

# Razor Forex System: Backtesting and the Combination with Tendency Forex System

Yue Wang\*

Department of G10 FX Trading and Research, Lino Capital, TianJin, China

## ABSTRACT

**Objective:** We back-tested and evaluated the Razor Forex System on G10 FX trading and the combination with the tendency forex system.

**Methods:** Back-testing was done in eSignal charting system with intraday historical data from 2010. VBA programming was used to merge or split the exported back-testing data, which was divided into 4 groups: Tendency forex system, razor forex system, filtered tendency forex system (filtered by razor forex system), filtered razor forex system (filtered by tendency forex system). SPSS 24.0 was used for statistical analysis. Python 3.11.4 was used to calculate the smoothness and the deviation degree of the equity curve of different groups.

**Results:** Filtered tendency forex system has a higher return and lower drawdown ( $P < 0.05$ ) when compared with tendency forex system, but the difference was not statistically significant when compared with the filtered razor forex system ( $p > 0.05$ ). Python analysis showed that the deviation degree of the filtered tendency forex system was a little lower than that of the filtered razor forex system.

**Conclusion:** Tendency forex system filtered by razor forex system: The trading signal can be directly used in real-time trading. Razor forex system filtered by tendency forex system: The trading signal can be used as a reliable back-testable indicator.

**Keywords:** Forex trading; Statistical analysis; Python; VBA programming

## INTRODUCTION

The razor forex system was created with JavaScript in eSignal charting system. It is an automated, back-testable, trend-following system, working on EUR/USD, USD/CHF, AUD/USD, USD/JPY 120 and 240 timeframes. The entry and exit signals can be directly flagged on the chart with audio and pop-up alerts [1].

## MATERIALS AND METHODS

### Back-testing conditions of the razor forex system

- Historical data feed: eSignal
- Period: From Jan. 2010 to Dec. 2022
- Initial virtual balance: \$ 10k

- Contract size: Fixed 0.1 standard lot per trade
- VBA programming in microsoft excel 2019 to merge or split the exported back-testing data (Figures 1 and 2) [2,3].

The razor forex system could be used independently for real-time trading. However, its original design was mainly to combine with the tendency forex system to complement each other in mechanism, so as to reduce drawdown and enhance the stability [4-6].

For the tendency forex system, once a buy/sell arrow was flagged, if the razor forex system also generated a buy/sell arrow on the next bar, then the trading signal of the tendency forex system could be confirmed.

For the razor forex system, if we have no trading signal of tendency forex system on the previous bar, then the trading signal of the razor forex system could be confirmed (Figure 3).

**Correspondence to:** Dr Yue Wang, Department of G10 FX Trading and Research, Lino Capital, TianJin, China, E-mail: yuewang2000@outlook.com

**Received:** 30-Jan-2024, Manuscript No. JSFT-23-27921; **Editor assigned:** 02-Feb-2024, PreQC No. JSFT-23-27921 (PQ); **Reviewed:** 16-Feb-2024, QC No. JSFT-23-27921; **Revised:** 23-Feb-2024, Manuscript No. JSFT-23-27921 (R); **Published:** 01-Mar-2024, DOI: 10.35248/2168-9458.24.11.250

**Citation:** Wang Y (2024) Razor Forex System: Backtesting and the Combination with Tendency Forex System. J Stock Forex. 11:250

**Copyright:** © 2024 Wang Y. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

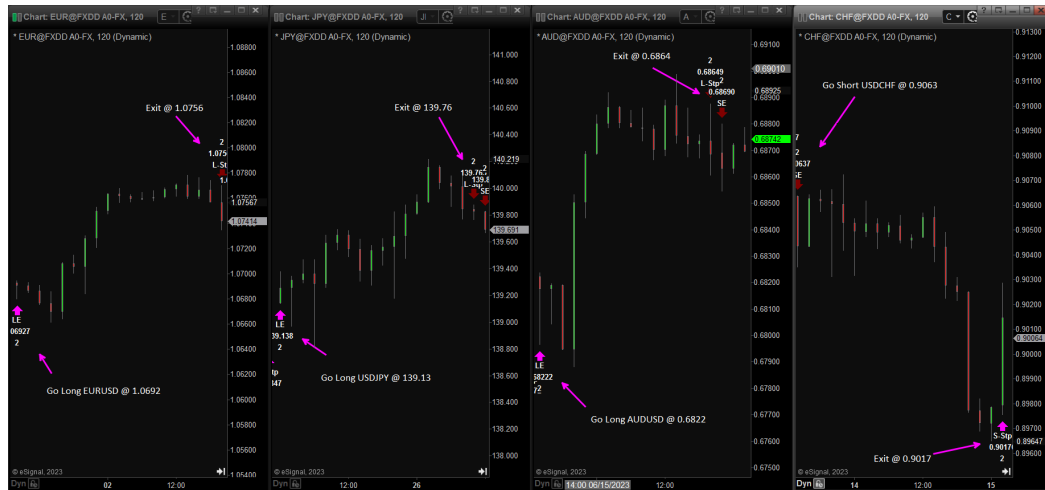


Figure 1: Razor forex system.

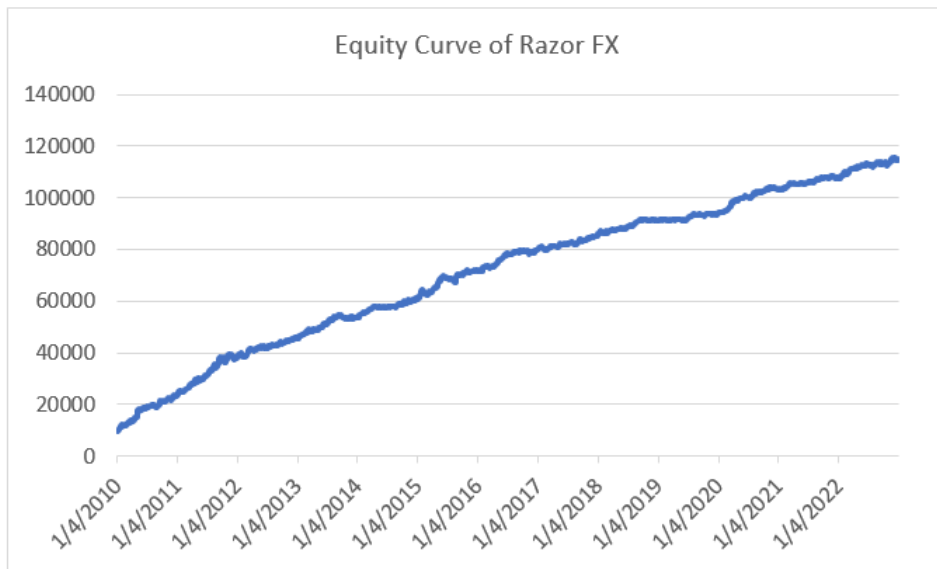


Figure 2: Razor forex system: Merged equity curve of EUR/USD, USD/CHF, AUD/USD, USD/JPY (close to close and end of the day).



Figure 3: Razor and tendency forex system filtered by each other.

## Statistical analysis part 1

SPSS 24.0 was used for statistical analysis. The studies' parameters were displayed as Mean  $\pm$  SD (Standard Deviation) for continuous variables. The comparison between the two groups was performed by t-test. The comparison between multiple groups was performed by paired samples t-test [7,8]. A P value  $<0.05$  was considered statistically significant for all analysis (Tables 1-3).

Group 1: Tendency forex system (Tables 1-3)

Group 2: Razor forex system (Tables 1-3)

Group 3: Filtered tendency forex system (filtered by razor forex system) (Tables 1-3)

Group 4: Filtered razor forex system (filtered by tendency forex system) (Tables 1-3)

In the paired samples t-test, to increase the sample size, we used quarterly return as the data source ( $n=4 \times 13=52$ ) for the statistical analysis. Due to the large amount of raw data, they were not included in this paper. If needed, please contact the author for further verification.

The results of group comparison showed that before filtering, the difference between the two groups was statistically significant ( $p=0.039<0.05$ ). After filtering, the difference between the two groups was not statistically significant ( $p=0.575>0.05$ ). The difference in the first group before and after filtering was statistically significant ( $p=0.000<0.05$ ), while the difference in the second group before and after filtering was also statistically significant ( $p=0.005<0.05$ ) (Table 4).

For the observation of drawdown, it is recommended to analyze it over a relatively long period. Using quarterly data may potentially

divide some large drawdowns into 2-3 small values, so we still use the annual drawdown data for statistical analysis.

The results of group comparison showed that before filtering, the difference between the two groups was statistically significant ( $p=0.006<0.05$ ). After filtering, the difference between the two groups was not statistically significant ( $p=0.139>0.05$ ). The difference in the first group before and after filtering was statistically significant ( $p=0.000<0.05$ ), while the difference in the second group before and after filtering was also statistically significant ( $p=0.005<0.05$ ).

## Python analysis

Python 3.11.4 was used to calculate the smoothness and the deviation degree of the equity curve of different groups (Figure 4) (Table 5) [9].

Group 1: Filtered tendency forex system (filtered by razor forex system) (Table 5)

Group 2: Filtered razor forex system (filtered by tendency forex system) (Table 5)

## Statistical analysis part 2

The method is the same as part 1.

Group 1: Tendency forex system (Tables 6-14)

Group 2: Filtered tendency forex system (filtered by razor forex system) (Tables 6-14)

We compared the annualized return and drawdown of all the pairs in group 1 and group 2 (Tables 6-14).

**Table 1:** Annualized return of different trading groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
<b>Group1</b>	6298	9211	6190	5978	4900	7033	8097	1432	4836	3073	7332	3113	5769	5635
<b>Group2</b>	13129	14592	8097	7848	7261	10736	8247	5765	5575	2657	9377	4398	6949	8048
<b>Group3</b>	9730	10221	6846	7366	6050	8215	9550	2282	5830	3846	7974	4329	8333	6967
<b>Group4</b>	11300	10750	5302	6681	5648	9563	6154	7515	3619	2082	3961	3956	6448	6383

**Table 2:** Annualized drawdown of different groups (close to close) (USD).

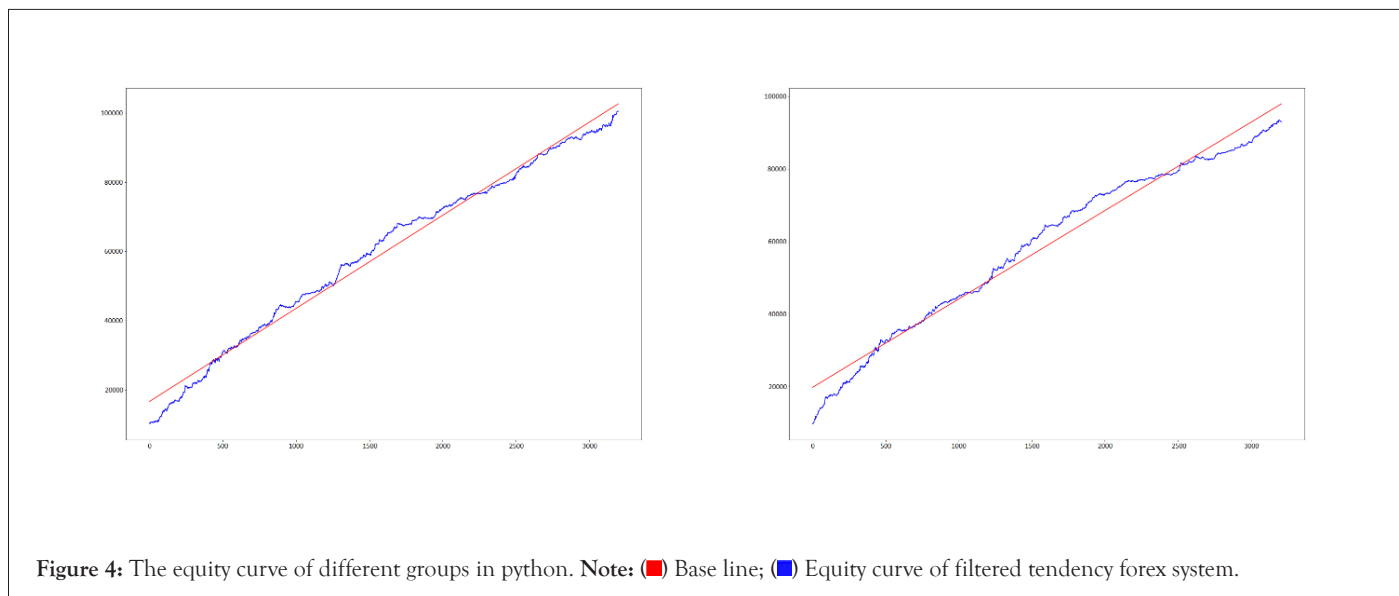
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
<b>Group1</b>	1118	1116	1151	1189	893	1551	909	1233	771	774	742	1236	1270	1073
<b>Group2</b>	1006	2447	1549	1858	1110	2385	1636	1533	1041	1069	1260	1158	1876	1533
<b>Group3</b>	637	1050	865	968	789	1245	689	744	719	576	622	1028	855	830
<b>Group4</b>	573	1367	623	547	342	1143	644	493	544	421	1029	518	536	675

**Table 3:** Comparison of quarterly return among multiple groups.

Group	n	Before filtered	After filtered	t	P
Group 1	52	1408.87 $\pm$ 1102.38	1741.80 $\pm$ 1061.14	5.989	0
Group 2	52	2012.11 $\pm$ 1540.15	1595.76 $\pm$ 1045.49	3.44	0.005
t	-	2.189	0.569	-	-
P	-	0.039	0.575	-	-

**Table 4:** Comparison of annualized drawdown among multiple groups.

Group	n	Before filtered	After filtered	t	P
Group 1	13	1073.30 ± 240.40	829.83 ± 197.28	5.966	0
Group 2	13	1532.79 ± 493.60	675.38 ± 305.93	8.766	0
t	-	3.017	1.53	-	-
P	-	0.006	0.139	-	-



**Figure 4:** The equity curve of different groups in python. Note: (■) Base line; (■) Equity curve of filtered tendency forex system.

**Table 5:** The smoothness and the deviation degree of the equity curve of different.

Group	Smoothness	Deviation degree
Group 1	0.517521902377973	0.0546482910397301
Group 2	0.519650655021834	0.0602633158438454

**Note:** The results showed that the smoothness of both groups is very close, but the deviation degree of group 2 is a little higher than that of group 1.

**Table 6:** EUR/USD-annualized return of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
Group1	3498	1178	1617	-510	1695	3500	2355	486	2961	882	2154	1451	830	1700
Group2	4966	750	2316	595	2325	3817	2981	1015	2853	1060	2219	1585	1404	2145

**Table 7:** EUR/USD-annualized drawdown of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
Group1	650	1297	712	1180	309	292	505	630	332	220	503	294	562	576
Group2	448	1195	668	835	309	300	418	459	210	216	387	292	495	479

**Table 8:** USD/CHF-annualized return of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
Group1	501	4424	889	1104	823	1112	1176	424	1051	982	2163	617	1078	1257
Group2	1583	4635	1133	1433	1122	1554	1725	992	1227	1330	2170	870	2403	1706

**Table 9:** USD/CHF-annualized drawdown of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
Group1	1059	628	834	698	318	934	756	785	979	533	302	517	868	708
Group2	613	628	499	492	270	856	598	563	753	434	255	269	411	511

**Table 10:** AUD/USD-annualized return of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
<b>Group1</b>	879	3734	2707	1795	1331	1563	1336	-306	304	502	2008	361	903	1317
<b>Group2</b>	1757	4603	2666	1528	1435	1505	1506	-182	894	518	2310	781	1360	1591

**Table 11:** AUD/USD-annualized drawdown of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
<b>Group1</b>	494	614	477	514	641	967	334	872	662	391	332	1570	718	660
<b>Group2</b>	370	359	347	462	465	916	318	718	494	352	310	1076	527	516

**Table 12:** USD/JPY-annualized return of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
<b>Group1</b>	1420	-125	977	3588	1052	857	3230	828	521	706	1008	684	2958	1362
<b>Group2</b>	1424	234	731	3810	1168	1339	3337	458	856	938	1276	1094	3166	1525

**Table 13:** USD/JPY-annualized drawdown of different groups (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg.
<b>Group1</b>	373	1218	293	282	311	555	312	536	410	522	520	361	479	475
<b>Group2</b>	335	931	234	212	274	496	309	430	363	391	463	312	460	401

**Table 14:** Paired samples t-test of all the pairs in different groups (USD).

		<b>Group 1</b>	<b>Group 2</b>	<b>t</b>	<b>p</b>
EURUSD	Return	1699.65 ± 1183.81	2144.95 ± 1280.93	-3.193	0.008
	Drawdown	575.78 ± 334.13	479.39 ± 277.87	3.463	0.005
USDCHF	Return	1257.32 ± 1042.94	1705.85 ± 985.07	-4.364	0.001
	Drawdown	708.36 ± 239.50	510.79 ± 184.95	4.827	<0.001
AUDUSD	Return	1316.65 ± 1085.65	1590.88 ± 1165.59	-2.793	0.016
	Drawdown	660.38 ± 334.33	516.36 ± 242.05	4.035	0.002
USDJPY	Return	1361.85 ± 1144.29	1525.50 ± 1149.15	-2.387	0.034
	Drawdown	474.93 ± 244.69	400.66 ± 182.81	3.711	0.003

**Note:** The results showed that before and after filtering, the differences in each group were statistically significant ( $P < 0.05$ ).

## RESULTS

### The results of statistical analysis part 1

The results of statistical analysis part 1 showed that:

- Razor forex system *vs.* Tendency forex system

Return was higher, but drawdown was also higher, and the difference was statistically significant.

- Filtered tendency forex system *vs.* Tendency forex system

Return was higher, drawdown was lower, and the difference was statistically significant.

- Filtered razor forex system *vs.* Razor forex system

Return was slightly lower, drawdown was lower, and the difference was statistically significant.

- Filtered tendency forex system *vs.* Filtered razor forex system

Return and drawdown were basically equivalent, and the difference was not statistically significant.

### The results of python analysis

The results of python analysis showed that the deviation degree of the filtered tendency forex system was a little-lower than that of the filtered razor forex system, indicating potential higher stability.

### The results of statistical analysis part 2

The results of statistical analysis part 2 showed that in the filtered tendency forex system, the return of each currency pair was higher than that before filtering, and the drawdown was lower than that before filtering, and the difference was statistically significant.

### Considering the trading logic

Considering the trading logic, the tendency forex system could identify potential trading opportunities earlier than the razor forex system. The system had been applied to real-time trading for a long time without any logical expression bugs. The results of both real-time trading and back-testing were completely consistent regardless of profit or loss.

Therefore, the filtered tendency forex system was selected as the preferred trading system, with the filtered razor forex system as a supplement when necessary.

**Filtered tendency forex system: Detailed back-testing parameters**

Filtered tendency forex system: Detailed back-testing parameters in 13 years.

Fixed 0.1 standard lot per trade on \$ 10k initial balance.

Average annualized return: 6967 USD

Peak close to close drawdown: 1244 USD (From Jan 22, 2015 to March 04, 2015)

Gross win: 245272 USD

Gross loss: 154699 USD

Profit factor: 1.58

Winning rates: 45.34%

Total trades: 10119 (2235 trades were filtered out)

Expected payoff: 8.95 USD (Figure 5) (Tables 15 and 16).

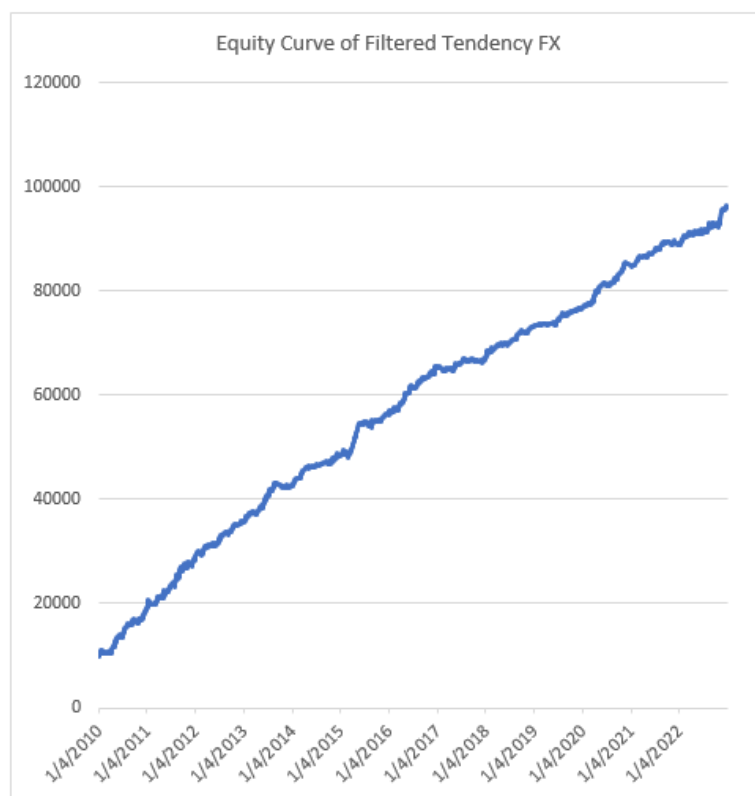


Figure 5: Equity curve (close to close and end of the day) (USD).

Table 15: Monthly return during the back-testing period (USD).

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	601	880	1150	1291	1263	640	276	-154	937	353	492	337	1412
Feb	271	198	62	643	124	-653	449	-430	617	238	490	1292	299
March	22	1044	633	-130	1473	1877	1129	479	1056	57	966	169	371
April	1388	215	414	694	467	2667	1675	-91	92	88	1643	226	368
May	1629	395	172	1144	320	1224	186	1096	578	446	529	377	-186
June	436	1298	1235	1702	-15	316	773	406	-63	357	388	1017	411
July	1719	-75	1066	1142	369	-173	960	641	503	742	98	181	96
Aug	270	2712	-22	1197	320	512	879	-341	1017	188	523	990	1373
Sep	500	1455	584	-376	-208	334	486	10	555	524	1223	364	73
Oct	-27	1181	1069	-168	1502	-215	650	-97	-489	505	616	-172	973
Nov	898	-84	311	-179	79	750	1037	33	634	73	1129	224	1953
Dec	2025	1002	172	406	355	938	1051	732	393	274	-124	-676	1189
Total	9730	10221	6846	7366	6050	8215	9550	2282	5830	3846	7974	4329	8333

**Table 16:** Peak close to close drawdown (USD).

Peak		Trough		Drawdown
Time	Equity	Time	Equity	
2015/01/22	41272.59	2015/03/04	40028	1244.59

## DISCUSSION

### Drawdown control

In this article, VBA programming in Microsoft Excel 2019 was used to calculate the peak drawdown. As eSignal does not support back-testing of multiple symbols and multiple timeframes at the same time, we can only get the peak close to close drawdown. However, according to the data of every symbol, the peak floating drawdown was 1.2-1.4 times of peak close to close drawdown, no higher than 1.5 times. The highest peak close to close drawdown of the filtered tendency forex system was 1244 USD. We assume the peak floating drawdown is 1866 USD ( $1.5 \times$  peak DD). Compared with the average annualized return (6967 USD), the risk reward is nearly 1:3.7.

### Multiple timeframes

How to identify potential inflection points on different timeframes in an early stage is an eternal theme for traders. The tendency forex system and razor forex system have highly quantified many classic indicators. From the logic perspective, if combining the chart patterns on the daily timeframe, the effectiveness will be even better [10-12]. For example, if a sell signal was flagged after a bearish key day reversal or a rising wedge with downside resolved, it should be a highly convincing trading opportunity. We could increase the volume if necessary.

### The change of return

Starting from 2016, the annualized return in back-testing has shown a pattern of "slightly higher in one year, slightly lower in the following year". This may be related to the changing rhythm of the market (clear trend in one year, consolidation in the next year). Therefore, starting from any time point, measuring the performance of the trading system on a 2-year cycle is more appropriate.

### Over-optimization

No over-optimization in both tendency forex system and razor forex system. All the indicators are working with default settings.

In order to pursue the results of back-testing one-sidedly, some indicators of the trading system are over-optimized, resulting in a "high degree of fit to historical data", which is one of the important reasons why many trading systems are eventually eliminated.

### Futures and other symbols

The filtered tendency forex system can also work well on gold, silver, oil, USD/CNH, euro futures, Australian dollar futures, Swiss franc futures, Japanese futures. However, they are not included in my spot forex trading portfolio. This topic is also not discussed in this article.

## CONCLUSION

- Tendency forex system filtered by razor forex system: The trading signal can be directly used in real-time trading.
- Razor forex system filtered by tendency forex system: The trading signal can be used as a reliable back-testable indicator.

## LIMITATIONS

- It is advisable to explore strategies for cross pairs, such as AUD/NZD, EUR/GBP, and fully hedge the risk of the US dollar when necessary.
- Both tendency forex system and razor forex system are created from the technical perspective only. If combined effectively with fundamental analysis, we can gain a better and more comprehensive understanding of the market.

The fundamental views require confirmation through technical analysis; otherwise, the results of fundamental analysis are likely to be incorrect. The technical views require support from fundamental analysis; otherwise, they could be false signals or the trend could not develop well.

## ACKNOWLEDGMENT

I am extremely grateful to my wife, Flora ZH. The process of learning trading has been exceptionally challenging, and the path to making a living through trading has been filled with obstacles. However, what has remained constant is her encouragement and trust in me.

I am deeply thankful to my parents. Our family was very poor when I was young. However, they not only taught me through their words and actions in order to shape me into a person with a strong sense of justice and integrity, but also they financially supported my education and life through pinching and scraping. Besides, they encouraged and developed various interests for me, enabling me to acquire not only a wealth of knowledge but also the ability to learn and absorb various types of knowledge. Ultimately, I became a trader from a surgeon.

Finally, I express my gratitude to all those who have supported and helped me all these years.

## REFERENCES

1. Hu Y, Feng B, Zhang X, Ngai EWT, Liu M. Stock trading rule discovery with an evolutionary trend following model. *Expert Syst Appl.* 2015;42(1):212-222.
2. Walkenbach J. *Excel 2010 power programming with VBA.* Wiley. 2010.
3. Blayney PJ, Sun Z. Using excel and excel VBA for preliminary analysis in big data research. *IGI Global.* 2019;27:110-136.



4. Wang Y. Tendency forex system: A backtestable indicator. *Mark Tech.* 2021;90:36-48.
5. Magdon-Ismail M, Atiya AF. Maximum drawdown. *Risk.* 2004;17(10):99-102.
6. Chekhlov A, Uryasev S, Zabarankin M. Drawdown measure in portfolio optimization. *Int J Theor Appl Finance.* 2005;8(1):13-58.
7. de Winter JCF. Using the student's t-test with extremely small sample sizes. *Pract Assess Res Evaluation.* 2019;18(1):10.
8. Ross A, Willson VL. Paired samples T-test. *Brill.* 2017;2017:17-19.
9. McKinney W. *Python for data analysis: Data wrangling with pandas, numpy, and jupyter.* O'Reilly Med. 2017.
10. Donnelly B. *The Art of Currency Trading: A Professional's Guide to the Foreign Exchange Market.* Wiley. 2019.
11. Deng S, Sakurai A. Foreign exchange trading rules using a single technical indicator from multiple timeframes. *IEEE.* 2013;2013:207-212.
12. Krishnan R, Menon SS. Impact of Currency Pairs, Time Frames and Technical Indicators On Trading Profit in Forex Spot Market. *Int J Bus Insights Transform.* 2009;2(2):34-51.