

Will this 'great' system hold up?

Quick Stats as of 7/16/2007	
Total Market Value (inc. Cash)	\$ 4,722,902.00
Cash	\$ -1,872.32
Number of Positions	10
Total Return	4,622.90%
Benchmark Return	33.54%
<u>Active Return</u>	4,589.35%
Annualized Return	84.55%
<u>Annual Turnover</u>	624.28%
Max Drawdown	-22.13%
Benchmark Max Drawdown	-40.83%
Overall Winners	(205/417) 49.16%
Sharpe Ratio	2.76
Correlation with S&P 500	0.38

This is an old 'public sim' run with current R2G settings. \$0 Transaction costs. Variable slippage. 84% AR. It was run from the old earliest date of P123 (3.31.2001 to the end of 2007). This is one of many sim's I've followed since joining P123 in Mid-2008. Many have been here longer.

Question

- Should I invest in this amazing looking sim that did nearly 85% AR in 6 years of backtests with 10 positions and 'only' 500-600% Annual Turnover?
- Would it help if it had a lot of robustness testing and made basic 'sense'?

- Let's try to 'break it.'

What if someone pays \$0.05 cents per share and 1% fixed slippage.

Quick Stats as of 7/16/2007	
Total Market Value (inc. Cash)	\$ 3,188,018.00
Cash	\$ 47.53
Number of Positions	10
Total Return	3,088.02%
Benchmark Return	33.54%
Active Return	3,054.48%
Annualized Return	73.37%
Annual Turnover	620.08%
Max Drawdown	-26.01%
Benchmark Max Drawdown	-40.83%
Overall Winners	(194/417) 46.52%
Sharpe Ratio	2.37
Correlation with S&P 500	0.38

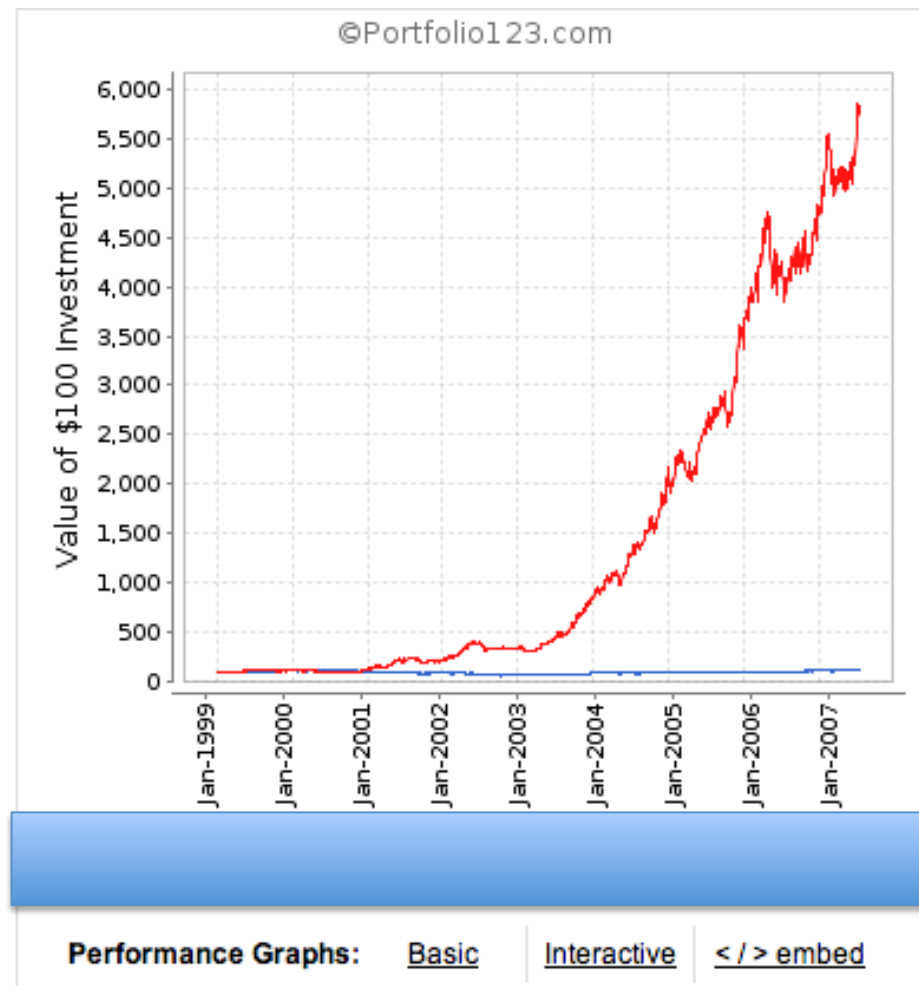
Still looks great. Turnover low enough that slippage doesn't kill it.

Now. P123 adds some earlier data with Compustat. What happens when we run backtests from this earlier time?

Quick Stats as of 7/16/2007	
Total Market Value (inc. Cash)	\$ 4,980,508.00
Cash	\$ 52.37
Number of Positions	10
Total Return	4,880.50%
Benchmark Return	26.06%
<u>Active Return</u>	4,854.45%
Annualized Return	58.08%
<u>Annual Turnover</u>	628.09%
Max Drawdown	-26.81%
Benchmark Max Drawdown	-49.15%
Overall Winners	(271/640) 42.34%
Sharpe Ratio	1.82
Correlation with S&P 500	0.39

Still very respectable. Right? Would you invest in it now? Even with 1% slippage and 2 years of 'previous' pre-sample performance, it's looking good, right?

But I used 'next open' and forgot to use 'average of next open and close' for the buy.



But Performance goes up! This has to be a great system, right? Let me do more 'robustness' testing.

So I test rolling 5+ Yr. periods. Ten of them

Perm ▲	Date Periods	Return% ◆	Active% ◆	Annualized% ◆	Sharpe ◆	StdDev ◆	DDown% ◆	Corr ◆	Value\$	Cash\$ ◆	Winners% ◆
<u>1</u>	01/02/99 03/06/04	971.91	977.80	58.19	1.83	29.31	-28.16	0.39	1,071,915.00	9.18	39.95
<u>2</u>	04/17/99 06/19/04	1,178.61	1,192.56	63.68	2.01	29.66	-28.84	0.39	1,278,608.25	450.47	42.79
<u>3</u>	07/31/99 10/02/04	1,117.19	1,132.03	62.13	1.96	29.43	-27.86	0.39	1,212,318.12	280.01	41.10
<u>4</u>	11/13/99 01/15/05	1,643.20	1,658.35	73.79	2.28	30.42	-27.89	0.39	1,745,590.62	443.60	42.97
<u>5</u>	02/26/00 04/30/05	1,784.21	1,797.45	76.42	2.34	30.83	-26.63	0.39	1,876,596.50	213.77	42.74
<u>6</u>	06/10/00 08/13/05	2,534.24	2,549.79	88.23	2.80	30.05	-25.74	0.37	2,626,460.50	28.15	45.86
<u>7</u>	09/23/00 11/26/05	3,056.34	3,068.80	94.93	3.00	30.20	-25.74	0.38	3,153,429.50	51.64	47.76
<u>8</u>	01/06/01 03/11/06	2,811.17	2,812.46	91.91	2.92	30.18	-25.76	0.36	2,899,458.00	2,359.51	47.77
<u>9</u>	04/21/01 06/24/07	2,942.81	2,921.93	73.97	2.37	29.37	-25.64	0.38	3,022,038.75	602.52	46.43
<u>10</u>	08/04/01 10/07/07	1,725.13	1,696.86	60.13	1.90	29.65	-28.58	0.41	1,825,127.00	74.10	42.92

Now it looks even better than before!

I test Even and Odd stock universes

Quick Stats as of 7/16/2007	
Total Market Value (inc. Cash)	\$ 1,287,628.62
Cash	\$ 38.24
Number of Positions	10
Total Return	1,187.63%
Benchmark Return	26.06%
Active Return	1,161.57%
Annualized Return	34.91%
Annual Turnover	674.84%
Max Drawdown	-30.07%
Benchmark Max Drawdown	-49.15%
Overall Winners	(285/667) 42.73%
Sharpe Ratio	1.16
Correlation with S&P 500	0.38

EVEN

Quick Stats as of 7/16/2007	
Total Market Value (inc. Cash)	\$ 3,068,218.50
Cash	\$ 40.81
Number of Positions	10
Total Return	2,968.22%
Benchmark Return	26.06%
Active Return	2,942.17%
Annualized Return	49.36%
Annual Turnover	813.69%
Max Drawdown	-18.54%
Benchmark Max Drawdown	-49.15%
Overall Winners	(294/667) 44.08%
Sharpe Ratio	1.66
Correlation with S&P 500	0.31

ODD

Performance falls a lot, but still looks pretty darned good. About 42% AR now. With 1% fixed slippage.

So I test various position numbers

My Studys ▶ Unclassified

 PositionsStudy

Perm ▲	Date Range	Pct of Portfolio Value ◆	Return% ◆	Active% ◆	Annualized% ◆	Sharpe ◆	StdDev ◆	DDown% ◆	Corr ◆	Value\$	Cash\$ ◆	Winners% ◆
<u>1</u>	01/02/99 07/16/07	20.0	6,447.06	6,421.00	63.23	1.46	40.49	-36.29	0.32	6,547,060.50	2,905.40	44.41
<u>2</u>	01/02/99 07/16/07	15	5,035.90	5,009.84	58.65	1.46	37.18	-37.71	0.34	5,135,884.50	91.74	42.82
<u>3</u>	01/02/99 07/16/07	12.5	6,004.59	5,978.54	61.90	1.77	32.45	-29.30	0.36	6,104,583.00	92.62	41.06
<u>4</u>	01/02/99 07/16/07	10	5,627.71	5,601.65	60.69	1.91	29.47	-28.16	0.39	5,727,706.50	77.71	42.61
<u>5</u>	01/02/99 07/16/07	6.67	4,072.41	4,046.35	54.84	1.94	25.95	-23.96	0.40	4,172,417.25	67.69	43.77
<u>6</u>	01/02/99 07/16/07	5	2,028.59	2,002.53	43.10	1.75	21.97	-22.64	0.43	2,128,591.00	14.74	42.98

From 5 stocks to 20 stocks, it still works. Some falloff after 15, but it works. And this is with 1% fixed slippage.

So I 'visually inspect' the ranking system. It's got 17 factors or so. But nearly half of them are value factors. A little short interest. A little momentum. Surely, it's fine. Nothing crazy. Looks good, right?

So...do I invest? If so, how much?

Lastly, I check the buy and sell rules.

Don't want them 'too complex.'

- 1. Buy side. There is a liquidity (AvgDailyTot (60)>\$200,000 and close>1 and market cap >50 and MktCap<5000 rule. One min. rank rule (Rank>99). And one trend rule. Could all fit on 2 lines.
- 2. Sell side. One rank rule. Rank<99. One below trend rule. Nothing too fancy.

Pause here.

- At this point I have more information than any investor has on any R2G.

So What happened 'out-of-sample?'

First run from public sim 'end date.'

Quick Stats as of 8/7/2013	
Total Market Value (inc. Cash)	\$ 73,695.73
Cash	\$ 157.89
Number of Positions	5
Total Return	-26.30%
Benchmark Return	9.54%
Active Return	-35.85%
Annualized Return	-4.91%
Annual Turnover	761.65%
Max Drawdown	-71.79%
Benchmark Max Drawdown	-56.78%
Overall Winners	(92/251) 36.65%
Sharpe Ratio	-0.18
Correlation with S&P 500	0.58

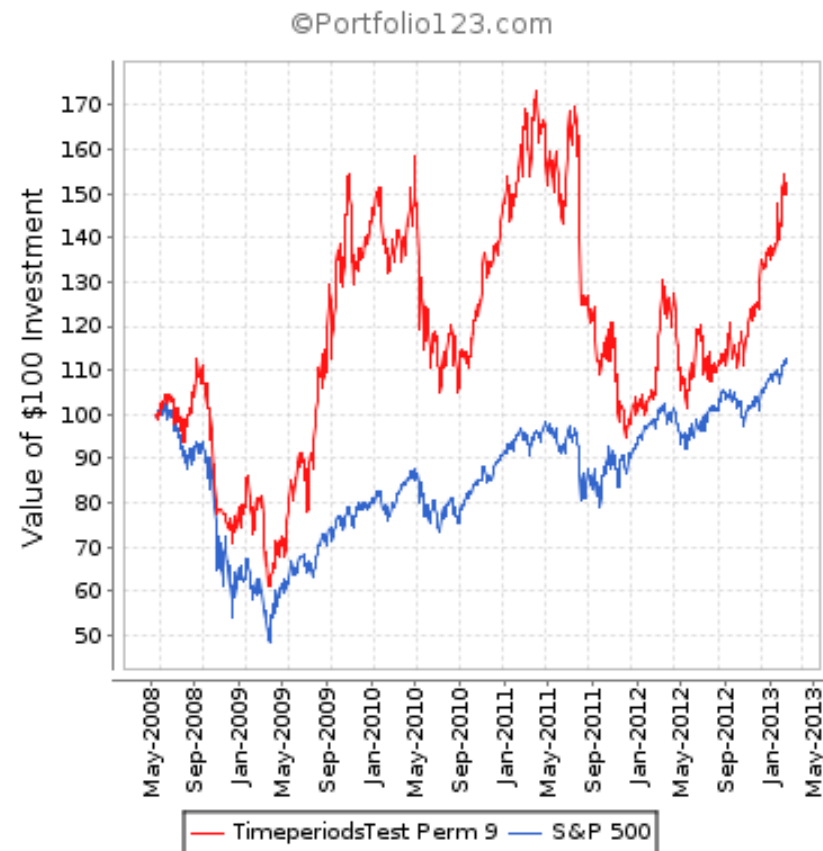
But maybe that was just 'unlucky'.
How do 'randomly' chosen other out
of sample subperiods hold up?

TimeperiodsTest

Term ▲	Date Periods	Return% ◆	Active% ◆	Annualized% ◆	Sharpe ◆	StdDev ◆	DDown% ◆	Corr ◆	Value\$ ◆	Cash\$ ◆	Winners% ◆
<u>1</u>	07/16/07 06/11/12	-40.75	-25.22	-10.12	-0.30	44.32	-71.79	0.60	59,250.14	3.19	35.81
<u>2</u>	08/20/07 07/16/12	-11.99	-5.63	-2.57	-0.13	44.11	-64.64	0.60	88,008.30	126.80	37.68
<u>3</u>	09/24/07 08/20/12	-31.57	-25.01	-7.44	-0.24	44.13	-64.37	0.59	68,429.35	106.19	36.54
<u>4</u>	10/29/07 09/24/12	-24.33	-18.87	-5.52	-0.19	43.99	-62.98	0.59	75,668.03	288.57	37.56
<u>5</u>	12/03/07 10/29/12	-22.92	-18.81	-5.18	-0.19	44.02	-58.52	0.59	76,581.23	10,774.01	37.81
<u>6</u>	01/07/08 12/03/12	-10.32	-9.84	-2.20	-0.12	44.10	-54.88	0.60	89,680.96	74.17	39.50
<u>7</u>	02/11/08 01/07/13	3.52	-5.65	0.71	-0.05	44.10	-48.07	0.60	103,517.01	19.75	40.00
<u>8</u>	03/17/08 02/11/13	40.87	22.04	7.23	0.10	43.93	-48.06	0.59	140,870.48	4.04	41.49
<u>9</u>	04/21/08 03/18/13	38.37	26.56	6.84	0.09	43.96	-48.10	0.59	138,370.50	102.00	42.70
<u>10</u>	05/26/08 08/1/13	42.10	18.05	7.01	0.10	43.71	-48.06	0.58	142,100.38	298.59	41.75

Not well. The vast majority lose money. Seventy percent of them to be exact. The best one beats the SP500.

The best simulated 'out of sample' performance. Lucky or good?

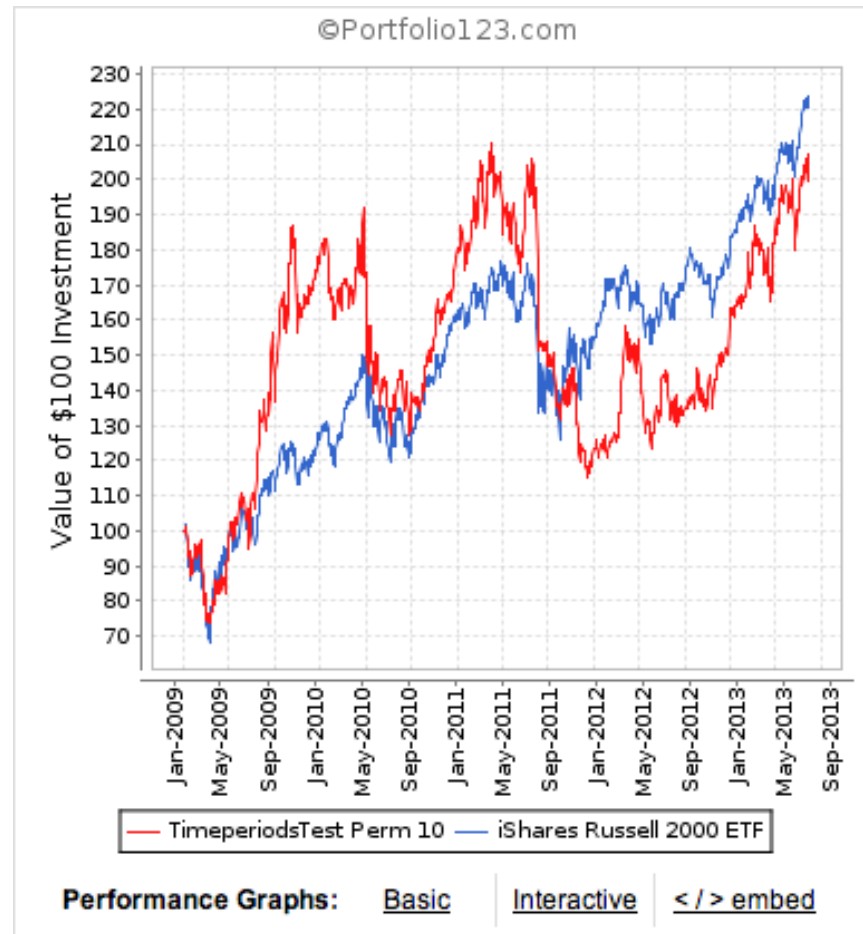


Performance Graphs: [Basic](#) [Interactive](#) [</> embed](#)

Why did it happen?

- What is the source of the underperformance?
Maybe it was 2008?

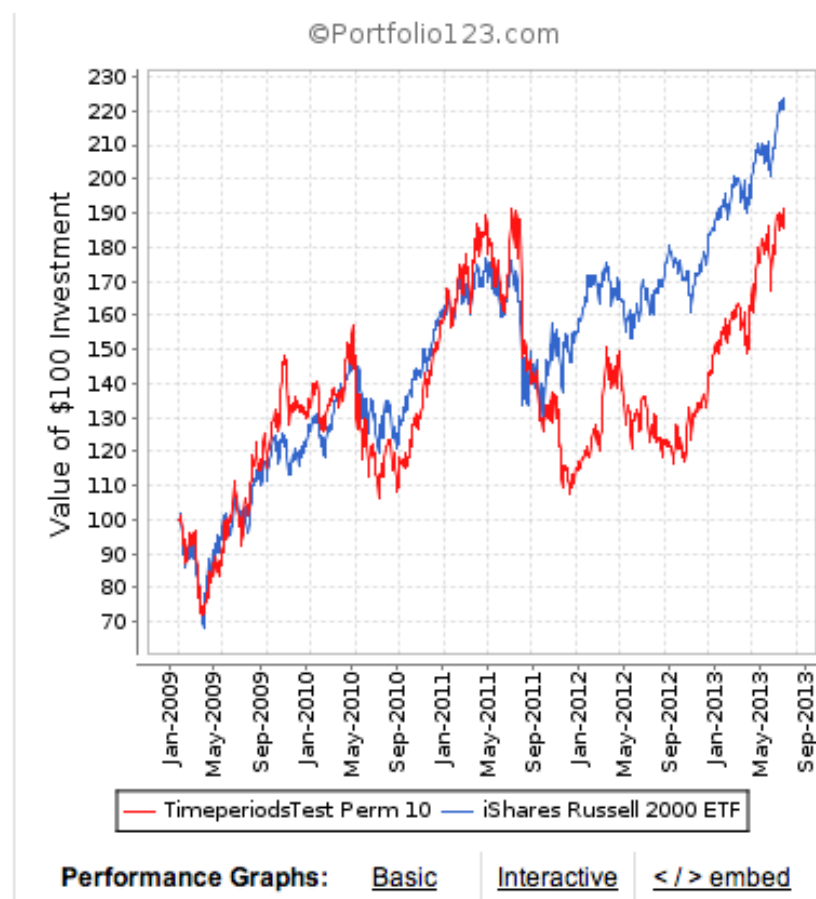
What if we 'take 2008' out of the system?



Nope. Doesn't work.

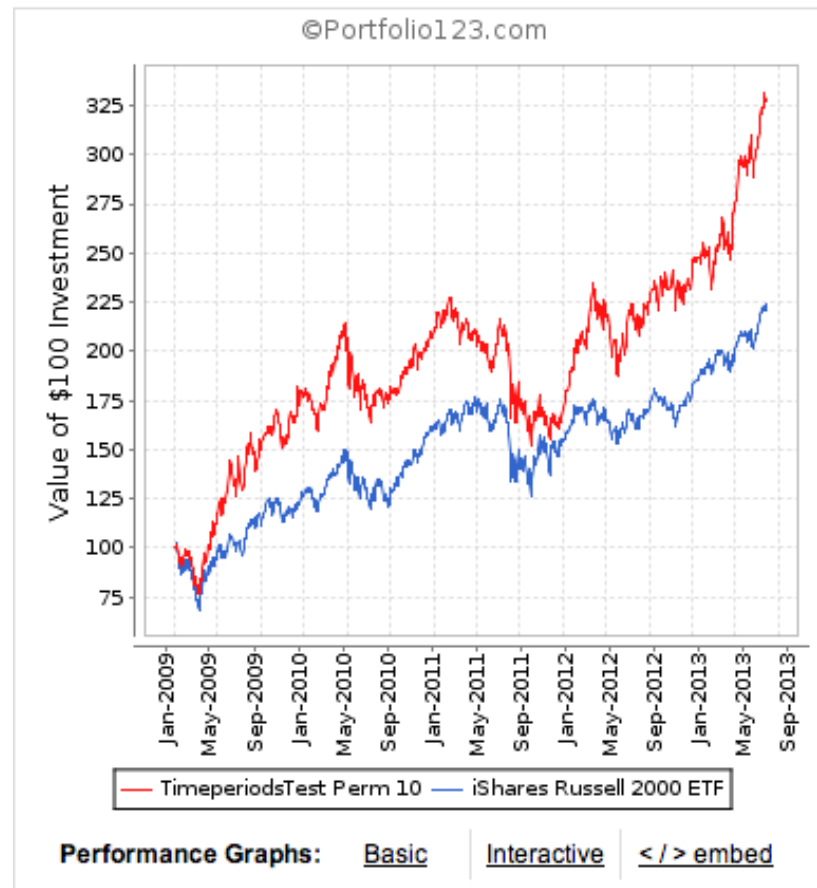
Maybe it's the complexity?

What if we try to cut turnover down?
Option 1, reduce Rank at which we
force sale. But keep trend rule.



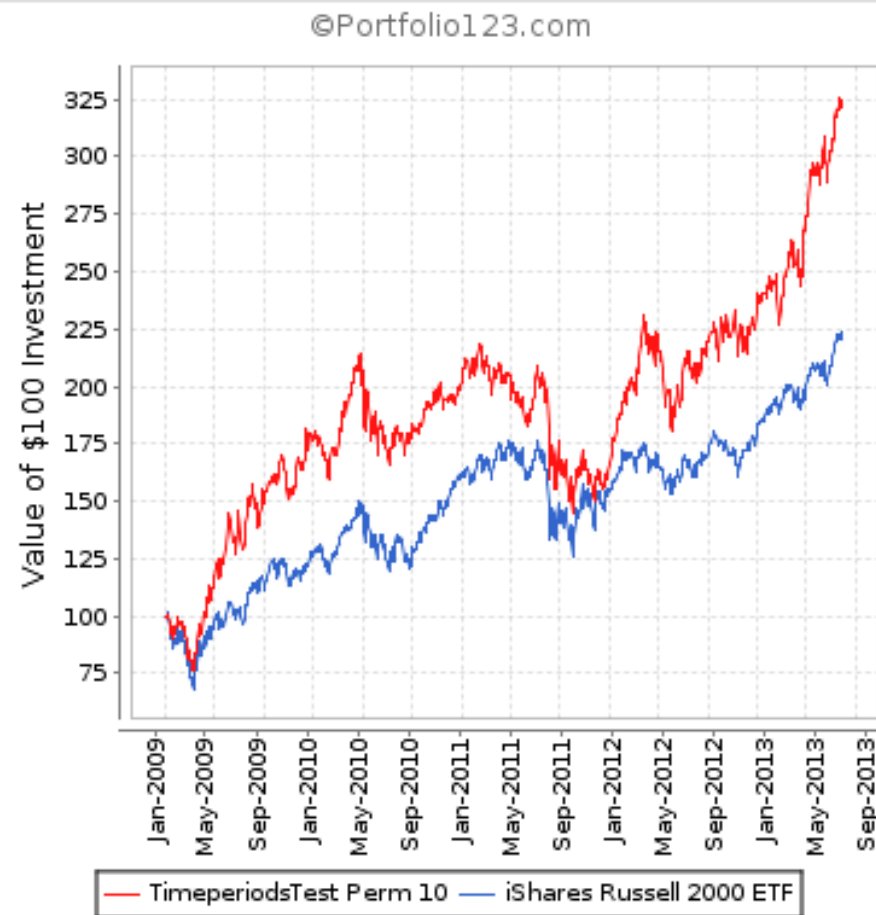
We lose money still. Turnover still around 450%.

Option 2, remove trend rule and reduce rank rule.



Turnover falls to 30% and the system kind of works, doesn't it?!

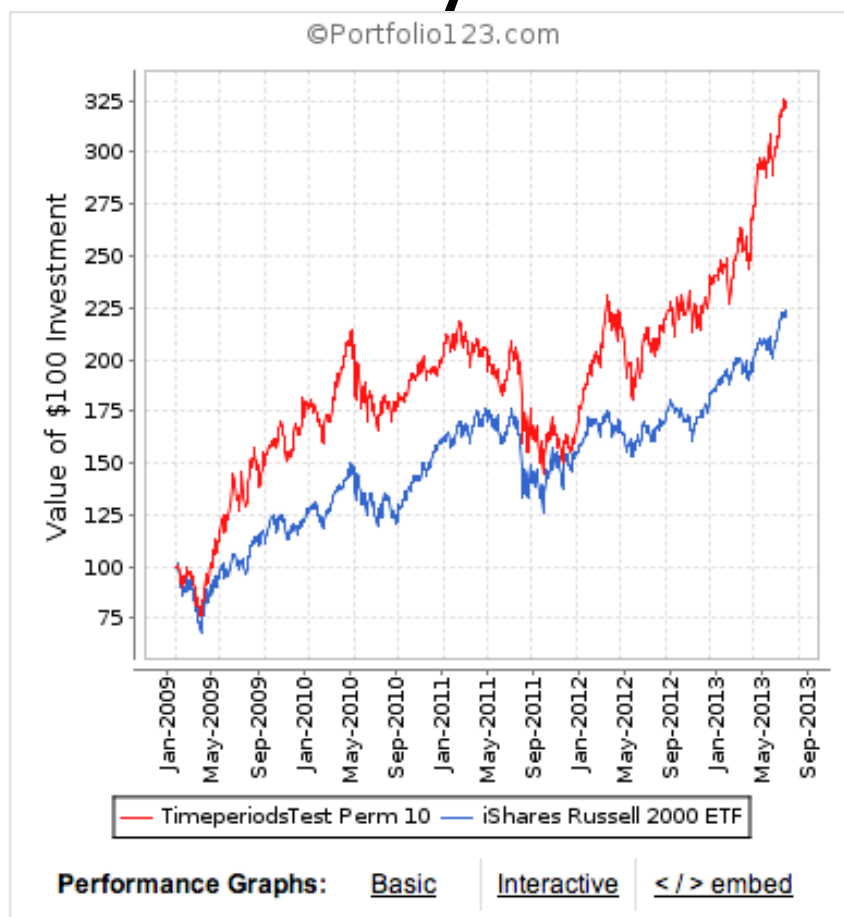
What if we remove the 'trend rule' on the buy side, too?



Performance Graphs: [Basic](#) [Interactive](#) [< / > embed](#)

We get nearly the exact same performance.

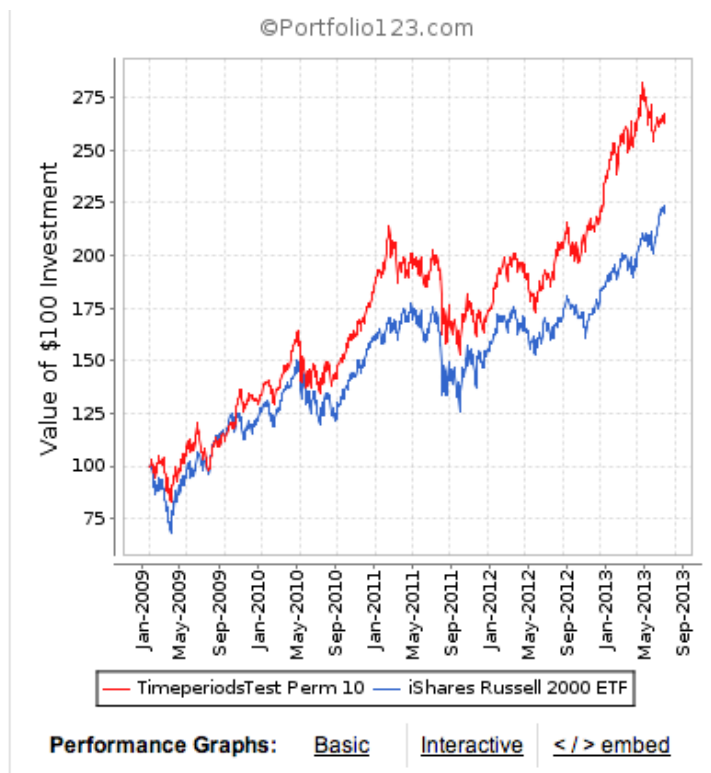
What if we remove the 'extreme' rank on buy side.



Same results. Our 'fancy' rules didn't make a lick of difference out of sample. At least in this case, with lower turnover.

So what does matter?

- 1. The very low liquidity stocks and low AvgDailyTot did impact returns somewhat. But with AvgDailyTot(50)>\$500,000 and close(0)>5 and MktCap>200, here's what happens.



It's actually better. But was the sim lucky or good?

What did we learn?

- Is the answer that complexity is bad?
- Degrees of 'freedom' and complexity make it very hard to separate 'good' from 'lucky.'
Takes huge numbers of tests to know. We don't have that.

How does this 'simpler' version do in 'random' periods?

TimeperiodsTest Perm 10											
erm ▲	Date Periods	Return% ◆	Active% ◆	Annualized% ◆	Sharpe ◆	StdDev ◆	DDown% ◆	Corr ◆	Value\$	Cash\$ ◆	Winners% ◆
<u>1</u>	01/01/09 08/01/13	170.61	42.34	24.28	0.76	28.02	-28.66	0.84	270,614.78	6,303.32	54.17
<u>2</u>	01/01/08 12/25/12	-51.48	-70.47	-13.52	-0.43	37.54	-67.08	0.88	48,516.91	2,521.29	25.71
<u>3</u>	02/05/08 01/29/13	-12.82	-51.63	-2.72	-0.16	35.33	-61.93	0.87	87,177.22	1,822.25	34.38
<u>4</u>	03/11/08 03/05/13	-1.69	-49.39	-0.34	-0.08	38.19	-66.57	0.88	98,311.71	1,996.48	41.18
<u>5</u>	04/15/08 04/09/13	-19.85	-64.11	-4.34	-0.21	34.65	-62.72	0.89	80,153.70	5,117.86	25.93
<u>6</u>	05/20/08 05/14/13	-7.74	-51.29	-1.60	-0.13	33.89	-61.23	0.86	92,257.66	2,000.01	34.78
<u>7</u>	06/24/08 06/18/13	16.45	-35.50	3.10	0.01	33.36	-59.52	0.85	116,446.53	2,503.70	40.00
<u>8</u>	07/29/08 07/23/13	-26.27	-84.80	-5.93	-0.26	33.59	-61.37	0.87	73,732.05	927.04	39.29
<u>9</u>	09/02/08 08/1/13	-17.40	-71.09	-3.82	-0.19	35.24	-63.34	0.89	82,601.20	5,166.73	44.44
<u>10</u>	10/07/08 8/01/13	87.26	-15.72	13.91	0.34	32.91	-41.66	0.85	187,256.27	3,635.85	46.15
<u>11</u>	11/11/08 8/05/13	107.02	-28.09	16.63	0.46	30.53	-36.23	0.88	207,019.73	3,040.93	46.15

STILL MOSTLY A LOSER. Lost to the Benchmark in all 11 trials.

Here is the results of the same
'system' with a well known 2 factor
Ranking.

My Studys ▶ Unclassified

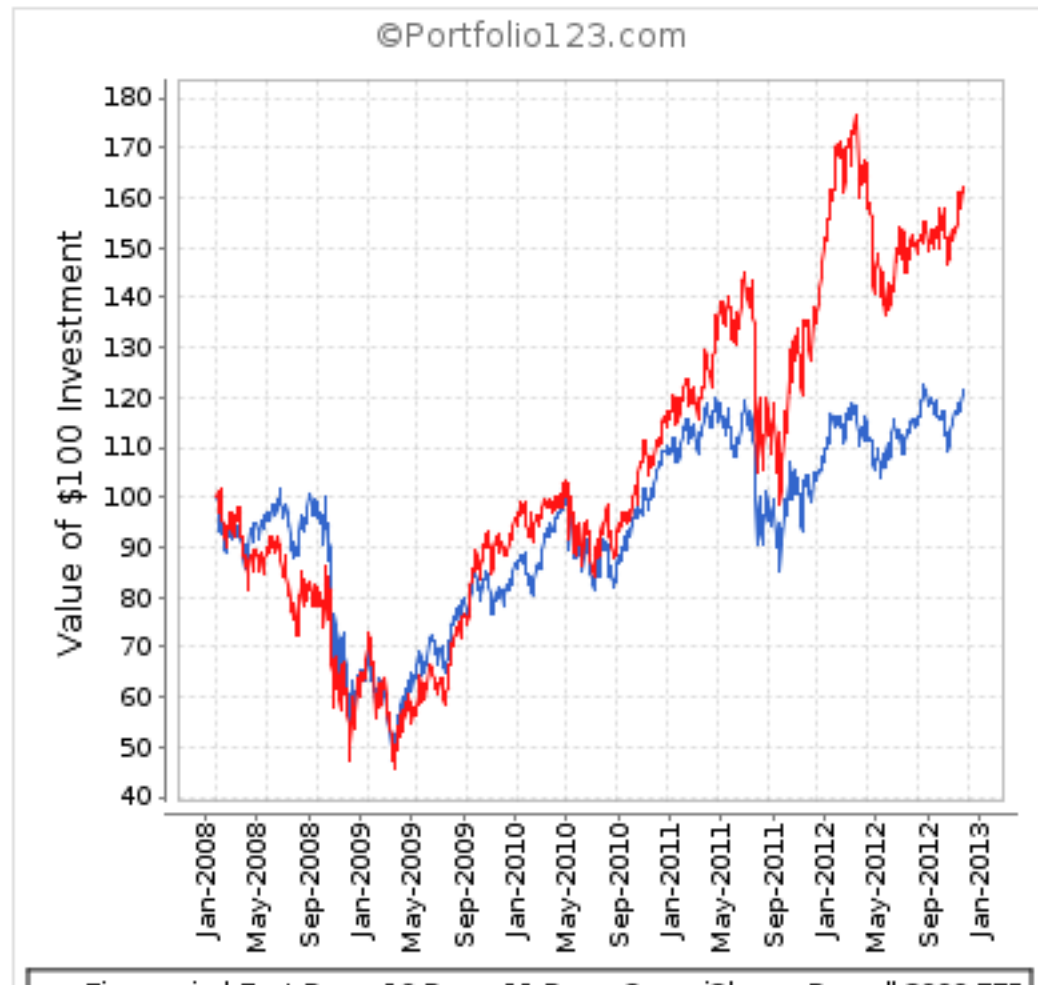
 TimeperiodsTest Perm 10 Perm 11

Perm ▲	Date Periods	Return% ◆	Active% ◆	Annualized% ◆	Sharpe ◆	StdDev ◆	DDown% ◆	Corr ◆	Value\$	Cash\$	Winners% ◆
<u>1</u>	11/11/08 08/05/13	242.15	107.05	29.69	0.77	35.16	-40.34	0.86	342,154.19	4,569.57	75.00
<u>2</u>	01/01/08 12/25/12	56.97	37.98	9.48	0.19	37.00	-45.49	0.87	156,973.48	6,293.02	56.25
<u>3</u>	02/05/08 01/29/13	80.84	42.03	12.62	0.26	37.86	-48.15	0.88	180,837.02	6,090.93	57.58
<u>4</u>	03/11/08 03/05/13	93.47	45.77	14.16	0.29	38.31	-42.95	0.88	193,473.02	7,967.06	53.57
<u>5</u>	04/15/08 04/09/13	130.48	86.22	18.24	0.43	36.12	-47.35	0.88	230,479.92	6,568.95	63.64
<u>6</u>	05/20/08 05/14/13	145.37	101.82	19.74	0.43	39.37	-50.92	0.89	245,370.33	833.17	72.73
<u>7</u>	06/24/08 06/18/13	114.96	63.02	16.60	0.37	37.07	-48.11	0.90	214,964.20	7,377.82	63.33
<u>8</u>	07/29/08 07/23/13	131.53	73.01	18.35	0.44	35.15	-48.51	0.88	231,534.28	1,341.46	70.00
<u>9</u>	09/02/08 08/1/13	91.81	38.12	14.18	0.30	37.83	-55.28	0.87	191,809.83	5,349.17	63.33
<u>10</u>	10/07/08 8/1/13	322.12	219.15	34.86	0.88	36.68	-39.41	0.87	422,121.16	12,273.42	79.31
<u>11</u>	11/11/08 8/01/13	237.62	103.52	29.41	0.76	35.19	-40.34	0.86	337,621.25	4,146.57	75.00

HINT: use SHIFT keys to sort by multiple columns

MUCH BETTER.

And with a 1 factor ranking.



Conclusion

- Outperforming 'out of sample' is very hard.
- Simple systems are likely to be better. Need lots of data on even a simple system to get a feel of if it will work or not.
- I frequently look at pro systems in my daily life. Most are very simple. One to three rules on the entry side. One or two sell rules. That's it. Simple rules. Tested over huge data sets. And out of sample. I know a few people trading very complex systems and making money, but not many.