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RON SCHELLING

Ron Schelling, private trader, reviews and discusses the FX-Quant trading system using quantitative analyses on Forex markets

Forex Arbitrage Using the Currency Basket

What does Arbitrage mean?

Arbitrage is a financial operation in which currency pairs are bought and sold, either simultaneously or in a minimum lapse of time, either in the same market or a different one, with the goal of obtaining a profit spread – a product of the rate's price differentials. Arbitrage, in its purest form, is defined as the purchase of securities on one market for immediate resale on another market in order to profit from a price discrepancy. This results in immediate risk-free profit.

Arbitrage, however, can take other forms as well. Unlike pure arbitrage, statistical arbitrage (also called a pair trade or spread trade) does involve risk. Despite the disadvantages in pure index arbitrage, statistical arbitrage is still accessible to most retail traders. Although this type of arbitrage requires taking on some risk, it is generally considered "playing the odds".

What is an Arbitrage Model?

Arbitrage models for currency/stock pairs may be designed in a variety of ways. The important key is to have knowledge of the relationships among pairs.

Statistical Arbitrage (Pairs) Trading Systems

It is rarely in the best interests of investment bankers and hedge fund managers to share profitable trading strategies with the public, so the arbitrage remained a secret of the professionals and a few deft individuals.

Statistical Arbitrage: Pairs Trading

This form of arbitrage relies on a strong correlation between two related securities. Pairs trading has the potential to achieve profits through simple and relatively low-risk positions. The pairs trade is market-neutral, meaning the direction of the overall market does not affect its win or loss.

What Is "Market-Neutral"?

A market neutral strategy is one where a trader takes a long position and a short position at the same time. There are many ways of implementing this strategy but the basic premise is the same: at any given time some securities are overvalued and others are undervalued. Once two markets determined to be statistically "out of alignment", a long position is taken in the market considered to be undervalued while a short position is simultaneously taken in the market considered to be overvalued relative to the first market.

In this article I like to take a next step, review and discuss the FX-Quant trading system using quantitative analyses on Forex markets.

With most trading systems, monthly returns are uncorrelated, i.e. a series of losing months does not improve the chances for profit in the coming months. With FX Quant's system, however, the losses make ground for future gains.

Numerical simulations show that in long run, and if reasonable leverage is used, the profit factor of this system will be greater than unity (the sum of gains will always be greater than the sum of losses). The leverage is carefully determined in order to avoid disastrous draw downs.

The objective is to achieve capital appreciation with controlled draw downs. This sophisticated and innovative methodology is viable investment alternative for both private and institutional investors, especially in today's chaotic markets.

It took some time within investment circles for currency to be recognized as something where you can consistently add value. In currency markets, because wherever there is a buyer there is a seller, many have said currency markets are a zero-sum game. Also, as the currency market is the most liquid and largest financial market in the world, it is a big ocean to feed in. This allows opportunities for our system to extract value from inefficiencies in the currency markets and generate positive returns.

The FX Quant's trading strategy is based on quantitative analysis - a statistical concept. It is 50% statistical arbitrage statistical and 50% position size management. Unlike most trading systems, which attempt to predict market direction, this trading model reacts to price action and makes trading decisions.

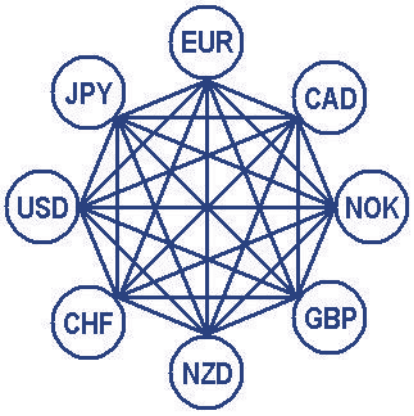


Figure 1 – The Strategy

Diversification

The strategy creates a complex portfolio of 10 global currencies and adjusts its components daily. The mathematics of portfolio diversification show that when you combine weakly correlated currency pairs together, a higher information ratio (returns per unit of risk) is generated than with individual currencies. In other words, diversification of currencies can lead to better risk-rewards for the combined portfolio.

As an example, in a portfolio comprised of three currency pairs, one position can be unprofitable at the moment, but the other two can show profits to more than compensate for the losses incurred with the losing one.

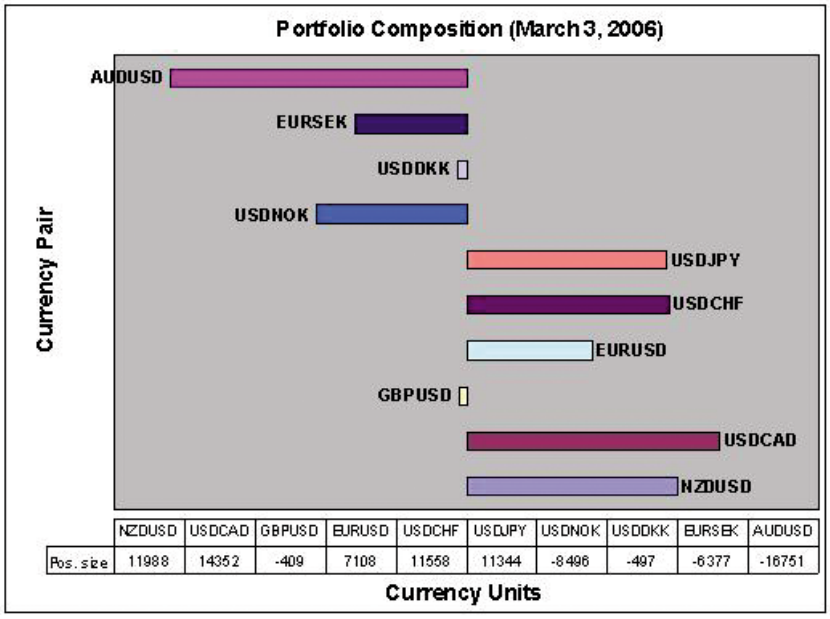
The system works with all currency pairs. The system is non-parametric, i.e. there are no parameters to optimize, except the leverage. Hence, the system is very robust and does not depend on price patterns (which most trading systems depend on).

The leverage is carefully determined in order to avoid disastrous draw downs.

Standard risk parameters employ an average combined leverage around 2.5:1 for the entire portfolio. The historical maximum leverage was 5.9:1 and it lasted for less than 2 months. An important system feature is that leverage reverts/oscillates around a long term average. The best time to start trading is when the actual leverage is above the average (long term) leverage. The leverage and the estimated risk is reported in the monthly performance reports.

The system opens positions in opposite directions. The system is USD neutral (i.e. USD bought = USD sold), although there is a long/short exposure in other currencies. As stated before, due to portfolio diversification, the risk is diversified and more limited than if one was to trade just one currency alone.

The risk is addressed by diversification and position size management. The system rebalances portfolio by gradually buying/selling fractional currency lots. Since the system does not open large positions in any direction, directional risk is limited and controlled. As stated before, the leverage oscillates around a long term average. Hence there is no need for protective stops. When a drawdown occurs, portfolio is rebalanced and ready to recover from losses and make a new equity peak.



	NZDUSD	USDCAD	GBPUSD	EURUSD	USDCHF	USDJPY	USDNOK	USDDKK	EURSEK	AUDUSD
Pos. size	11988	14352	-409	7108	11558	11344	-8496	-497	-6377	-16751

Figure 2 – Portfolio Composition

Drawdowns typically occur during prolonged trending periods (with no retracements, i.e. little price noise) in all currency pairs simultaneously. These events, however, tend to be less frequent today, as the Forex market is becoming more and more efficient - the "matured" G-7 currencies particularly. As soon as the market retraces or enters the consolidation phase (actually, there is always some noisy/random price action, even in a trending market), the system recovers from losses and makes a new equity peak.

That makes this system superior over most rule-based, pattern recognition, Elliot Wave, W.D. Gann, many indicator-based trading systems and other trading alchemy. No one knows when will the market change its behavior and those systems will break up. Potential risk for this system comes from over-leveraged trading, i.e. trading too large positions for the account size. In order to avoid a potential disaster, please keep the recommended risk level of 25% (average leverage of 3 and maximum leverage of 5:1 or less) at all times.

Unless your account is large (> $300,000), you can not trade mini currency lots (10k of base currency), available with most currency dealers. Your account should be held with an FCM which allows fractional size lot dealing (10 currency units or less per lot). Oanda Inc., with its fractional lot size dealing is such a dealing company for trading this system.

To trade this system there is no need to stay all day long in front of your computer screen. This makes the system suitable for traders in all time zones, as well as for those having a regular, full time job. Placing orders takes less than 5 minutes per day. All trades are initiated by market orders, and not by stop or limit orders. This is an important advantage, as most trading signals services post signals, which are either associated with slippage (stop orders), or missed altogether (sometimes limit orders are not activated by 1-2 pips on some platforms). This drastically deteriorates the profitability of those systems.

This system is different. You do not need to rush with orders, as you do not trade large directional positions, but rather make small position adjustments. This significantly reduces the effect of price slippage and minimizes performance deterioration. FX Quant's trading system does not make directional bets, but rebalances portfolio on a daily basis. What will happen if you delay (or even omit) your daily trades? Nothing disastrous will happen. Depending on market conditions, you will miss some profit potential, but you can adjust your portfolio the next day.

FX Quant's trading system generates trading signals based on many currency crosses (forty five, to be more exact). Actually, you do not trade the crosses themselves, but make synthetic positions based on the majors (G-7 currency pairs: GBPUSD, EURUSD, USDCHF, AUDUSD, USDCAD, USDJPY), plus NZDUSD USDDKK, EURSEK and USDNOK. For example, long GBPNZD position is equivalent to long GBPUSD / short NZDUSD etc. This way, you combine positions and reduce the bid/ask spread costs.

Figure 2 shows a trading plan example (as of Friday, March 3, 2006):

In this sample all positions are normalized for a $10,000 opening account balance and standard risk level of 20% (month end to month end).

NZDUSD +11988 means the system is LONG 11988 units of the base currency (NZD in this case).

USDNOK -8496 means the system is SHORT 8496 units of the base currency (USD in this example).

In a $30,000 account, NZDUSD position would be (30,000/10,000) × (+11988) = +35964 (Long 35964 units NZDUSD), and USDNOK position would be (30,000/10,000) × (-8496) = -25488 (Short 18762 units USDNOK).

Simply: you should buy/sell as many cur-

rency units as needed to make the position size as per trading plan.

For example, if the NZDUSD position was +11716 the day before (in a $10,000 account), you should BUY ADDITIONAL 272 NZDUSD units in order to make position size +11988.

Rebalancing Portfolio

Let us assume our position (carried from the day before) is +11716 NZDUSD.

If the current trading plan reads "+11988 NZDUSD", it means we should adjust the NZDUSD position by +11988-(+11716) = +272 NZDUSD (buy 272 NZDUSD units). In a $30,000 account (opening account balance) we should buy 3×272 = 816 NZDUSD units.

Be patient. Do not expect to make a fortune over night - profit generation is a very slow process. Ideally, trading should be started when a drawdown occur, or when current leverage is higher than average leverage for the life of trading. If interested, we can tell you what the best time to start trading is. Unless you are patient enough to trade for at least six months, you should better not start trading at all. Sometimes, the system quietly accumulates positions for months, before the profit explodes. This innovative trading model does not attempt to time the market. It doesn't care where the market moves, but it extracts profits day in and day out.

Trading Approach

The trading system is based on mathematical models, which are based on quantitative analysis, statistical arbitrage and position size management. Through these methods, trades currencies of developed countries (EUR, GBP, CHF, CAD, JPY, AUD, NZD, SEK, DKK and NOK) in the spot markets and does not trade futures or options on futures on any organized exchange. This program analyses exchange rates between the currencies comprising the basket. It gives specific trading signals for each currency, which are then implemented against the six remaining currencies. The resulting positions are then implemented in the market.

It uses statistical methodology and not classical fundamental or technical analysis. There are no classical indicators which attempt to predict market direction (no one can predict market direction!), no pattern recognition techniques and no trading rules based on trader's experience. The trading system is always in the market, but portfolio components are adjusted daily. Leverage is applied in line with client's preferred risk tolerance level.

Performance Summary

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Jan	0.94%	2.86%	4.98%	2.67%	2.04%	-11.85%	-3.61%	2.56%	3.44%
Feb	2.10%	5.08%	1.27%	3.37%	3.92%	-4.07%	-0.23%	1.19%	
Mar	-0.26%	-9.35%	-3.69%	2.19%	3.90%	18.28%	5.38%	8.61%	
Apr	-11.26%	-5.62%	4.70%	0.21%	6.35%	8.28%	-5.26%	-1.41%	
May	5.32%	21.75%	-16.94%	4.68%	2.73%	7.75%	6.50%	1.06%	
Jun	-1.24%	7.68%	8.85%	4.20%	-1.30%	5.36%	-0.68%	-2.03%	
Jul	13.50%	-2.27%	13.71%	-3.64%	3.45%	0.89%	7.34%	1.78%	
Aug	2.42%	-15.47%	9.24%	4.43%	0.70%	4.53%	6.54%	8.27%	
Sep	1.27%	4.75%	-9.30%	1.15%	6.03%	3.76%	-4.89%	2.99%	
Oct	-1.25%	-10.21%	12.88%	6.03%	-3.72%	2.71%	0.65%	-1.52%	
Nov	-9.74%	22.10%	5.88%	3.41%	1.96%	0.07%	-2.46%	4.39%	
Dec	-2.86%	31.50%	10.50%	-3.41%	1.22%	4.04%	6.48%	2.87%	
Total	-1.06%	52.8%	42.08%	25.29%	27.28%	39.75%	15.76%	28.76%	3.44%

Figure 3 – Monthly Report

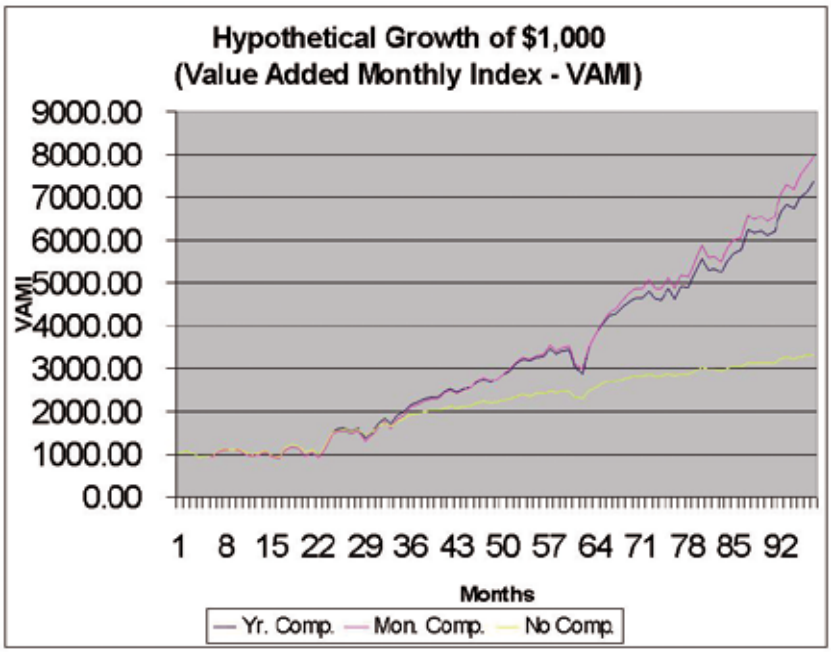


Figure 4 – Value Added Monthly Index

Ron Schelling (1954) was born in The Netherlands and started as an Airtrafic controller in the Dutch Air Force followed by pilot training in the USA , flying business aircraft and teaching as a flight instructor in Europe and the USA. In 1983 he started commodity trading in Dallas, London and then back to Holland. He was also involved in Airline Lease Partnerships.

Since his start in the financial world he has been active in technical analysis and trading systems using the discipline he had learned in aviation. Further he advise several airlines on Forex and Jet Fuel Risk management. Today he trades a small private fund and several trading accounts, mostly using Spreads and Aribitrage on Forex, Fututes and Stocks. He is a speaker in international technical analysis seminars and is the founder of the 2HEDGE Company - www.2hedge.com