

FX Volatility – Part 1

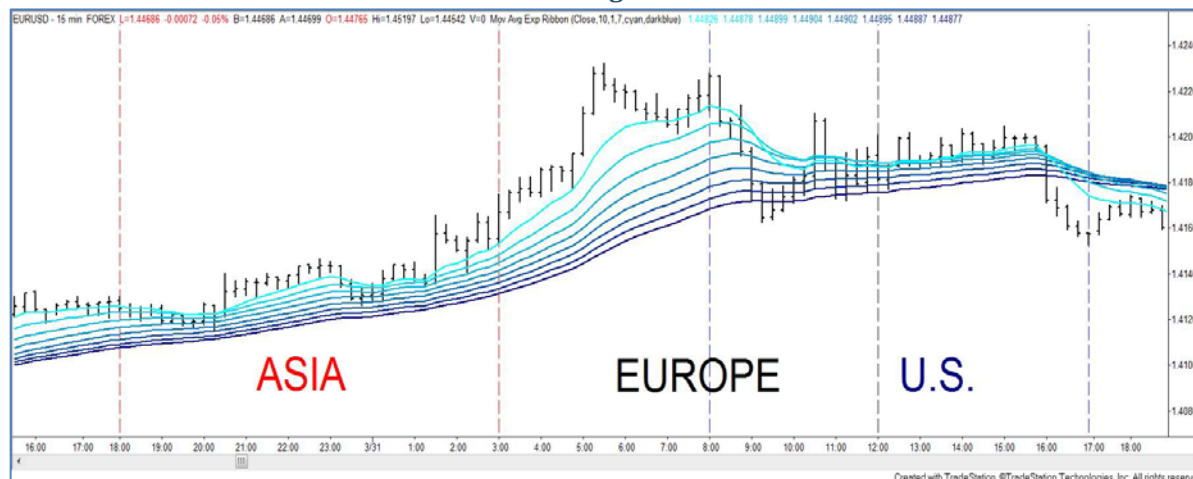
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Summary

Very much like people, foreign exchange (forex or FX) pairs have unique behaviors and traits that can be observed and studied over time. This may help us to better understand the nature of their price movements. For instance, volatility in a forex pair, captured by using the standard deviation of price movements in percentage terms, expresses the uniqueness of each pair while revealing the general heartbeat of the FX market. While shared patterns become apparent, each pair's volatility shows distinct characteristics that can be utilized by forex traders. Analyzing these findings may not only broaden your knowledge of the forex market, but also improve your trading methodologies.

Chart 1: EURUSD 15 min with the different trading sessions



Background

Although the forex market is open 24 hours a day from Sunday evening through Friday evening (U.S. time), the activity in a given pair is not consistent throughout the day. To better understand the intraday structure of the price activity, it is important to note that the forex market is commonly divided into four major daily trading sessions: the Sydney session (4:00 p.m.–1:00 a.m. ET*, or 16:00–1:00 ET*), the Tokyo session (6:00 p.m.–3:00 a.m. ET*, or 18:00–3:00 ET*), the London session (3:00 a.m.–12:00 p.m. ET, or 3:00–12:00 ET), and the

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New York session (8:00 a.m.–5:00 p.m. ET, or 8:00–17:00 ET). However, due to the almost complete overlap of the Sydney and Tokyo sessions, it is usually the Tokyo, London, and New York sessions (referred to as the Asian, European, and U.S. sessions) that are the focal points of trading activity.

*Note: winter times.

Volatility Ranking

Before diving deeper into each pair’s unique volatility profile, let’s consider how the different pairs rank against each other within each session in order to create a frame of reference. As a reminder, a simple definition of volatility is the amount of price variation relative to time. Since the paper will focus on price movements in percentage terms, not the price movements valued in a given currency, regular standard deviations will be used instead of other possible methods such as geometric standard deviations (GSD). The rankings in Tables 1-3 below show the pairs ranked from most to least volatile during the Asian, European, and U.S. sessions. Volatility calculations are made using open to close ranges.

Table 1: U.S. Session (8:00–17:00 ET) 5 Years of Data

Forex Pair	Volatility Ranking	Standard Deviation (%)	Pips (2 Std. Dev. * Close)
NZDJPY	1	0.9473	120
AUDJPY	2	0.9465	163
AUDUSD	3	0.7159	148
NZDUSD	4	0.6962	106
GBPJPY	5	0.6550	174
EURJPY	6	0.6086	143
USDCAD	7	0.5976	116
EURAUD	8	0.5560	152
USDCHF	9	0.5293	97
CHFJPY	10	0.5227	95
USDJPY	11	0.5182	86
EURUSD	12	0.4968	141
GBPUSD	13	0.4842	155
GBPCHF	14	0.4641	137
EURGBP	15	0.3609	64
EURCHF	16	0.3133	82

Table 2: Asian Session (18:00–3:00 ET) 5 Years of Data

Forex Pair	Volatility Ranking	Standard Deviation (%)	Pips (2 Std. Dev. * Close)
NZDJPY	1	1.1658	147
AUDJPY	2	1.1227	192
EURJPY	3	0.8667	203
GBPJPY	4	0.8472	226
USDJPY	5	0.7631	126
CHFJPY	6	0.6517	118
NZDUSD	7	0.5718	87
AUDUSD	8	0.4746	98
EURCHF	9	0.3944	102
EURAUD	10	0.3605	99
GBPCHF	11	0.3491	103
EURUSD	12	0.2770	78
USDCHF	13	0.2701	50
USDCAD	14	0.2164	42
GBPUSD	15	0.1899	61
EURGBP	16	0.1796	32

Table 3: European Session (3:00–2:00 ET) 5 Years of Data

Forex Pair	Volatility Ranking	Standard Deviation (%)	Pips (2 Std. Dev. * Close)
NZDJPY	1	0.9566	121
AUDJPY	2	0.9147	157
GBPJPY	3	0.7726	205
NZDUSD	4	0.7027	107
AUDUSD	5	0.6897	143
EURJPY	6	0.6719	158
USDCAD	7	0.6061	118
GBPCHF	8	0.6034	177
CHFJPY	9	0.5978	108
GBPUSD	10	0.5825	187
USDCHE	11	0.5761	106
EURAUD	12	0.5591	153
EURUSD	13	0.5473	155
USDJPY	14	0.5292	88
EURGBP	15	0.5133	91
EURCHF	16	0.3596	93

The ranking would be different if pip values in a given currency (e.g., U.S. dollar) were considered, since 1 pip in dollars would be different for the EURGBP versus that for the NZDUSD at any given time. Additional content on this topic will be shared in the upcoming “Analysis Concepts: Behind the Scenes” webinar. For now, let’s assume that trade sizes are adjusted to account for the different pip values to keep the standard deviation values on a level playing field. The “Pips” column in the tables converts the values in the “Standard Deviation” column into expected typical open – close ranges for the different sessions. (These tables refer to standard pips, not fractional pips that are used in the TradeStation platform. As a reminder, 1 standard pip is the fourth digit to the right of the decimal point for most currency pairs and equals 10 fractional pips in TradeStation.)

Several interesting observations can be made from the different tables. While the volatility fluctuates significantly at times, each forex pair has a tendency to remain in roughly the same position across the different trading sessions, with a few exceptions such as the EURCHF. On average, the European session is the most volatile, followed by the U.S. session. The Asian session is the least volatile overall, while having the highest individual volatilities (NZDJPY and AUDJPY). It’s important to recognize that the London session is the largest FX market.

The “Pips” amount is displayed to provide an idea of what type of movement can be expected during each session. This amount can be greater for a forex pair ranked lower than another pair due to the different price levels and the way the calculations are being performed. For example, in the table above, the NZDJPY ranks above the AUDJPY, but the pips amount for AUDJPY is greater than that for the NZDJPY. This is mainly due to the fact that the overall price level of AUDJPY was higher than that of NZDJPY at the end of the study, not because the AUDJPY is more volatile than the NZDJPY.

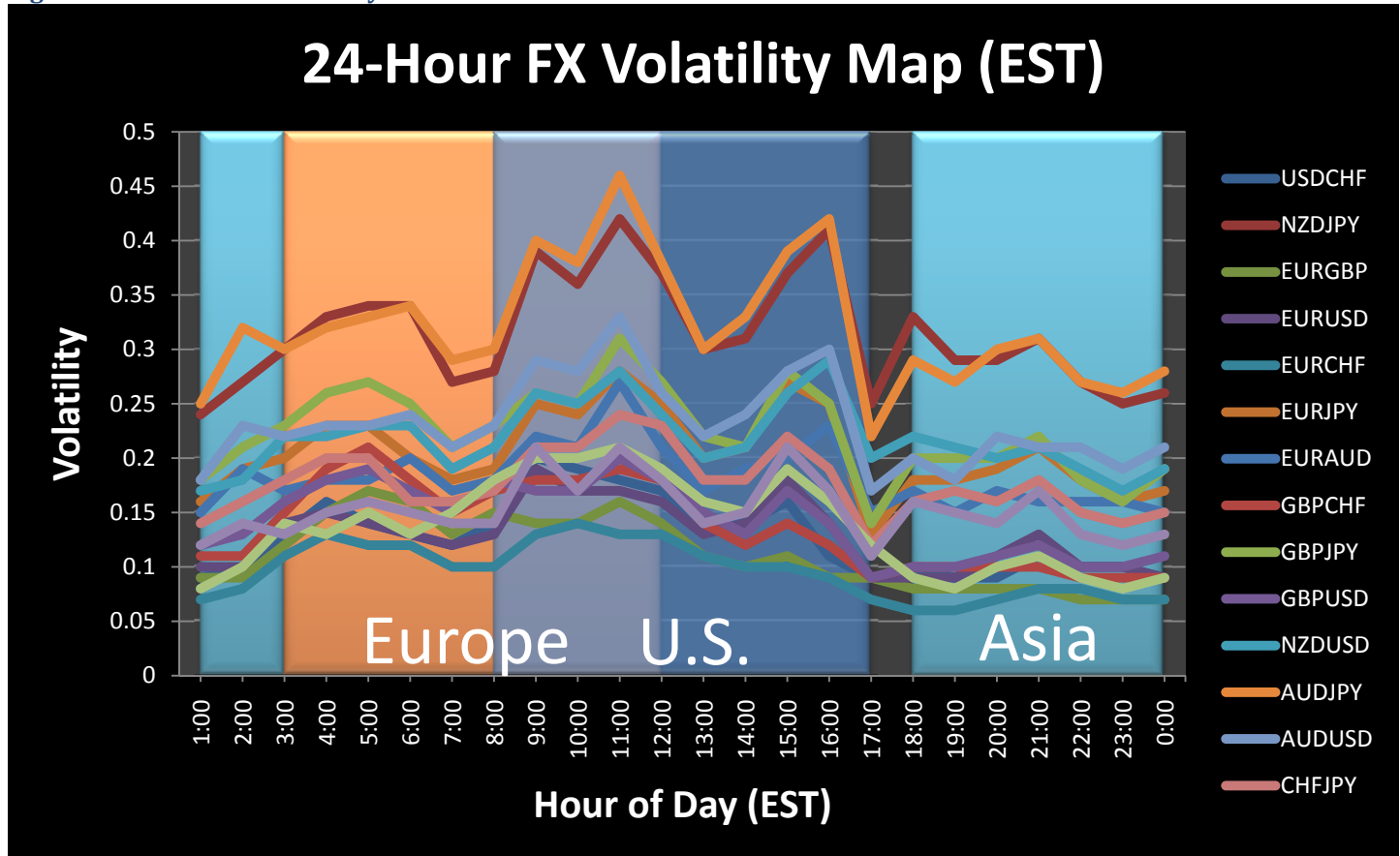
To an FX trader, the information in the different tables can be very useful in choosing which pair to trade depending on one’s particular disposition. For example, someone seeking a lower amount of volatility may want to stay away from the Asian pairs in favor of a European cross-currency. Please note, however, that lower volatility in the forex market can relate to high volatility in other asset classes, mainly due to the high leverage.

Now that we have an overall view of these forex pairs, what can be expected within each trading session? Are different times within each session more volatile than others? Are there volatility patterns across the different pairs? Can some pairs be grouped together due to their historical volatilities? To answer these questions, let’s consider a 24-hour volatility map for all these different pairs.

24-Hour Volatility Map

The first graphic leverages the power of TradeStation with Excel to display all forex pairs' volatility (standard deviations of hourly ranges - highs to lows) during an average 24-hour period over a five-year period (Figure 1 below). The map refers to U.S. Eastern time and the three different sessions (Asian, European, and U.S.) are marked using differently colored backgrounds.

Figure 1 - 24-Hour FX Volatility



While the overall heartbeat of the FX market is readily visible, the distinctiveness of each pair is just as noticeable. This provides forex traders with a sketch of when volatility rises and falls as the global business day progresses. The overlap between the European and U.S. sessions provides the greatest volatilities across the board, mainly due to high liquidity and to large investors converting their European assets to U.S. dollar assets in anticipation of the opening of the U.S. market. In the FX market, liquidity means volatility.

The following graphs show that particular forex pairs can be grouped together since their 24-hour volatility maps are very much comparable (Figures 2-4 below). The first group includes forex pairs where an Asian currency is both the base and quote currency (Asian cross-currencies). The second group includes forex pairs where a European currency is both the base and quote currency (European cross-currencies). The last group includes the "Big 4" from the major currencies. After analyzing the Asian crosses, you may start to wonder if there's any benefit in trading both the AUDJPY and the NZDJPY. Also, when looking at the European crosses, if you trade the GBPCHF but are becoming uncomfortable with the volatility, you may want to consider the EURCHF instead. On the other hand, if you are based in the U.S. and looking for a major with some added volatility to trade before going to bed, the USDJPY may be for you. In addition, if you employ breakout strategies, you may want to stay away when volatility is silent. At the same time, if you prefer using support and resistance levels instead, periods of lower-than-average volatility may be worth focusing on.

Figure 2 – Asian Crosses 24-Hour FX Volatility

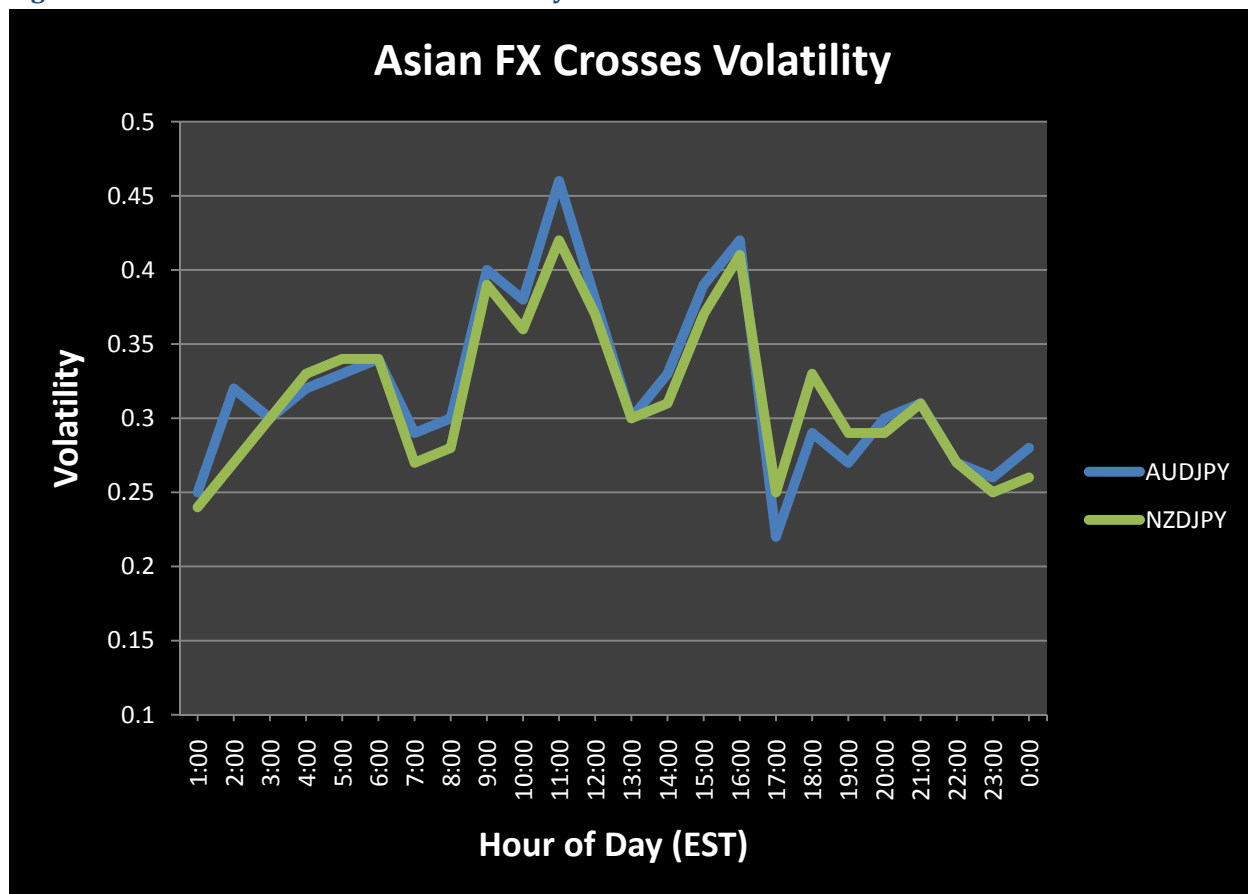


Figure 3 – European Crosses 24-Hour FX Volatility

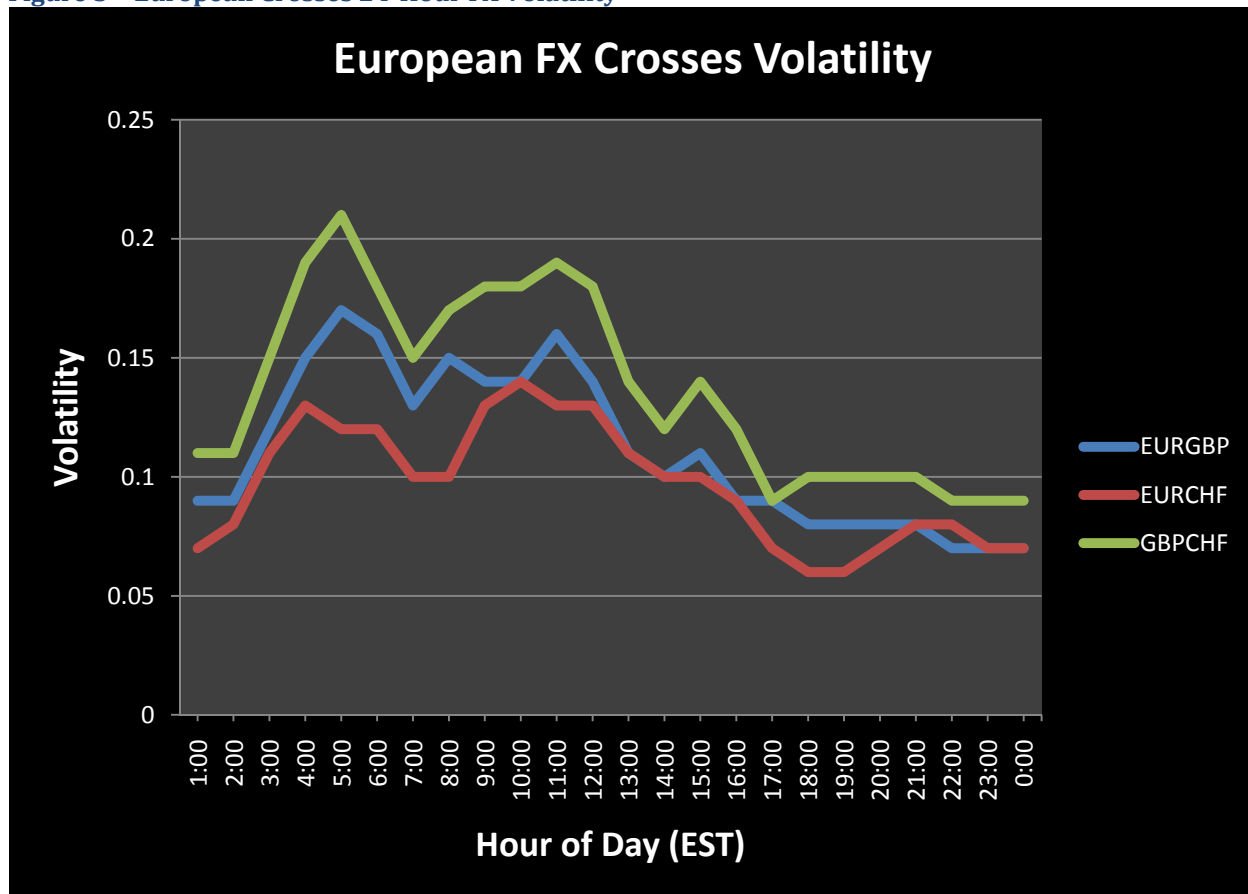
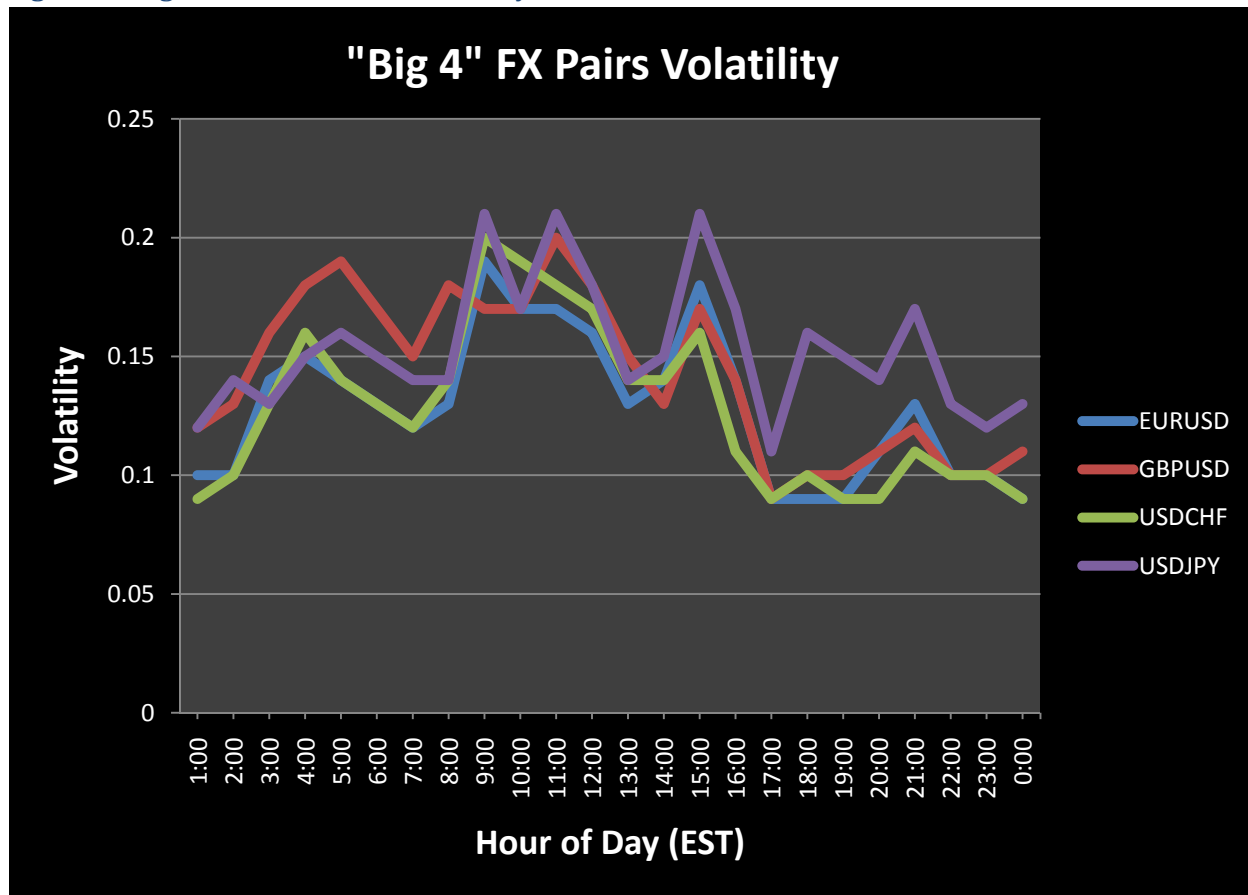


Figure 4 – Big 4 FX Pairs 24-Hour Volatility



Conclusion

For a forex day trader, it is vital that a particular currency pair has enough movement (volatility) to allow the trader to capture intraday price swings. Adequate liquidity is also needed to avoid excessive slippage. Trading may be made more efficient by targeting the time of day that most consistently provides the needed amount of volatility and liquidity. Of course, these criteria need to be balanced with your unique profile, which may encompass a wide array of factors including risk tolerance, trading methodologies, experience, current financial situation, and geographic position. Over time, the successful FX trader will achieve a proper and personal balance of these elements, making FX trading disciplined, productive, and fulfilling.

Part 2 will introduce a custom indicator for forex pairs that utilizes historical volatility to further assist FX traders.

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