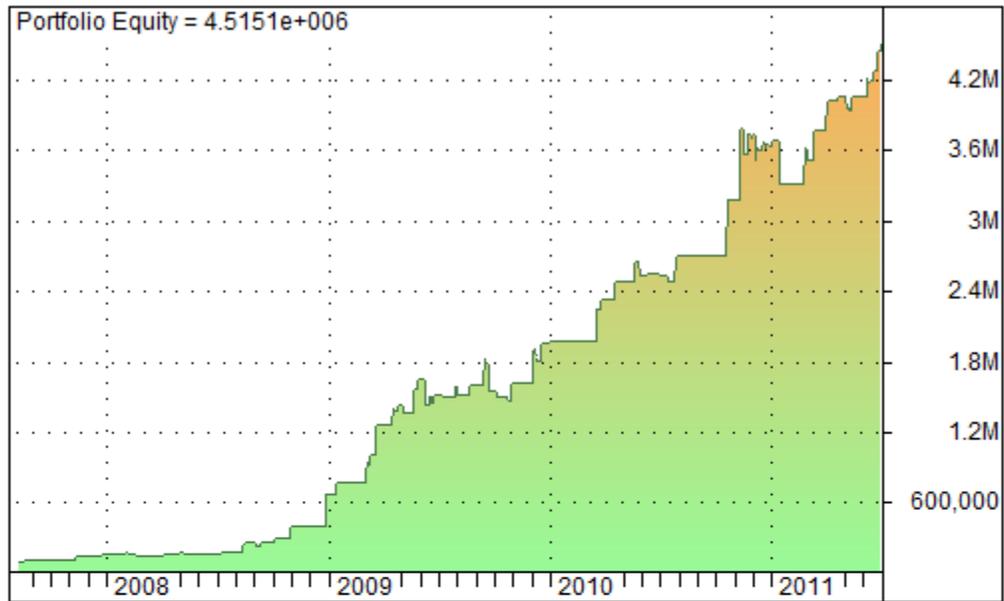
2. Underwater Equity

Composite Robot (50% IWM – 50% GDX)

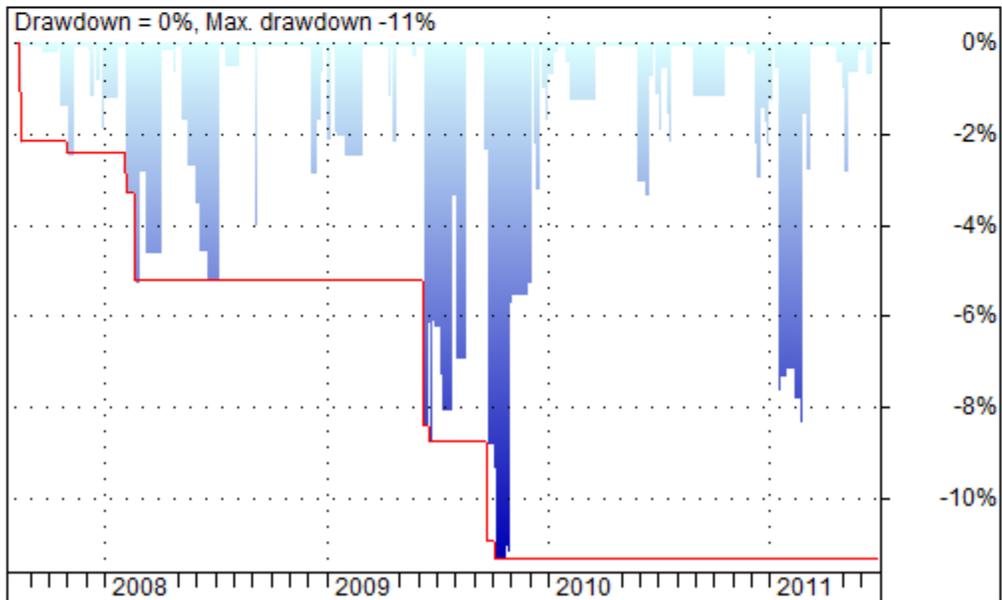|	
Annual Return %	133.14 %
Max. system % drawdown	15.04 %
CAR/MaxDD	8.85
Risk-Reward Ratio	3.80
Ulcer Performance Index	32.36

1. Portfolio Equity
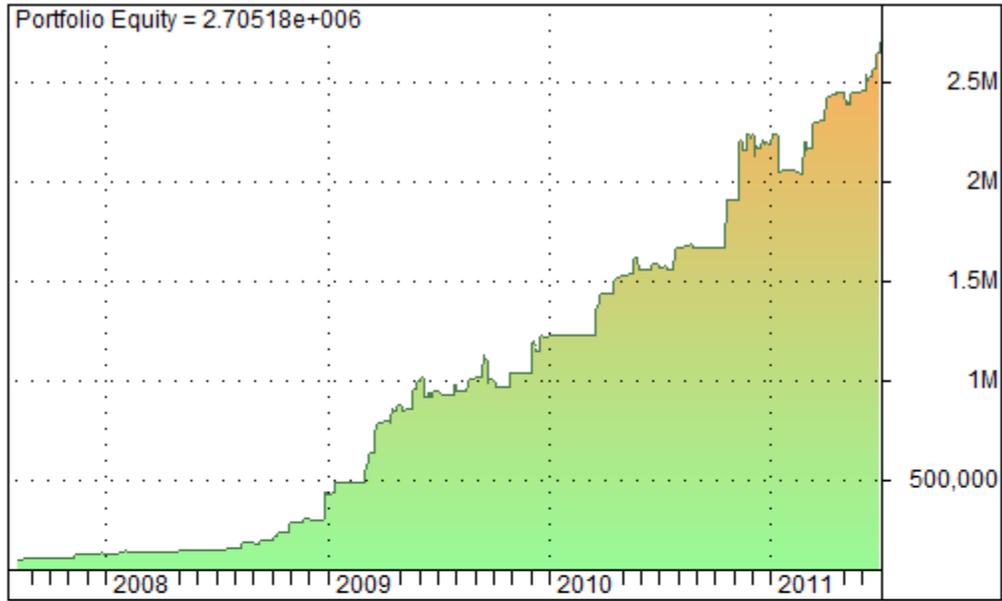
2. Underwater Equity

Composite Robot (67% IWM – 33% GDX)

|	
Annual Return %	118.20 %
Max. system % drawdown	11.35 %
CAR/MaxDD	10.42
Risk-Reward Ratio	3.92
Ulcer Performance Index	35.10

1. Portfolio Equity
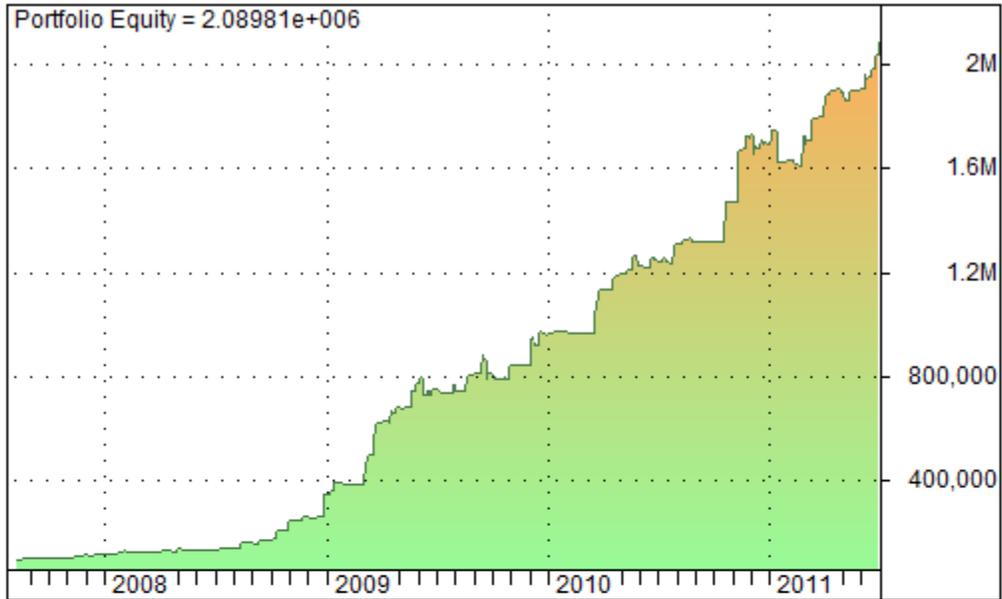
2. Underwater Equity

Composite Robot (80% IWM – 20% GDX)

Annual Return %	104.36 %
Max. system % drawdown	8.36 %
CAR/MaxDD	12.48
Risk-Reward Ratio	4.04
Ulcer Performance Index	38.61

1. Portfolio Equity

Portfolio Equity = 1.61923e+006

2. Underwater Equity

Drawdown = 0%, Max. drawdown -8.4%
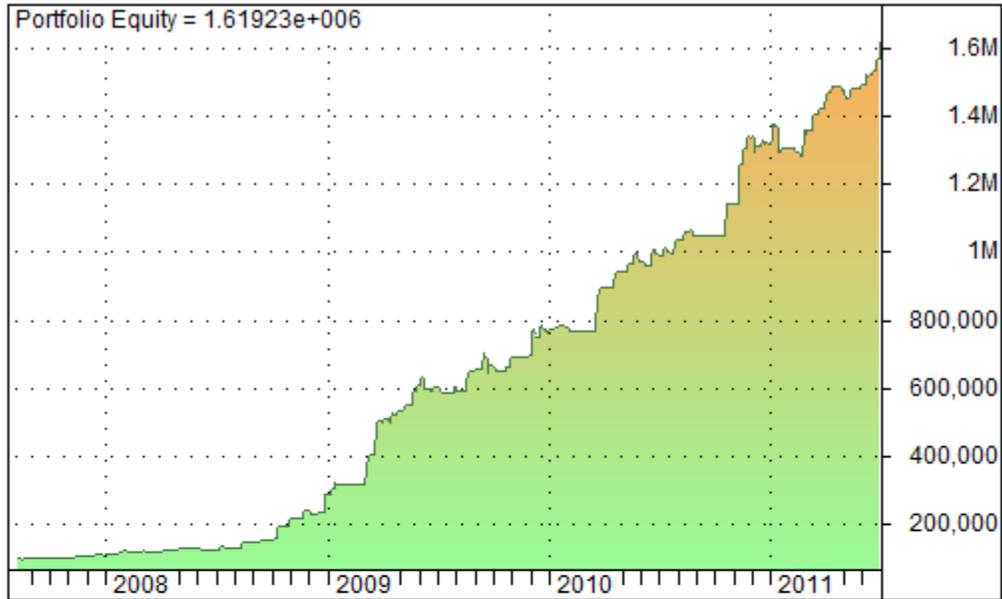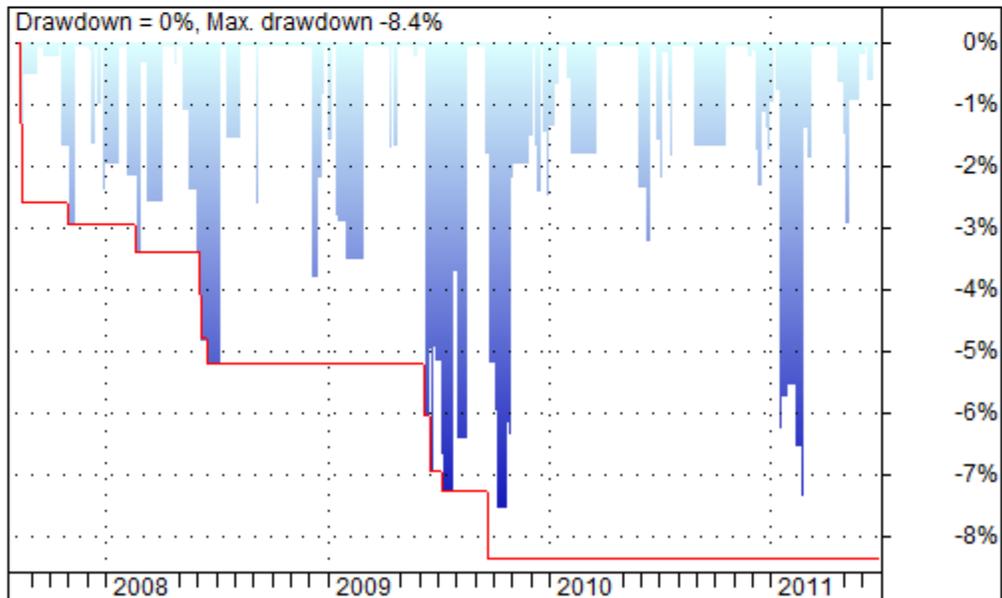
Conclusion

There really is no one best combination to allocate funds between both robots. It's a balancing act between risk and reward and it depends on one's preference. In my opinion tough a healthy mix of both systems is better than using only one because in real trading the diversification will make for a more robust model.

Rembert