Robustness Report

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Contents

1. Strategy Overview

This report explores the robustness of four different trading strategies on the data discussed in section 2.1. Each strategy is publicly available and I include a reference to source of the particular rules as well the history of the indicator or strategy.

1.1 Williams %R

Equation 1 shows the equation for calculating Williams %R. The rules for trading are as follows [4]:

1. We enter a long position when the indicator crosses below -90
2. Exit the long position when the indicator crosses above -30 or when the close is higher than yesterday's high

$$\%R = -100((\text{last n days high–close})/(\text{last n days high–last n days low})) \tag{1}$$

There are a few tunable parameters for this strategy. There are the two levels that the indicator crossing will cause a position change. For this strategy we used the two levels shown above. The third parameter is the lookback period for determining the previous high and low.

1.2 Commodity Channel Index

Equation 2 shows the equation for calculating the CCI. The rules for trading are as follows [3]:

1. We enter a long position when the indicator crosses below -90
2. Exit the long position when the close is higher than the previous days high.

$$\text{CCI} = \frac{\text{Typical Price} - \text{SMA of Typical Price}}{0.015 \times \text{Mean Deviation}} \tag{2}$$

Where:

1. Typical Price (TP):
$$\text{Typical Price} = \frac{\text{High} + \text{Low} + \text{Close}}{3}$$
2. SMA of Typical Price: The simple moving average of the Typical Price over a specified period.
3. Mean Deviation:
$$\text{Mean Deviation} = \frac{1}{n}\sum_{i=1}^{n} |TP_i - \text{SMA of Typical Price}|$$
4. Constant (0.015): Used to scale CCI values.

There are a two tunable parameters for this strategy. There is the lowerbound level, which triggers a long position when the CCI falls below it, and the period which is used in the CCI equation.

1.3 Stochastic Indicator

Equation 3 shows the equation for the fast stochastic indicator. There is also a slow stochastic indicator which is generally the same with a period of 3. This strategy utilizes the following rules [7]:

1. Enter a long position when the stochastic indicator falls below 25
2. Exit long position when close is higher than previous days high

$$\%K = 100 \times \frac{C - L}{H - L} \tag{3}$$

Where:

1. C = The most recent closing price
2. L = The lowest price traded of the n previous trading sessions
3. H = The highest price traded during the same n period

This strategy has two tunable parameters. The look back period for the stochastic indicator and the lowerbound level which triggers a long position when the stochastic indicator falls below it.

1.4 Turnaround Tuesday

This strategy is very simple and does not come with any complex indicators. The rules are as follows [8]:

1. Enter a long position when it's Monday and the close is lower than the previous trading day's close
2. Exit the long position after 5 trading days or when the close is higher than the previous days high

There is not naturally any easily tunable parameters to this strategy. However, I optimized over the number of trading days to wait before exiting.

2. Robustness Testing

The robustness analysis consists of three different tests performed on each trading strategy. Each strategy is first optimized by finding the best parameters using both CAGR and Sharpe ratio as target variables. The best parameters are not simply the parameters with the highest target variable. The best parameters are the parameters with the highest median target value of a section of neighboring points. For these tests I used the nearest 5 neighbors in each direction (i.e. a period of 5 has periods 1-4 and periods 6-9 in its section).

2.1 Data

I used ten different forex currency pairs with USD: USD: AUD, CHF, CAD, EUR, GBP, HKD, JPY, MXN, NZD, and SEK. Each strategy is robustness tested on each currency pair individually. The data consists of hourly bars ranging from 10/09/2022 23:00:00 to 11/08/2024 22:00:00.

2.2 Code

The robustness testing was done using the Backtrader package [6]. This is an open source package with a lot of in depth documentation and usage available online. Much of the code written in combination with this report sits on top of Backtrader, providing a higher level interface for using it. Some of the code that accompanies this report was assisted by GPT-4o [5] and Perplexity [1]. It is indicated in the code itself where that occurred.

2.3 Tests

The tests that I used are shown below. Each of the tests were inspired by an article on Build Alpha called *Robustness Tests and Checks for Algorithmic Trading Strategies* written by David Bergstrom [2]. The parameters for the strategies were optimized using the in sample data for both the CAGR and the Sharpe ratio statistics separately. However, to reduce clutter in this report and focus on the strategy robustness, I will be using the optimized parameters on the CAGR statistic. A more in depth description of the optimization process can be found in the backtesting report.

1. Out of Sample

   This splits the data into a train set and a test set. The train set is used to optimize the strategy parameters and the test set is used to see if the strategy can generalize to unseen data. In this test, the in sample data ranged from 10/09/2022 23:00:00 to 05/14/2024 10:00:00 and the out of sample data ranged from 05/14/2024 11:00:00 to 11/08/2024 22:00:00. An example is shown in Figure 1. The left strategy would be deemed not robust while the right one would be considered more robust.

   This test is vital for any strategy that is intended to be used in practice. The in sample data represents the historical data that you currently have access to. It can be used however one pleases to optimize or develop a strategy. After the strategy is deemed ready for in practice use, it can be tested on the out of sample data. This represents a sneak peak of how it will perform once implemented in practice. If it performs poorly on the unseen data then the strategy was overturned to the historical data and will not actually provide an edge when trading in real time.

2. Monte Carlo Random Entry

   This test changes the entry rule of the strategy to be random. This means that whenever the strategy is not holding a position it will randomly, with 50% probability, enter a long position. The base strategy is compared against 100 trials of the randomized entry. An example graph is shown in Figure 2. The blue curve outperforms the random strategies indicating that it's rule(s) have an edge, while the others do not.

   This robustness test allows one to test whether the exit rule of a strategy has an edge. Testing a specific part of the strategy is extremely helpful in the quest for developing a high quality trading strategy. If the strategy performs better with than the randomized entry strategies then you know that the entry rule has an edge. If the strategy performs the same, then you know the entry rule does not have an edge and any gains were carried by the exit rule. If it performs consistently worse, then the entry rule may still have an edge and only needs to be flipped.

3. Monte Carlo Random Exit

This test changes the exit rule of the strategy to be random. This means that whenever the strategy is holding a position it will randomly, with 50% probability, exit its position. The base strategy is compared against 100 trials of the randomized exit. The same example graph in Figure 2 would be what you hope to see from this test as well.

The random exit robustness test provides similar information to the random entry test but on the opposite side. If the strategy performs better than the randomized exit strategies then you know that the exit rule has an edge. Similarly, if it performs the same, then you know the exit rule does not have an edge. And if it performs consistently worse, then the exit rule may have an edge and needs to be flipped.

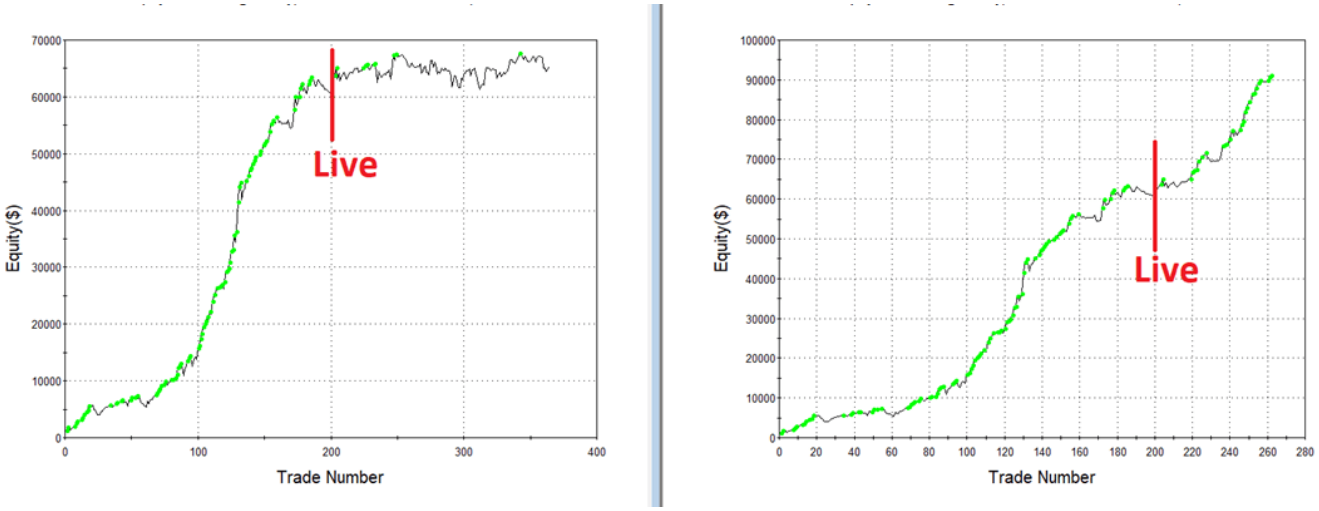


Figure 1: Example of what an out of sample test curve would look like. The data tested after the live bar is the out of sample data. The left strategy is not robust while the right one is.

Each of these tests tested a specific attribute of the strategy. The out of sample tests the ability for the optimized parameters to generalize to unseen data. The Monte Carlo Random entry tests whether the exit rule has an edge. The Monte Carlo Random exit tests whether the entry rule has an edge.

3. Williams %R

3.1 Out of Sample

Figures 3a and 3b show the equity curves of the William %R strategy on the in sample and out of sample data respectively. The in and out of sample statistics are shown in Tables 1 and 2. respectively. In general the strategy performed very poorly on this test. The out of sample returns are generally much lower than the in sample returns. In many cases the out of sample returns are even in the negative which is really bad!

3.2 Monte Carlo Random Entry

Figure 4 shows the results of the Monte Carlo Random Entry test on the Williams %R strategy using CAGR optimization. About half of the currency pairs have promising results that indicate this strategies entry as an edge. Specifically, USDMXN significantly outperforms every one of the random trials strongly indicates an edge from this entry rule. The other notable pair is USDJPY

Symbol	Period	Lowerband	Upperband	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	2	-95	75	15.357	0.746	-0.698	269	4.026	1.046
usdnzd	18	-95	70	14.128	2.245	0.257	300	5.677	1.137
usdmxn	2	-95	70	13.162	2.624	0.161	161	3.263	1.275
usdjpy	2	-95	70	7.838	1.716	0.029	157	4.737	1.189
usdhkd	2	-95	70	10.985	0.135	-13.281	149	0.388	1.151
usdgbp	20	-95	70	14.586	0.089	-0.645	271	4.203	1.007
usdeur	20	-95	70	14.860	0.259	-0.602	258	3.680	1.022
usdchf	2	-95	70	13.528	2.866	0.753	228	1.941	1.349
usdcad	2	-95	70	4.475	0.172	-1.004	73	1.601	1.075
usdaud	20	-95	70	11.578	3.682	1.627	209	2.713	1.289

Table 1: Performance metrics for different currency symbols using CAGR optimized parameters for Williams %R strategy on the train data. Sharpe calculate with risk free rate of 0.01.

Symbol	Period	Lowerband	Upperband	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	2	-95	75	16.309	0.556	0.002	83	2.850	1.038
usdnzd	18	-95	70	14.781	-1.466	-0.007	86	3.681	0.879
usdmxn	2	-95	70	8.445	2.717	0.010	47	2.147	1.328
usdjpy	2	-95	70	9.250	-6.795	-0.026	49	6.000	0.525
usdhkd	2	-95	70	13.055	-0.122	-0.003	59	0.491	0.897
usdgbp	20	-95	70	14.617	1.850	0.010	90	1.788	1.191
usdeur	20	-95	70	13.571	-1.295	-0.009	75	2.353	0.835
usdchf	2	-95	70	19.194	-6.969	-0.032	85	5.801	0.531
usdcad	2	-95	70	3.655	0.227	0.004	17	0.556	1.162
usdaud	20	-95	70	9.647	-0.365	-0.002	51	1.367	0.944

Table 2: Performance metrics for different currency symbols using CAGR optimized parameters for Williams %R strategy on the test data. Sharpe calculate with risk free rate of 0.01.

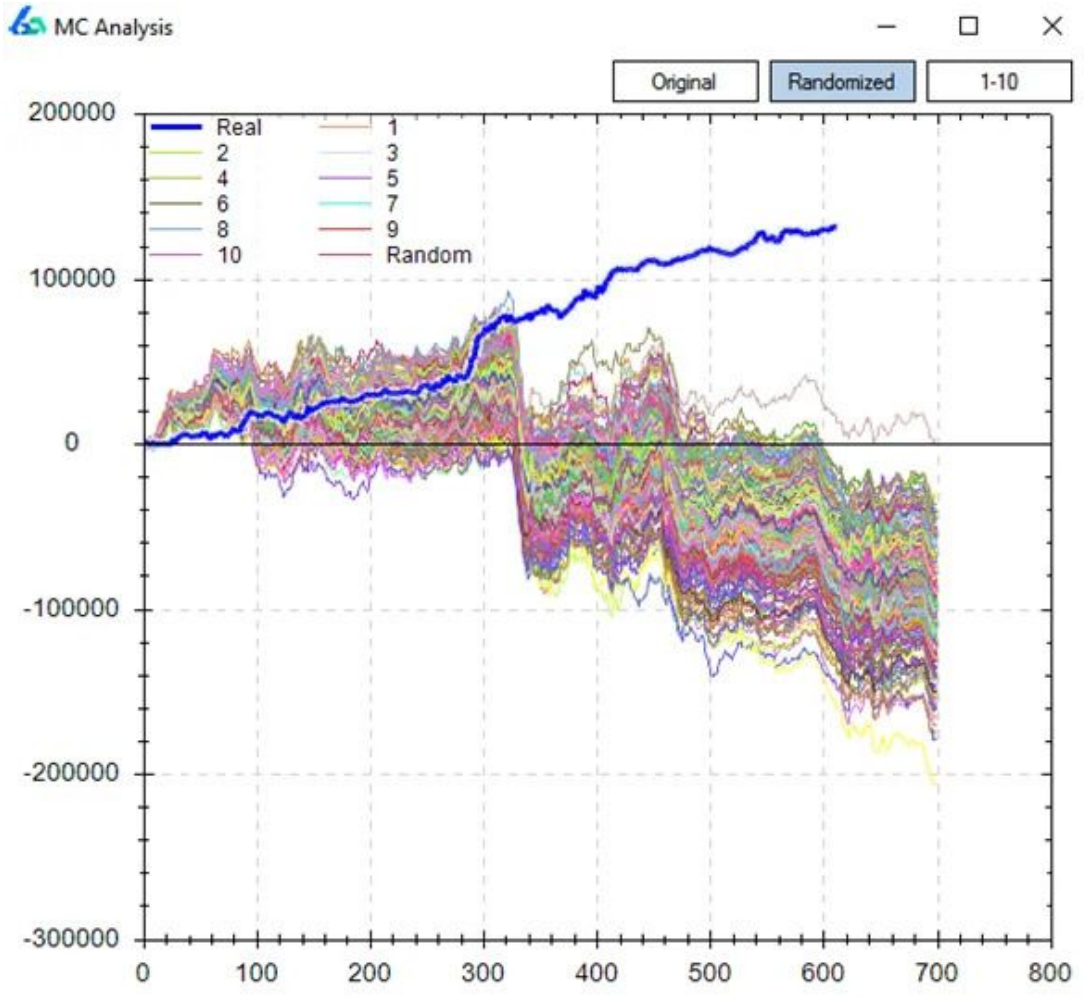
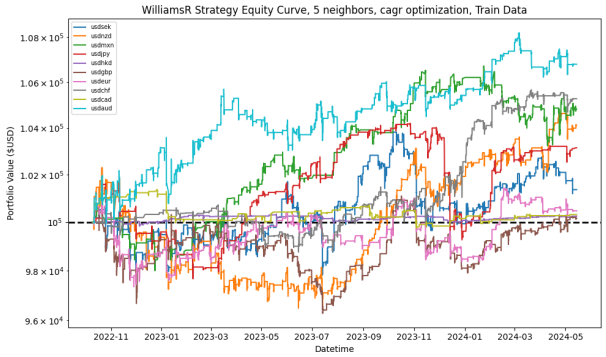
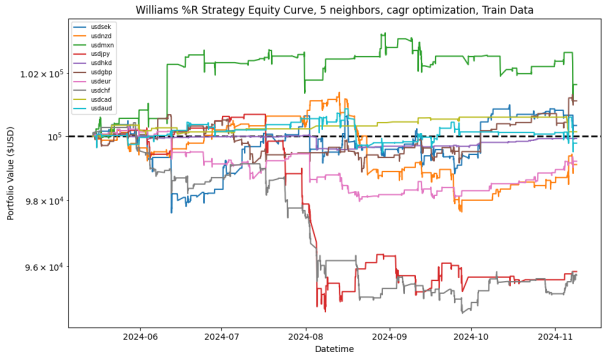


Figure 2: Example of what a monte carlo random entry or exit graph would look like. The blue strategy would be considered as having an edge while the others would not.



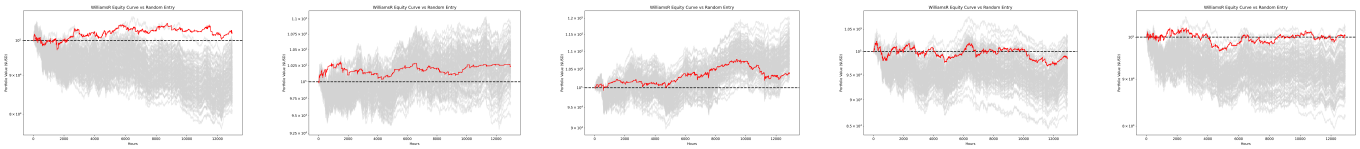
(a) Williams %R equity curve on the in sample data.



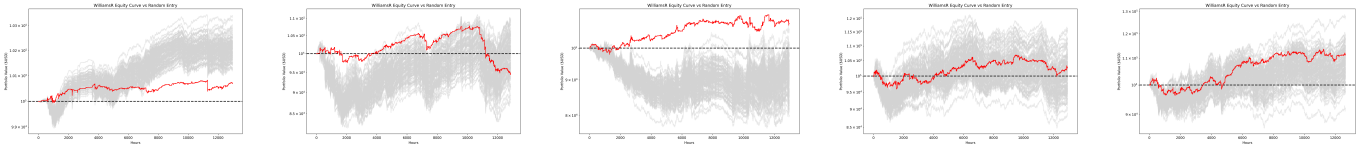
(b) Williams %R equity curve on the out of sample data.

Figure 3: In and out of sample equity curves for Williams %R strategy.

where it seems to have had an edge up until the end where the equity curve collapses back down to the random trials.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP

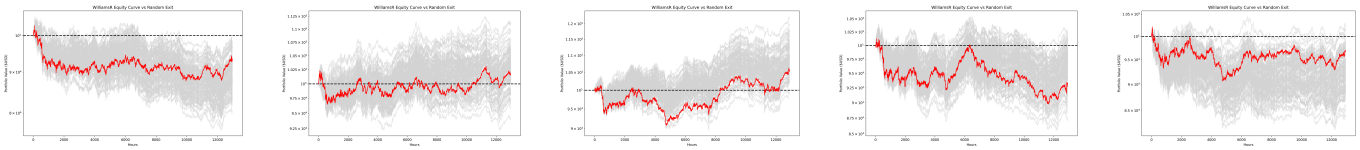


(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

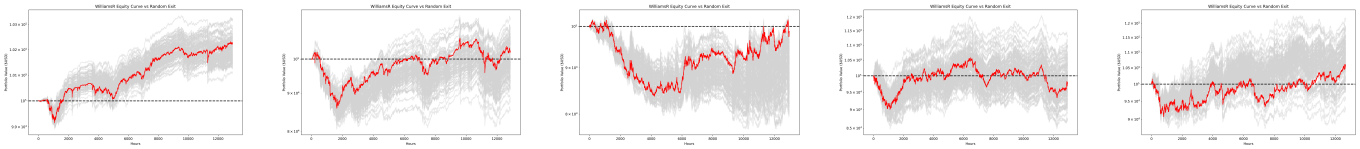
Figure 4: Monte Carlo Random Entry tests for Williams %R.

3.3 Monte Carlo Random Exit

Figure 5 shows the results of the Monte Carlo Random Exit test on the Williams %R strategy using CAGR optimization. These strategy results all fall well within the range of the random trials. This indicates that The exit position of this strategy does not have an edge. It is worth taking a closer look at the USDMXN pair because of a potential edge from the entry on that pair. The early parts of this strategy clearly falls in the range of the random trials but it does outperform all random trials by the end which indicates there still may be a slight edge of this exit on USDMXN.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP



(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

Figure 5: Monte Carlo Random Exit tests for Williams %R.

4. Commodity Channel Index

4.1 Out of Sample

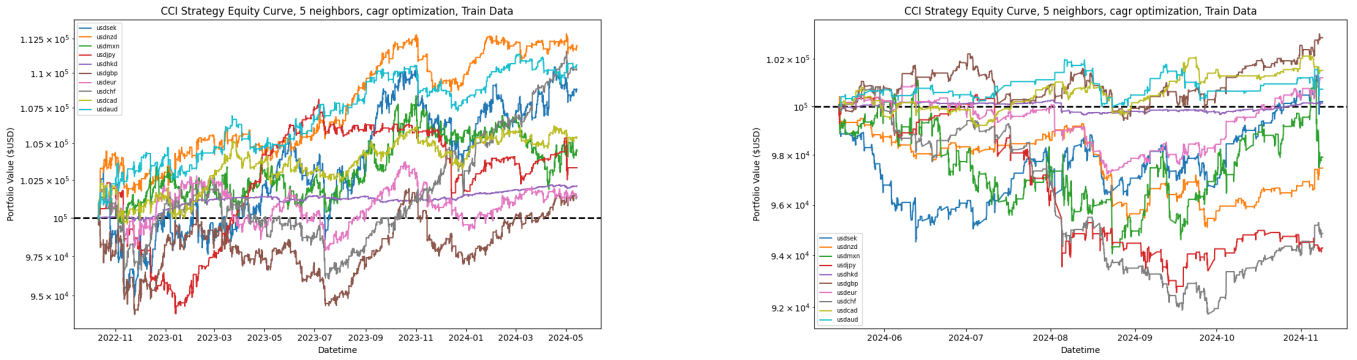
Figures 3a and 3b show the equity curves of the William %R strategy on the in sample and out of sample data respectively. The in and out of sample statistics are shown in Tables 3 and 4 respectively. This strategy performed better than the Williams % R strategy on this test. However, the in sample performances were not very good leading to poor out of sample performances despite in some cases being better than the in sample.

Symbol	Period	Lowerband	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	10	-20	41.578	4.729	0.950	789	7.845	1.097
usdnzd	10	-100	18.052	6.431	1.416	405	3.652	1.317
usdmxn	10	-20	49.475	2.445	0.246	717	5.983	1.059
usdjpy	10	-100	17.651	1.824	0.045	345	8.253	1.092
usdhkd	10	-20	49.122	1.153	-1.536	681	0.454	1.344
usdgbp	19	-20	39.984	0.757	-0.195	830	6.410	1.022
usdeur	19	-20	40.935	0.776	-0.268	803	4.778	1.025
usdchf	19	-20	40.026	5.517	0.907	747	6.033	1.180
usdcad	19	-20	39.421	2.952	1.670	722	2.801	1.129
usdaud	19	-100	14.715	5.682	3.075	312	2.953	1.354

Table 3: Performance metrics for different currency symbols using CAGR optimized parameters for CCI strategy on the train data. Sharpe calculate with risk free rate of 0.01.

Symbol	Period	Lowerband	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	10	-20	41.174	0.335	0.001	226	5.538	1.009
usdnzd	10	-100	19.751	-4.160	-0.016	113	5.289	0.784
usdmxn	10	-20	42.321	-3.440	-0.005	211	6.978	0.935
usdjpy	10	-100	18.532	-9.290	-0.026	103	7.888	0.632
usdhkd	10	-20	46.116	0.232	0.004	212	0.616	1.069
usdgbp	19	-20	38.980	4.851	0.018	268	2.724	1.210
usdeur	19	-20	39.438	1.994	0.008	221	3.625	1.105
usdchf	19	-20	41.042	-8.373	-0.027	208	9.061	0.721
usdcad	19	-20	35.999	2.502	0.015	208	1.628	1.168
usdaud	19	-100	13.865	1.194	0.006	78	1.963	1.118

Table 4: Performance metrics for different currency symbols using CAGR optimized parameters for CCI strategy on the test data. Sharpe calculate with risk free rate of 0.01.



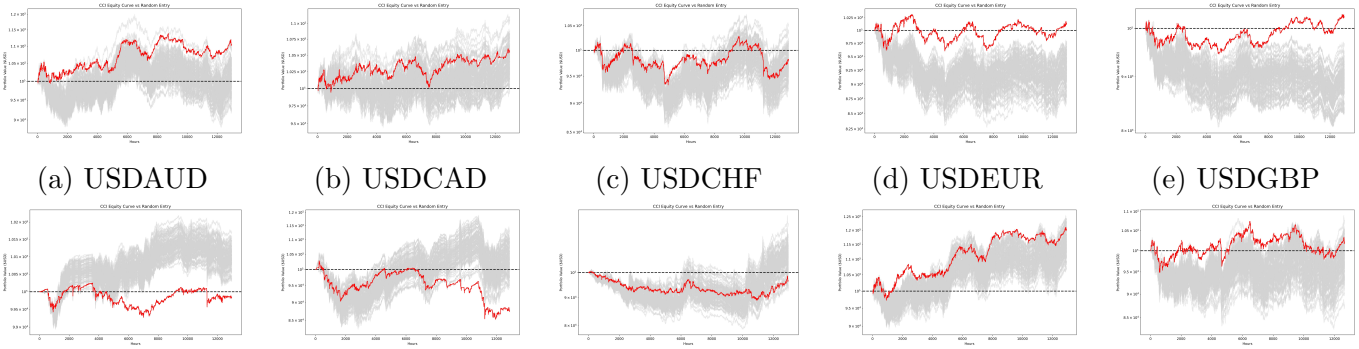
(a) CCI equity curve on the in sample data

(b) CCI equity curve on the out of sample data.

Figure 6: In and out of sample equity curves for CCI strategy.

4.2 Monte Carlo Random Entry

Figure 7 shows the results of the Monte Carlo Random Entry test on each currency pair using the CCI optimized strategy. The strategy only consistently outperforms all random strategies on USDEUR and USDGBP. However, it is among the better random strategies on most currency pairs. This indicates that this strategy does have some amount of an edge in its entry rule. Especially in the two cases where is outperforms all random trials.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP

(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

Figure 7: Monte Carlo Random Entry tests for CCI.

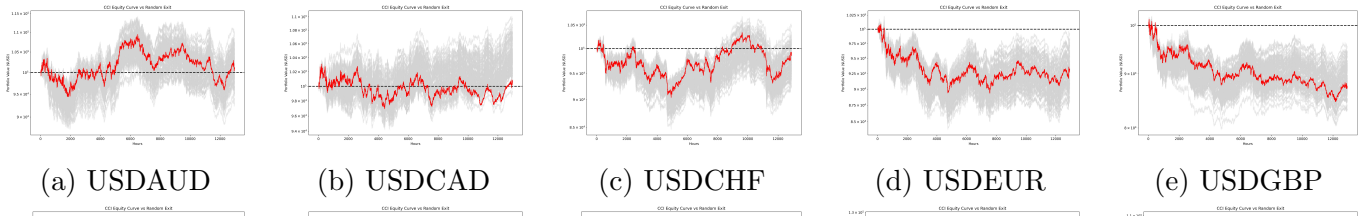
4.3 Monte Carlo Random Exit

Figure 8 shows the results of the Monte Carlo Random Exit tests on the CCI strategy optimized for CAGR. Only one of the currency pairs have this strategy consistently outperforming the randomized exit, USDGBP. While it performs well on this pair, the rest do not indicate that this strategies exit rule has an edge.

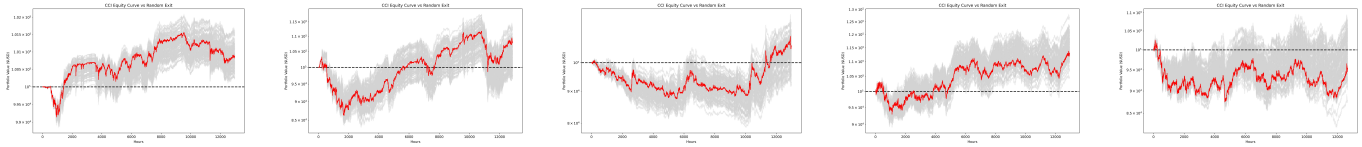
5. Stochastic Indicator

5.1 Out of Sample

Figures 9a and 9b show the equity curves of the Stochastic strategy on the in sample and out of sample data respectively. The in and out of sample statistics are shown in Tables 5 and 6. respectively.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP



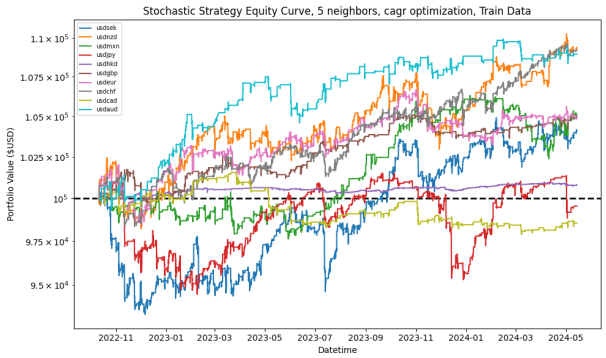
(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

Figure 8: Monte Carlo Random Exit tests for CCI.

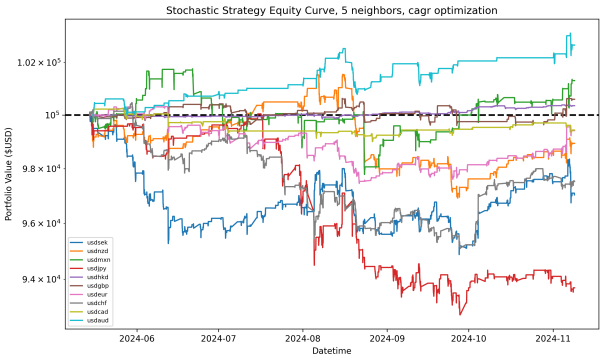
Each of the equity curves look like reflections over the x-axis which is the opposite of what you want to see with this test. The only currency pair that had a stand out performance was USDAUD with a CAGR over 4 in both the in and out of sample data.

Symbol	Period	Lowerband	Period Fast	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	4	20	2	27.739	2.233	0.094	510	6.983	1.073
usdnzd	19	20	2	21.966	5.065	1.371	514	4.437	1.193
usdmxn	2	20	3	18.374	2.776	0.205	245	3.801	1.203
usdjpy	2	20	2	19.971	-0.243	-0.329	404	6.568	0.989
usdhkd	4	20	2	17.175	0.439	-14.092	270	0.405	1.319
usdgbp	9	20	9	12.926	2.716	0.455	285	2.178	1.374
usdeur	19	20	2	24.142	2.662	1.258	481	3.501	1.145
usdchf	2	20	2	23.278	4.975	2.105	426	2.906	1.314
usdcad	19	20	10	12.489	-0.798	-1.610	232	3.616	0.899
usdaud	19	20	14	11.346	4.836	0.714	265	2.694	1.408

Table 5: Performance metrics for different currency symbols using CAGR optimized parameters for Stochastic strategy on the train data. Sharpe calculate with risk free rate of 0.01.



(a) Stochastic equity curve on the in sample data.



(b) Stochastic equity curve on the out of sample data.

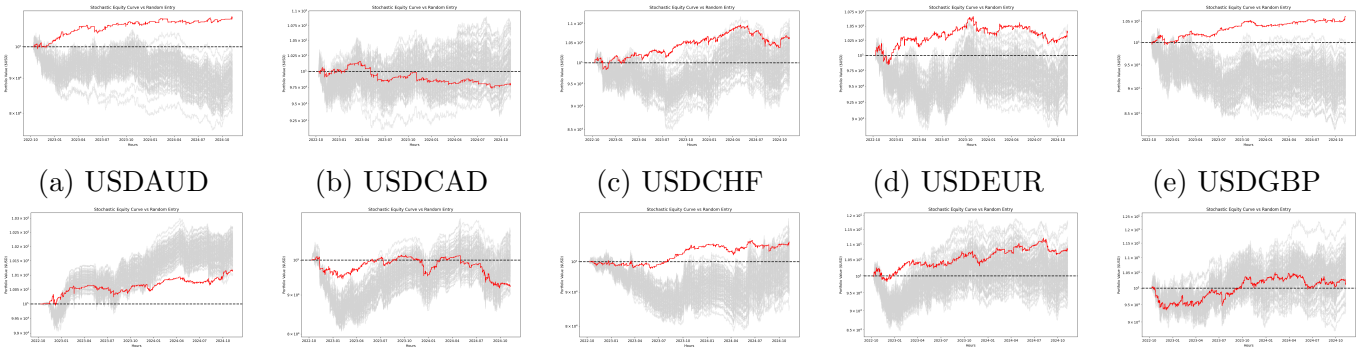
Figure 9: In and out of sample equity curves for Stochastic strategy.

Symbol	Period	Lowerband	Period Fast	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	4	20	2	28.859	-4.866	-14.115	153	5.150	0.828
usdnzd	19	20	2	22.106	-1.757	-17.125	150	4.555	0.921
usdmxn	2	20	3	13.466	2.172	-15.622	72	3.903	1.168
usdjpy	2	20	2	22.646	-10.231	-13.261	128	7.295	0.640
usdhkd	4	20	2	22.161	0.583	-163.762	103	0.236	1.470
usdgbp	9	20	9	12.557	0.986	-34.887	93	1.024	1.141
usdeur	19	20	2	23.839	-0.968	-26.945	133	2.851	0.925
usdchf	2	20	2	30.233	-4.067	-18.219	151	5.343	0.801
usdcad	19	20	10	9.791	-0.935	-63.308	53	1.250	0.749
usdaud	19	20	14	11.216	4.461	-29.966	79	1.711	1.574

Table 6: Performance metrics for different currency symbols for Stochastic strategy on the test data. Sharpe calculate with risk free rate of 0.01.

5.2 Monte Carlo Random Entry

Figure 10 shows the results of the Monte Carlo Random Entry test on the Stochastic strategy using CAGR optimization. This test does show a different story than what we saw with the in and out of sample data. While most of the currency pairs fall well within or even below the randomized entry runs, USDAUD, USDCHF, USDEUR, and USDGBP all have strong performances compared to the randomized strategies. This provides confidence that the entry rule does have a slight edge in some currency pairs.



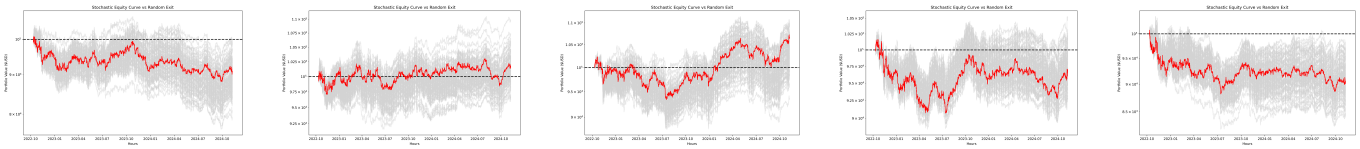
(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP

(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

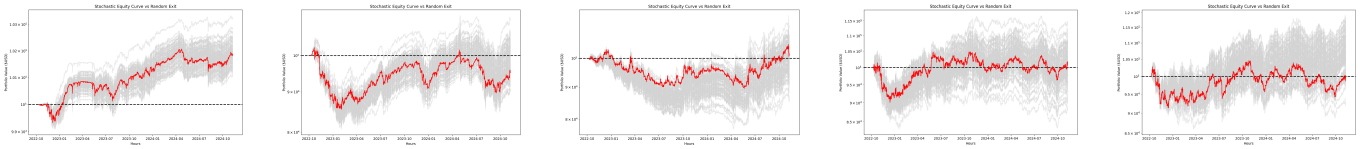
Figure 10: Monte Carlo Random Entry tests for Stochastic.

5.3 Monte Carlo Random Exit

Figure 11 shows the results of the Monte Carlo Random Exit test on the Stochastic strategy. This test exposes the main problem with this strategy and reinforces what the in and out sample test showed. If the exit rule had an edge we would see the strategy outperform the random exits in at least some currency pairs. Unfortunately, that is not the case. This test exposed that only a exit rule of this strategy needs to be improved which is a good start.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP



(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

Figure 11: Monte Carlo Random Exit tests for Stochastic.

6. Turnaround Tuesday

6.1 Out of Sample

Figures 12a and 12b show the equity curves of the Turnaround Tuesday strategy on the in sample and out of sample data respectively. The in and out of sample statistics are shown in Tables 7 and 8. respectively. These results show some promise from this strategy. Interestingly, in many cases the strategy actually performs *better* on the out of sample data than on the in sample. This is very unexpected as there should at least be a slight drop in performance. In general this strategy largely passes this robustness test on all currency pairs.

Symbol	Wait Days	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	3	11.009	-0.737	-0.350	421	6.366	0.956
usdnzd	7	14.705	1.319	-0.418	365	3.782	1.085
usdmxn	4	13.192	2.533	0.279	405	3.071	1.165
usdjpy	9	14.566	4.230	5.209	330	2.320	1.401
usdhkd	7	15.650	-0.327	-6.550	317	0.722	0.800
usdgbp	7	14.617	-0.764	-0.627	353	5.766	0.938
usdeur	1	6.650	0.477	-1.304	657	1.905	1.052
usdchf	9	15.793	-0.005	-0.337	330	4.974	0.999
usdcad	9	14.998	1.181	-0.226	306	3.469	1.152
usdaud	1	6.404	-0.271	-3.161	635	3.082	0.981

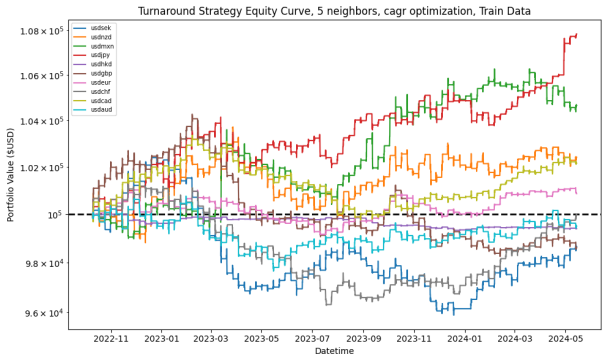
Table 7: Performance metrics for different currency symbols using CAGR optimized parameters for Turnaround Tuesday strategy on the train data. Sharpe calculate with risk free rate of 0.01.

6.2 Monte Carlo Random Entry

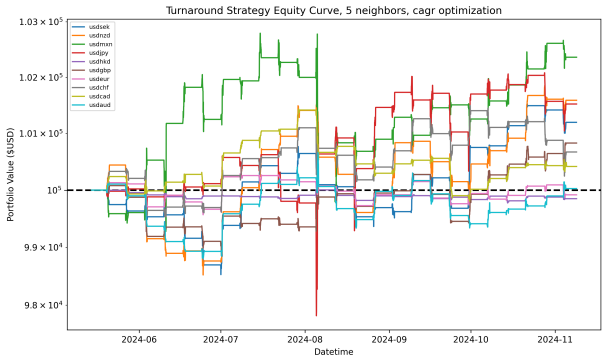
Figure 13 shows the results of the Monte Carlo Random Entry test on the Turnaround Tuesday strategy using CAGR optimization. Unfortunately, the strong results from the out of sample tests could not hold up. All of these fall within or below the randomized strategy with USDHKD falling well below. The only currency pairs that this strategy shows some promise on is USDJPY and USDGBP. However, even for those two currency pairs, I would still consider them a fail.

Symbol	Wait Days	Exposure	CAGR	Sharpe	Trades	Max Drawdown	Profit Factor
usdsek	3	10.973	1.993	0.012	127	1.490	1.174
usdnzd	7	13.506	2.650	0.015	107	1.912	1.238
usdmxn	4	11.933	3.945	0.012	108	2.923	1.240
usdjpy	9	13.496	2.538	0.010	106	2.863	1.184
usdhkd	7	15.242	-0.249	-0.010	98	0.234	0.830
usdgbp	7	14.094	1.380	0.011	104	1.239	1.180
usdeur	1	6.246	-0.137	-0.002	191	0.702	0.980
usdchf	9	15.427	1.116	0.007	102	1.233	1.128
usdcad	9	14.001	0.690	0.008	95	1.607	1.127
usdaud	1	6.115	0.045	0.000	187	1.315	1.004

Table 8: Performance metrics for different currency symbols using CAGR optimized parameters for Turnaround Tuesday strategy on the test data. Sharpe calculate with risk free rate of 0.01.



(a) Turnaround Tuesday equity curve on the in sample data.

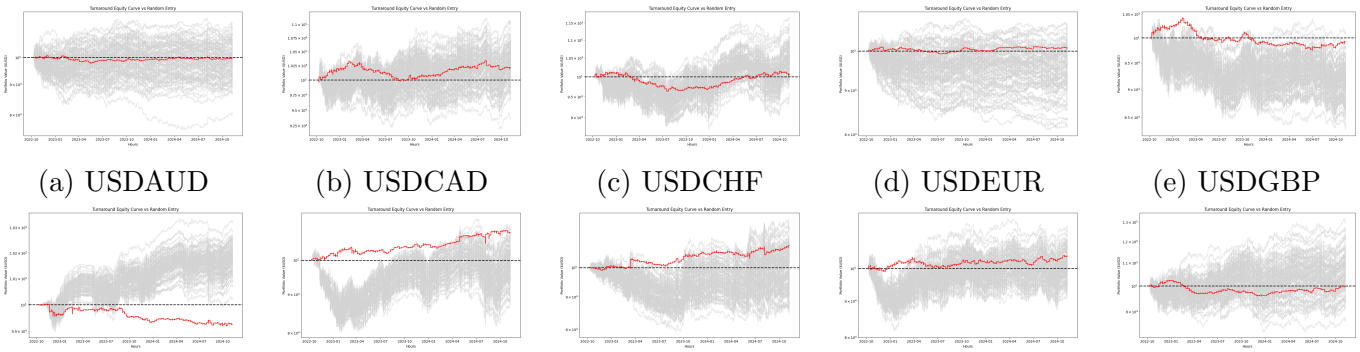


(b) Turnaround Tuesday equity curve on the out of sample data.

Figure 12: In and out of sample equity curves for Turnaround Tuesday strategy.

6.3 Monte Carlo Random Exit

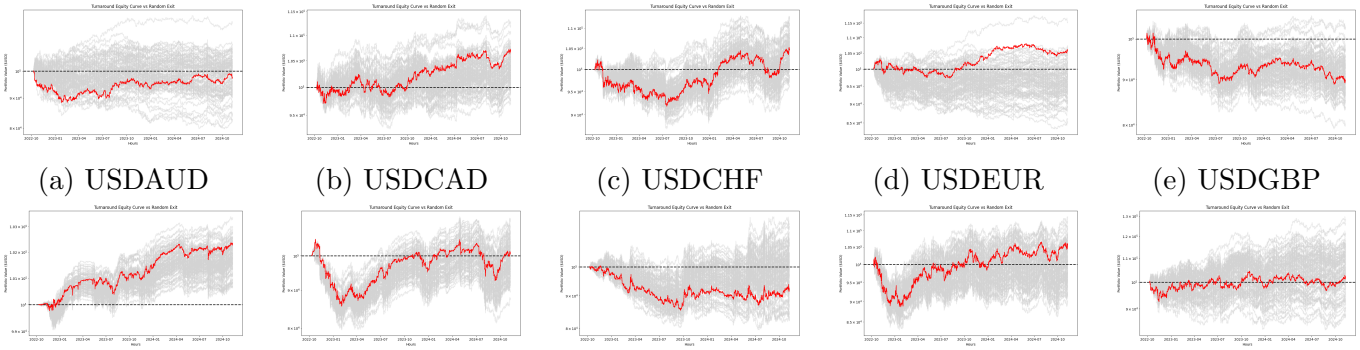
Figure 14 shows the results of the Monte Carlo Random Exit test on the Turnaround Tuesday strategy. This test does not yield any better results compared to the random entry test. The strategy falls well within the random trials for all currency pairs. With this test also being a failure, it is curious out the strategy held up in the out of sample test.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP

(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

Figure 13: Monte Carlo Random Entry tests for Turnaround Tuesday.



(a) USDAUD (b) USDCAD (c) USDCHF (d) USDEUR (e) USDGBP

(f) USDHKD (g) USDJPY (h) USDMXN (i) USDNZD (j) USDSEK

Figure 14: Monte Carlo Random Exit tests for Turnaround Tuesday.

7. Conclusion

In this report I discussed the results of three robustness tests on four trading strategies across ten currency pairs. These robustness tests provide valuable insight into the real world capability of these strategies. The optimized strategies showed good performance across most of the pairs on the train data, however, they generally got much worse on the test data. Furthermore, the Monte Carlo randomized entry and exit tests showed the entry and exit rules of all of the strategies do not have consistent predictive capability across all currency pairs.

This report actually constitutes a fourth robustness test: VS Others. Many of these currency pairs likely have some amount of correlation at different times. Given that, we would expect the strategies to perform somewhat consistently regardless of the currency. Given that we get varied performance, this does not indicate that these strategies will perform well if implemented in practice on future, unseen data.

7.1 Possible Winners

While most of the strategies failed most of the tests across most of the currency pairs, there were a few strategies on certain currency pairs that stood out as potentially promising to explore.

The Williams %R strategy with the USDMXN currency pair performed quite well. It achieved a CAGR of 2.624 on the in sample data and a CAGR of 2.717 on the out of sample data. The exposure was quite low in both samples as well as the max drawdown. The strategy also strongly outperformed all of the random strategies in the Monte Carlo Random Entry test. Even better, most of the random strategies had negative returns while Williams %R had a positive return. While it did not perform as well on the Random Exit test, it still came in top of all of the random strategies. This pair is worth exploring further.

The CCI strategy with the USDCAD currency pair also had a strong performance on the out sample test. It got a CAGR of 2.952 on the in sample and 2.502 on the out sample. It kept a modest profit factor of 1.129 and 1.168 on the in and out samples respectively. The thing I like the most about this pair when compared to the previous strategy/currency pairing is that it traded a lot more. The exposure was 35.99% which indicates to me that some modest tweaking to the strategy might be able to bring that down while keeping the gains. This strategy did not perform as well on either of the Monte Carlo tests with the entry being among the top performers and the exit being among the bottom performers. However, like I said, a modest tweak to the exit which appears to be the weak link might get this strategy/currency pair over the edge.

The Stochastic indicator strategy with the USDAUD currency pair had seemingly the strongest performance out of the possible winners. With a CAGR on the in and out samples being 4.836 and 4.461 respectively and decent trading volume plus a profit factor of 1.574 on the out of sample data, this is looking really strong. It heavily outperforms every random strategy on the Monte Carlo Random Entry test and falls in the middle of the pack on the Random Exit test. If I had to pick any strategy/currency pair to put my money, it would be this one.

The Turnaround Tuesday strategy had a couple strong currency pairs coming out of the out of sample test, USDJPY and USDMXN. Both kept strong CAGRs in the out of sample testing of 2.538 and 3.945 respectively. The also both fell in the upper range of the random strategies in the random entry test. However, USDJPY was middle of the road on the Random Exit and USDMXN was bottom portion on the Random Exit. These two pairings show some promise but I'm not sure I would super confident with either of them.

Overall, we found a few potential winners out of this robustness report. Prior to this report, a lot more of the strategy and currency pair parings looked really good. This report shows the importance

of looking at the robustness of a strategy prior to implementing it. After all, the future will not look the same as the past.

8. References

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