

# Simple trend-following strategies in currency trading

*Jessica James discusses how simple trading rules, applied systematically, can yield interesting results.*

## Introduction

‘The trend is your friend’, as they say on the trading floor. Long-term economic pressures mean that trending behaviour is common in the currency world—and unlike other market instruments like interest rates and equities, FX rates have no natural barriers or limits. Currency trends can last a long time.

Thus, trend-following trading strategies are a useful addition to any currency portfolio. However, not all currencies trend. Some, like USD/CAD, are the exchange rate between two very strongly linked economies, and the pressures and differences which lead to trends are absent in these currency pairs. It would be a useful exercise to identify those currencies which exhibit sufficient trend following behaviour to justify their inclusion in a trend-following strategy portfolio.

What really is a trend? Intuitively we feel that we know, but in fact different professions describe it differently. To a trader, a trend is a series of higher highs or lower lows. To a mathematician, a trend is more concerned with the degree of serial correlation in the data. To a spot trader, a trend can

appear and die within a day, while an economist looks for trends over periods of years. One man’s trend is another man’s range. However, we have chosen to use the type of ‘trend’ which may be most easily tested for in back data, with the unambiguous requirement that strategies based on utilizing it should make money. Our ‘trends’ occur when markets move further in a given time period than would be expected of a random, non-directional series. Under these circumstances, moving-average strategies would be expected to deliver positive returns.

## Strategy selection

The simplest trend-following strategies use moving averages. The variations which these can exhibit are many. They can use one, two or even three moving averages, which may be simple rate averages, or exponential averages, or even GARCH-based numbers. The trading rules can also be complex, with different weights applied to portfolio components according to how many of the moving averages are above or below the rate at the time. However, models which have a great many floating parameters are easily ‘over-

optimized’ until the back-tested returns are merely fitting data quirks. Such strategies seldom survive the test of actual trading. If a currency pair cannot be traded successfully with a simple trend-following strategy, it is unlikely to be realistically improved by adding levels of complexity to the same technique.

Accordingly, the strategies which we investigated were the simplest of all, with a single moving average. This was the average of the rate over a number of days  $n$ . If the actual rate on a day was above the moving average, then the strategy gave a long signal, and if it was below, then the signal was to go short. The actual number of days in the average was chosen to be that which gave the best information ratio for the currency. In table 1, the moving averages are tabulated together with the various returns and information ratios. The currencies which we tested were based on the MSCI index, without some of the more minor elements.

As can be seen, a number of the currencies exhibit satisfactory trend-following behaviour but others definitely do not. Those which do are shown with the information ratio in bold. It is interesting to note that for a number of the better trend-following currencies, almost all lengths of moving average gave a positive information ratio (IR), whereas for range trading currencies like USD/CAD, practically none of them did.

**Table 1.** Backtested results for single moving-average strategies for a variety of currencies.

Currency	Best moving average	Annual return	Average number of trades per year	Information ratio
USD/JPY	69	9.49%	9.9	<b>0.88</b>
USD/CHF	64	5.43%	12.2	<b>0.45</b>
USD/AUD	22	1.19%	27.8	0.13
USD/CAD	23	-0.19%	24.6	-0.04
EUR/USD	89	4.59%	10.3	<b>0.44</b>
EUR/JPY	11	6.14%	38.8	<b>0.59</b>
EUR/GBP	80	3.23%	10.6	<b>0.40</b>
EUR/CHF	116	0.80%	11.0	0.19
GBP/USD	7	2.86%	53.7	0.31
GBP/JPY	126	5.32%	9.8	<b>0.47</b>
GBP/CHF	98	1.80%	12.4	0.22
CHF/JPY	69	6.53%	11.3	<b>0.60</b>
USD/SEK	255	6.36%	3.7	<b>0.56</b>
USD/SGD	36	7.57%	14.0	<b>0.82</b>

**Table 2.** Effects of volatility adjustment on the backtested results.

Currency	No volatility adjustment		With volatility adjustment		
	Annual return	Information ratio	Annual return	Information ratio	Volatility cut-out level
USD/JPY	9.49%	0.88	8.78%	0.88	14.57%
USD/CHF	5.43%	0.45	6.85%	0.63	14.66%
EUR/USD	4.59%	0.44	4.47%	0.50	13.98%
EUR/JPY	6.14%	0.59	8.34%	0.92	15.75%
EUR/GBP	3.23%	0.40	3.37%	0.54	10.02%
GBP/JPY	5.32%	0.47	5.51%	0.56	15.35%
CHF/JPY	6.53%	0.60	7.48%	0.72	15.88%
USD/SEK	6.36%	0.56	7.45%	0.82	13.90%
USD/SGD	7.57%	0.82	5.28%	0.73	8.52%
Average	5.57%	1.07	5.70%	1.48	—

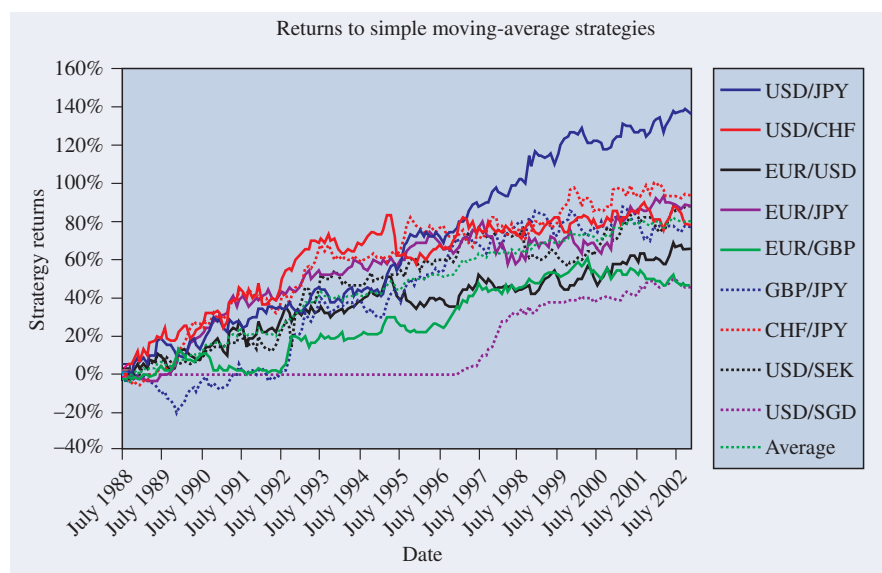
Thus it is relatively easy to select those currencies which are sufficiently trend following to include in a trading portfolio. Figure 1 shows the cumulative returns of those strategies which were selected.

Trading costs were included at a level of three basis points for all currencies. An interesting point arises when costs are included. Strategies with two moving averages are popular, and when optimized without costs almost inevitably provide better back-tested returns than those with only one moving average. However, when costs are included, then strategies which trade less frequently do proportionately better. This means in practice that optimizing for the best two moving averages frequently results in them both having the same number of days—in other words, they are the same, and the two moving averages have collapsed to one. Thus the decision to use only one moving average on the grounds of simplicity is further justified.

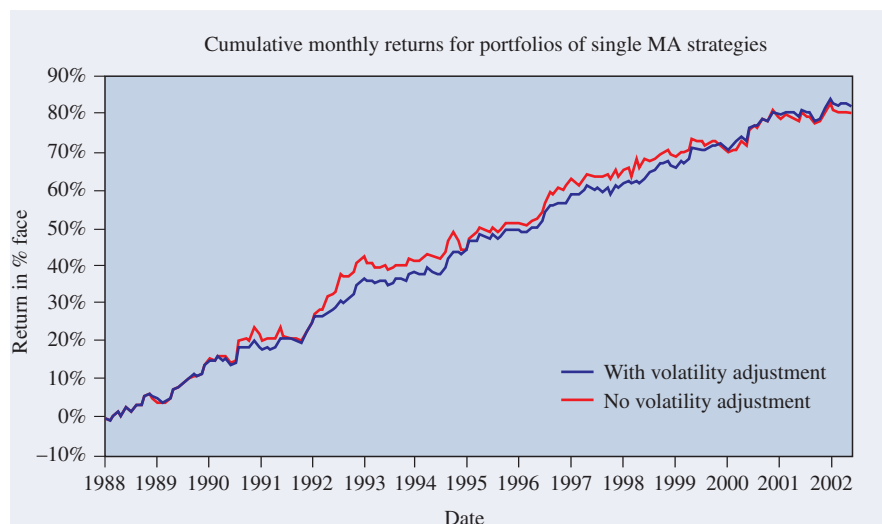
**Volatility adjustment**

It is often possible to improve the returns of a trend-following strategy by adjusting the face value of the trades according to the volatility of the underlying. In general, by reducing the face value at times of very high volatility, the information ratio is improved, as there is less ‘whipsaw’ effect from large rapid moves.

However, varying the face amount of trades according to complex rules means that the trading strategy is very vulnerable to over-optimization. Accordingly, to ensure that there were not too many variables which could be optimized to produce a good back-tested result, we varied a single optimization parameter, which was the level of volatility at which the face adjustment was made. This was a percentile of the overall



**Figure 1.** The ‘average’ series is created by a simple average of all the currency strategies and, as can be seen, is pleasingly smooth, with an information ratio of 1.07 after all costs are included.



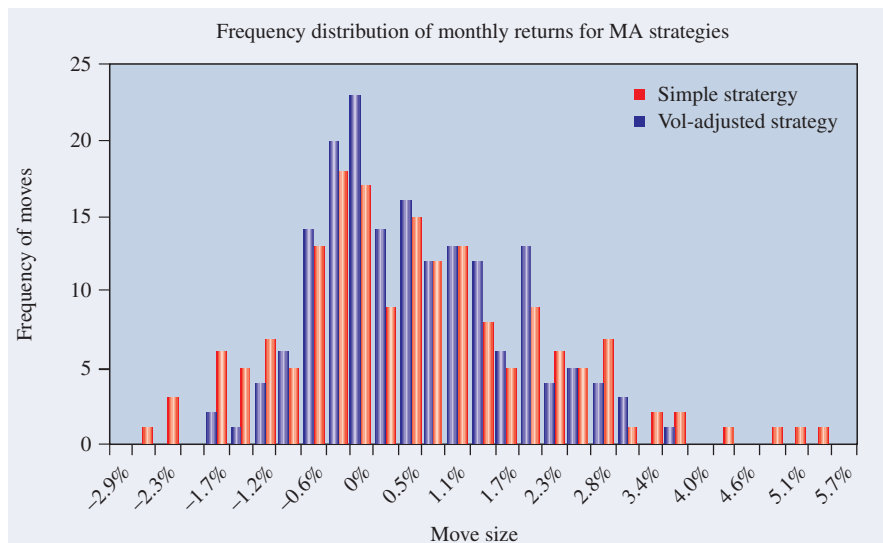
**Figure 2.** Cutting out trading at times of high volatility smooths returns significantly.

distribution of historical volatility for each currency, and the best level was found to be 85%. Thus, whenever the historical volatil-

ity of the FX rate, calculated as the standard deviation of the previous 21 business days, was above the 85th percentile of its range,

**Table 3.** Backtested results over different time periods.

Time period	Strategy	IR	Annual return	Worst month	Best month	Average monthly loss if loss
Last 14 years (start date July 1988)	Currency returns (simple strategy)	1.07	5.57	-2.62%	5.18%	-0.83%
	Currency returns (vol adjusted)	1.48	5.70	-1.99%	3.64%	-0.55%
	Currency returns (simple strategy)	0.64	3.51	-1.99%	4.13%	-0.86%
Last three years (start date October 1999)	Currency returns (vol adjusted)	1.01	4.54	-1.99%	3.14%	-0.59%



**Figure 3.** The volatility adjustment clearly reduces the risks of the trend-following strategy, cutting off the loss tail at the expense of some of the positive moves. The volatility-adjusted distribution has a sharper peak and shorter tails.

the face amount of that currency was reduced to zero. When the volatility moved below the 85th percentile, the face amount was adjusted to its original level. This means that the total face amount of the strategy varied with the number of currencies which were disqualified due to high volatility.

The improvements due to the volatility adjustment are tabulated in table 2, together with the 85% volatility cut-out levels for each currency. As can be seen, the IR is considerably improved for the volatility-adjusted strategy.

In figures 2 and 3, we plot the cumulative returns and frequency distributions of the strategy with and without volatility adjustment.

It can be clearly seen that the volatility adjustment reduces the standard deviation of returns, shifts the peak of the returns distribution in the positive direction, and cuts short the loss tail. This comes at the expense of sacrificing a few of the very best monthly

returns, but overall the effect is very pleasing, reflecting the improvement to the information ratio.

**Recent performance of moving-average strategies**

While the portfolio of moving-average strategies has performed very well since 1988, it is useful to focus on the most recent period of data to test the continuing viability of the technique. In table 3, we look at statistics from the whole data series since 1988 and for the last three years since October 1999.

Overall we can say that the simple moving-average-strategy is still working well, and cutting out currencies in times of high volatility is continuing to improve performance and reduce risk. Levels of return are slightly diminished but the information ratio remains good and risk levels are low. While this strategy is one which has only been tested on past data rather than actually traded,

every effort has been made to avoid over optimization and realistic trading costs are included. An investor who wishes to add a trend-following component to his or her portfolio could do much worse than consider this type of strategy

**References**

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*Jessica James is Vice President in CitiFX® Risk Advisory Group Investor Strategy, Citigroup.*

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