

- CHAPTER 4 -
RESULTS AND FINDINGS

4.0 Overview

In this section, the currency pair combination that is mentioned here refers to the following combination:

- a) EURO/USD and GBP/USD
- b) EURO/USD and YEN/USD
- c) GBP/USD and YEN/USD

For all the 31 Mondays (from June 2008 to December 2008), 128 observations of minute by minute data of time from 12pm GMT to 2pm GMT was analyzed using MODWT, 7 level of MRA.

In the output for each of the test highlighted in chapter 3 is arranged the date using the [month]-[date] format. For example, "6-2" or "6_2" means 2nd June 2008.

The results of the data analysis are in Appendix B.

Appendix C documents the individual charts based on the dates. These individual charts are consolidated into single chart based on the currency pair and is present in this chapter.

In all analysis, charts using average correlation values are plotted for easy viewing. These are:

- a) The average correlation of spread of currency pair combination by individual time period, D_x , calculated as:

$$\text{Average Correlation at time period } D_x = \frac{\sum_{M=1}^{31} (D_{M,x})}{31} \quad (11)$$

Where $x = 1$ to 7 (based on 7 level MRA)

- b) The average correlation of spread of currency pair combination for every Mondays, a total of 31 Mondays of date from 1st June 2008 to 31 December 2008, calculated as:

$$\text{Average Correlation on } M^{\text{th}} \text{ Monday} = \frac{\sum_{x=1}^7 (D_x)}{7} \quad (12)$$

4.1 Correlation Analysis of Spread of Currency Pair Combinations

The results from the correlation analysis of spread of different currency pairs (EURO/USD and GBP/USD, GBP/USD and YEN/USD and EURO/USD & YEN/USD) are shown in Figure 3, 4 and 5. From these figures, it is observed that the correlation of spread for all the combination starts from a concentrated point in D1 and expands or scattered wider as it moves from D1 to D7. The EURO/USD and GBP/USD spread correlation is seen be concentrated around values between 0.2 and 0.6 and slightly tend to have an

upward trend where at period D7 majority are concentrated between values of 0.5 and 1. As for the GBP/USD and YEN/USD spread correlation, at period D1 the values are concentrated between -0.1 and 0.2 and at the period D7 it is evenly scattered between values of -1 and 1. This is similar to what being observed in the EURO/USD and YEN/USD spread correlation. Therefore, from these figures, it shows that GBP/USD and EURO/USD moves in positively correlated manner.

Figure 3: Correlation of spread between EURO/USD and GBP/USD

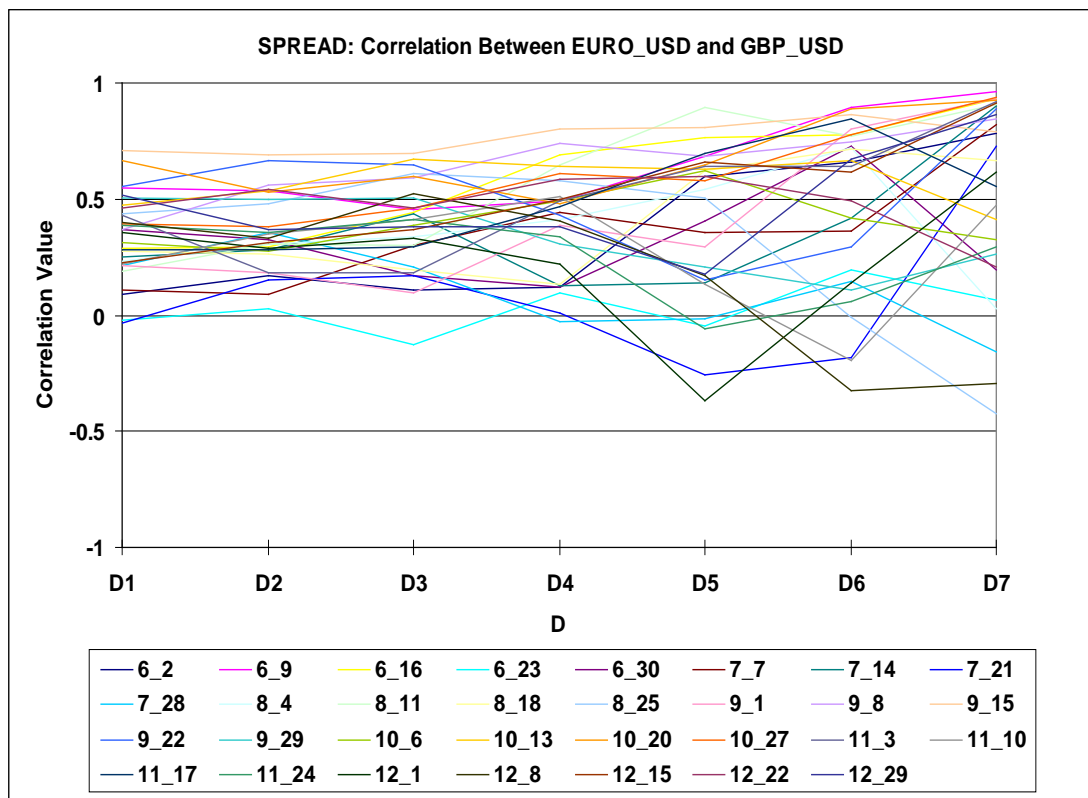


Figure 4: Correlation of spread of GBP/USD and YEN/USD

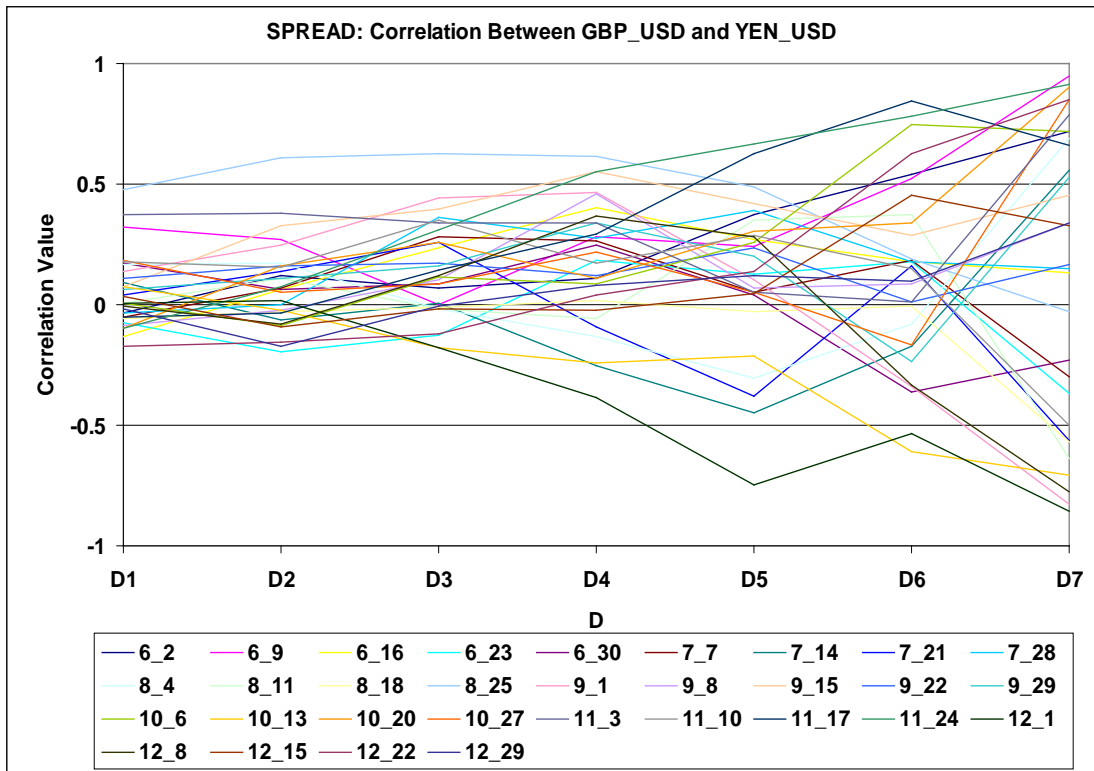
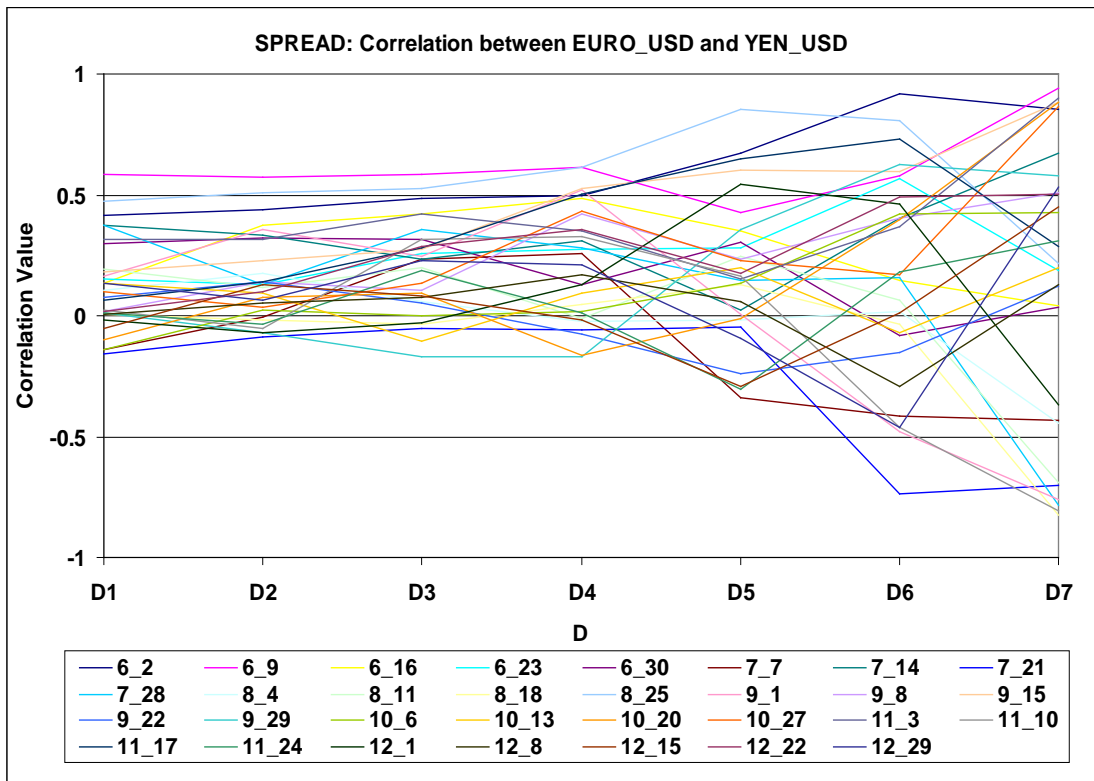


Figure 5: Correlation of spread of EURO/USD and YEN/USD



In Figure 6, the average correlation for the spread of EURO/USD and GBP/USD combination is significantly higher than EURO/USD and YEN/USD and YEN/USD and GBP/USD. This behavior is supported by the fact that during this period, the whole Europe was facing the financial crisis triggered in USA. During this period EURO/USD and GBP/USD were under downward pressure where else YEN/USD was considered as the safe haven for investors.

Figure 6: Spread – Average correlation values of all dates against D1 to D7

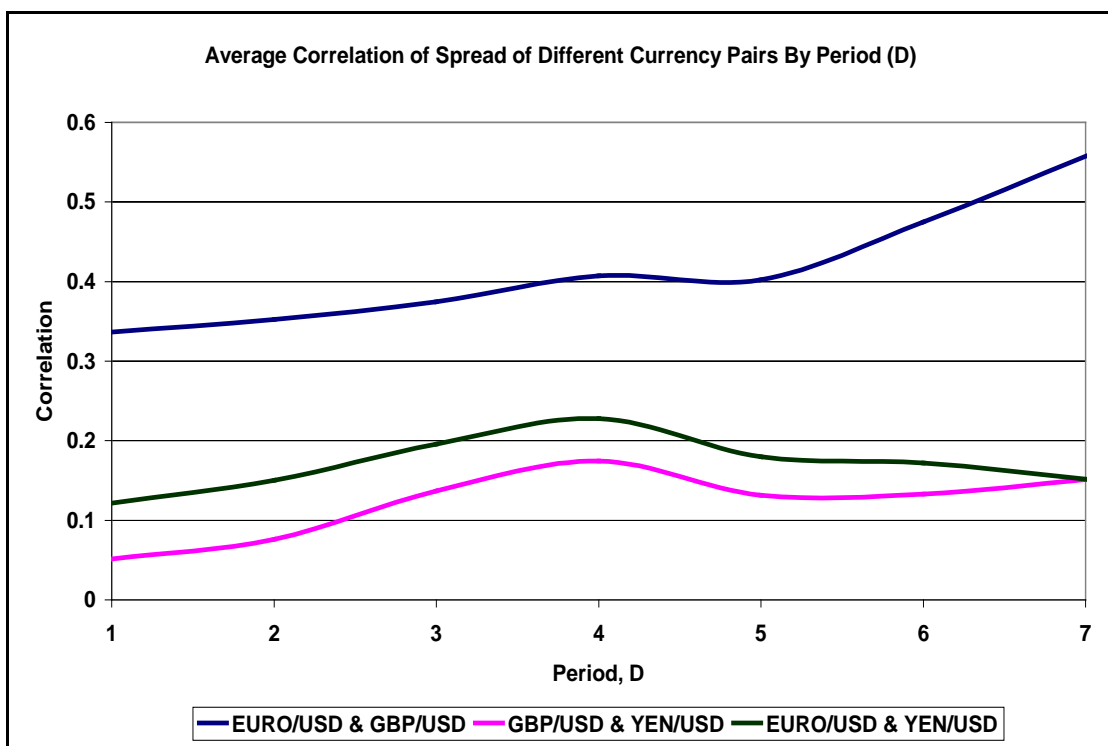
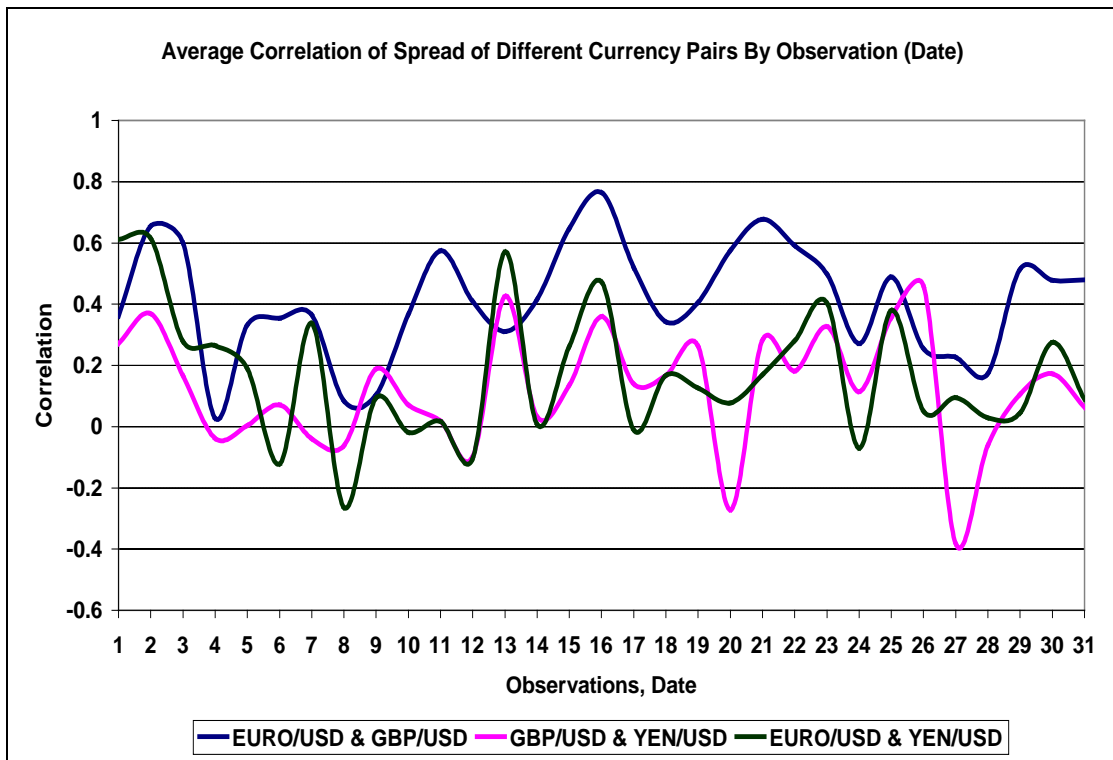


Figure 6 also shows that the average correlation value, from D1 to D7, for EURO/USD and GBP/USD is moving at higher values than the other two currency pair combinations. Furthermore, EURO/USD and GBP/USD average correlation value for spread rises at a significant rate from D5 to D7. However it is noted that average daily correlation values for EURO/USD and YEN/USD

and YEN/USD and GBP/USD are moving in similar trend and did not rise from D5 onwards. This perhaps shows that after the opening of New York financial market, EURO/USD and GBP/USD currency pairs would have the similar liquidity, assuming that the relationship of volume and spread is inversely proportional. This point is further supported by the correlation analysis of volume of currency pair combination presented in the next section.

Figure 7 displays the average daily correlation for all dates. Values from this chart are used to calculate the variance in the later section of this chapter.

Figure 7: Spread – Average correlation values across D1 to D7 against the dates



4.2 Correlation Analysis of Volume of Currency Pair Combination

The results from the correlation analysis of volume of different currency pairs (EURO/USD and GBP/USD, GBP/USD and YEN/USD and EURO/USD &YEN/USD) are shown in Figure 8, 9 and 10. From these figures, it is observed that the correlation of volume for all the combinations are highly correlated generally moves upward from D1 to D7. The EURO/USD and GBP/USD volume correlation is seen be concentrated around values between 0.5 and 0.8 and moves upward where at period D7 majority are concentrated between values of 0.9 and 1. The GBP/USD and YEN/USD volume correlation values at period D1 are concentrated between 0.3 and 0.5 and at period D7 the values are higher between values of 0.7 and 1. This is similar to what being observed in the EURO/USD and YEN/USD spread correlation.

Figure 8: Correlation of volume of EURO/USD and GBP/USD

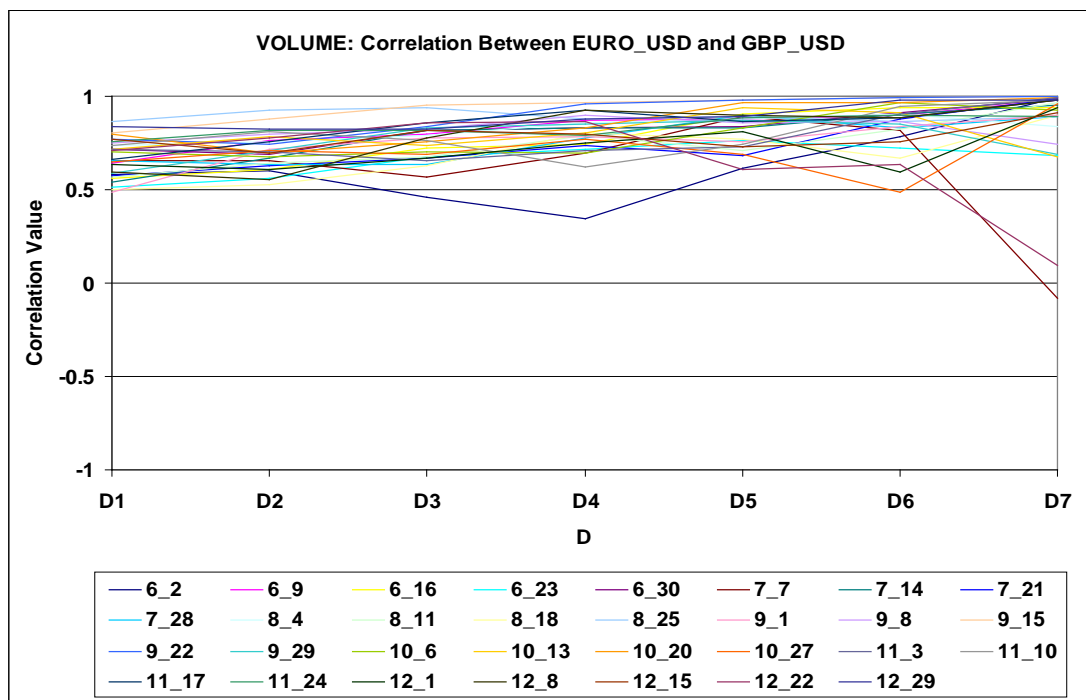


Figure 9: Correlation of volume of YEN/USD and GBP/USD

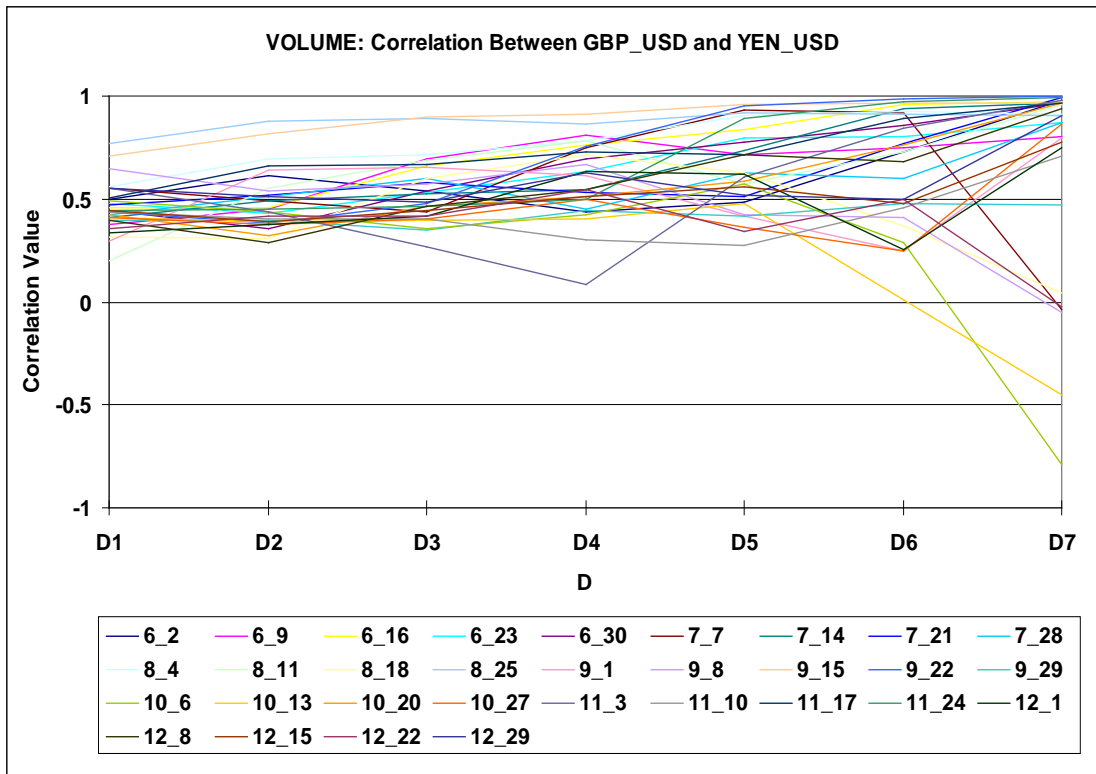


Figure 10: Correlation of volume of EURO/USD and YEN/USD

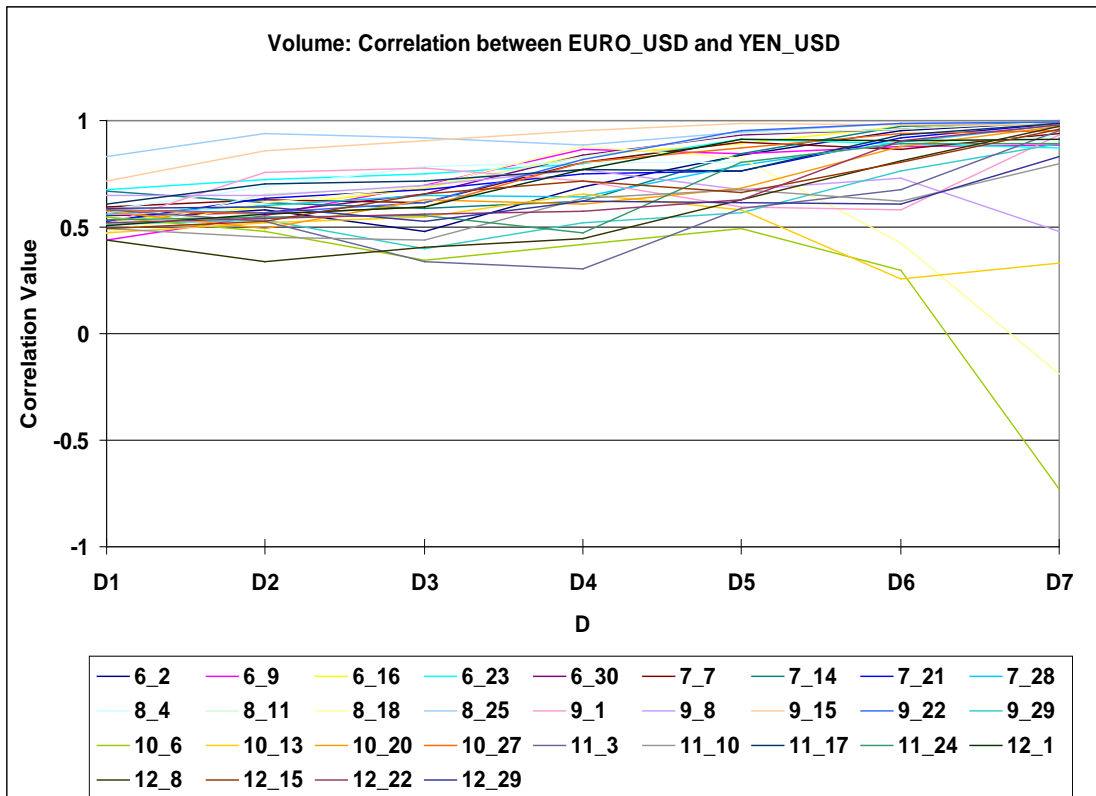


Figure 11 shows the average correlation of volume of currency pair combination by individual time period D_x . Figure 12 shows the average correlation of volume of currency pair combination for every Mondays, a total of 31 Mondays of date from 1st June 2008 to 31 December 2008.

Figure 11: VOLUME – Average correlation values of all dates against D1 to D7

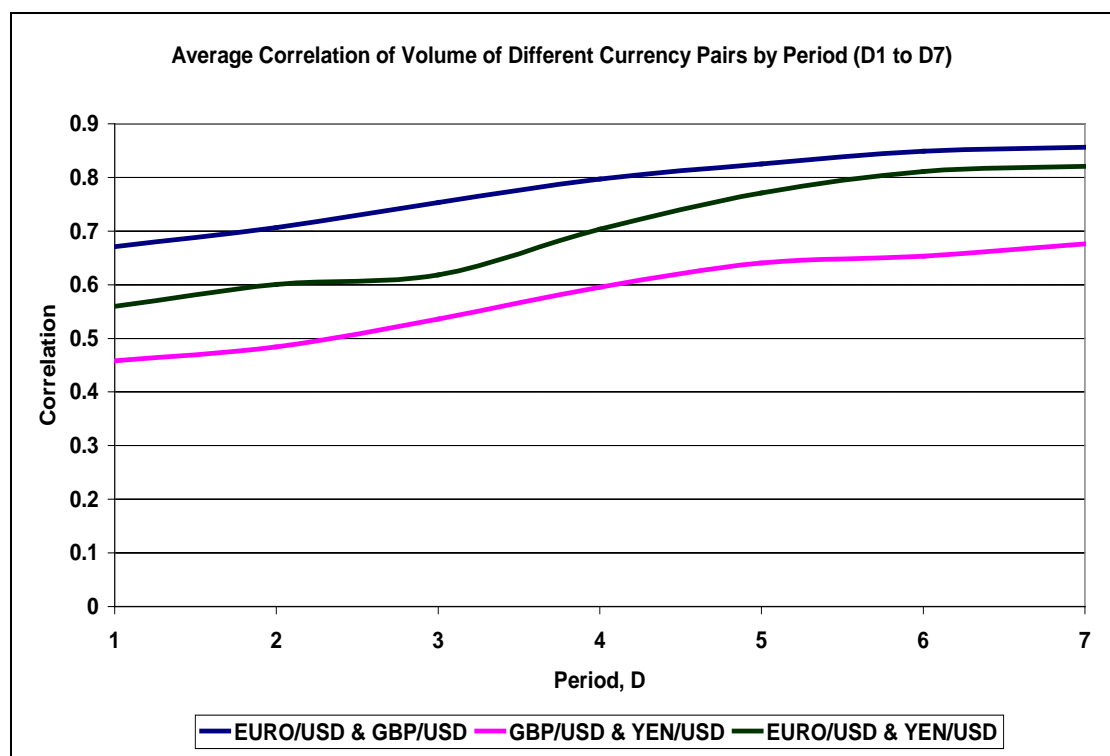
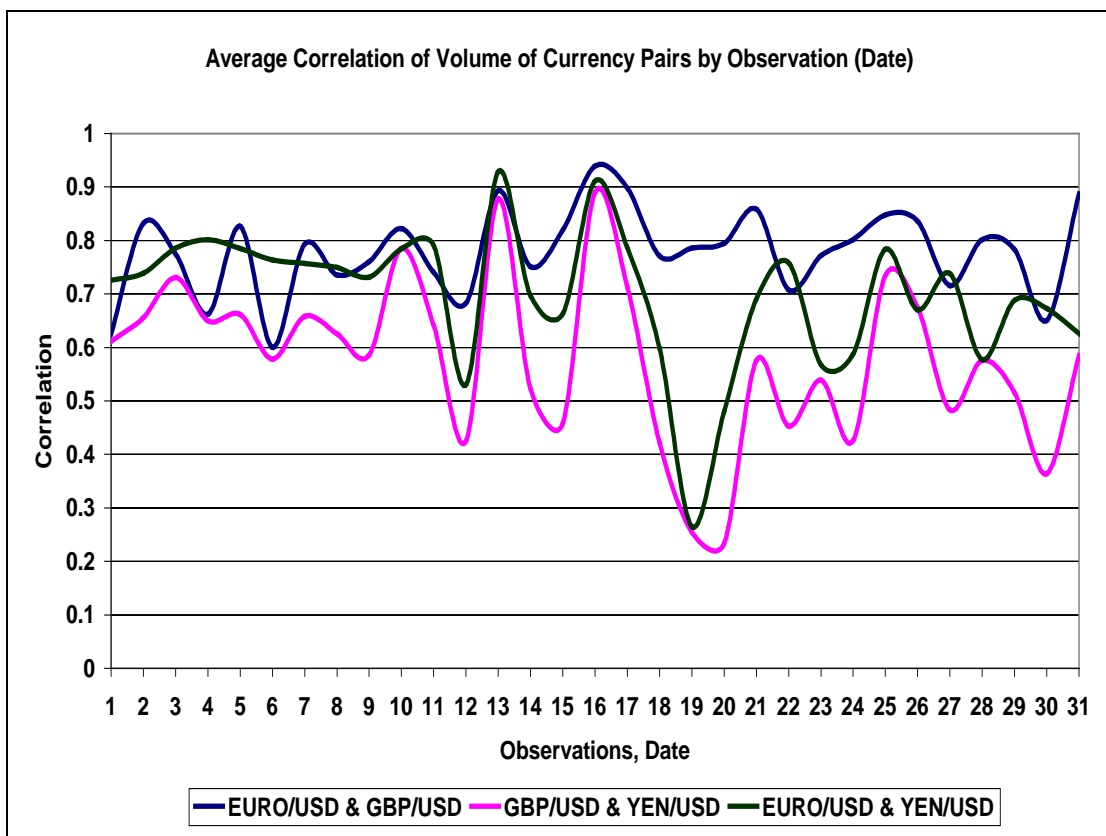


Figure 11 also show that the average correlation of volume in EURO/USD and GBP/USD is the highest, starting from 0.7 at D1 and moves to 0.85 at D7. It is also noted from that the average correlation of volume of all currency pair combinations do show a similar upward trend from D1 to D7. This observation proves the earlier point made in the average correlation of spread section, where it was mentioned that high correlation of spread indirectly shows that these two currency pairs have similar trend in liquidity. This behavior is also

supported by the fact that the data used is based around the opening time of New York financial market, which means more traders are actively trading. In fact during this period is it is when the two major financial markets (London and New York) in the work are overlapping as well.

Figure 12: Volume – Average correlation values across D1 to D7 against the dates



In Figure 12, it is observed that correlation of volume of the currency combination of GBP/USD and YEN/USD, and EURO/USD and YEN/USD is moving more volatile than EURO/USD and GBP/USD during the period of 11th Monday (11th August 2008) to 27th Monday (1st December 2008). This could be explained by revisiting the event where it was the peak of subprime

financial crisis, where Lehman Brothers collapsed in September 2008. During the peak of this crisis, investors were over reacting to any news that comes into the market. In fact, many pulled out from stock equities and parked their money in gold, USD and YEN. At the same time as well, British Pound was getting pounded due to its exposure to subprime crisis; Northern Rock and Halifax was bailed out. Similarly, EURO suffered the same fate but lesser damage from the sub-prime crisis. Therefore this explains the lower volatility in the correlation of volume for the combination of GBP/USD and EURO/USD.

Values from figure 12 are used to calculate the variance in the later section of this chapter.

4.3 Correlation Analysis of Spread and Volume of Individual Currency Pair

Pair

Figure 13, 14 and 15 show the correlation of volume and spread for each of the currency pair. From these figures, it is seen that all currency pairs exhibits a very similar pattern.

Figure 13: EURO/USD - Correlation of spread and volume

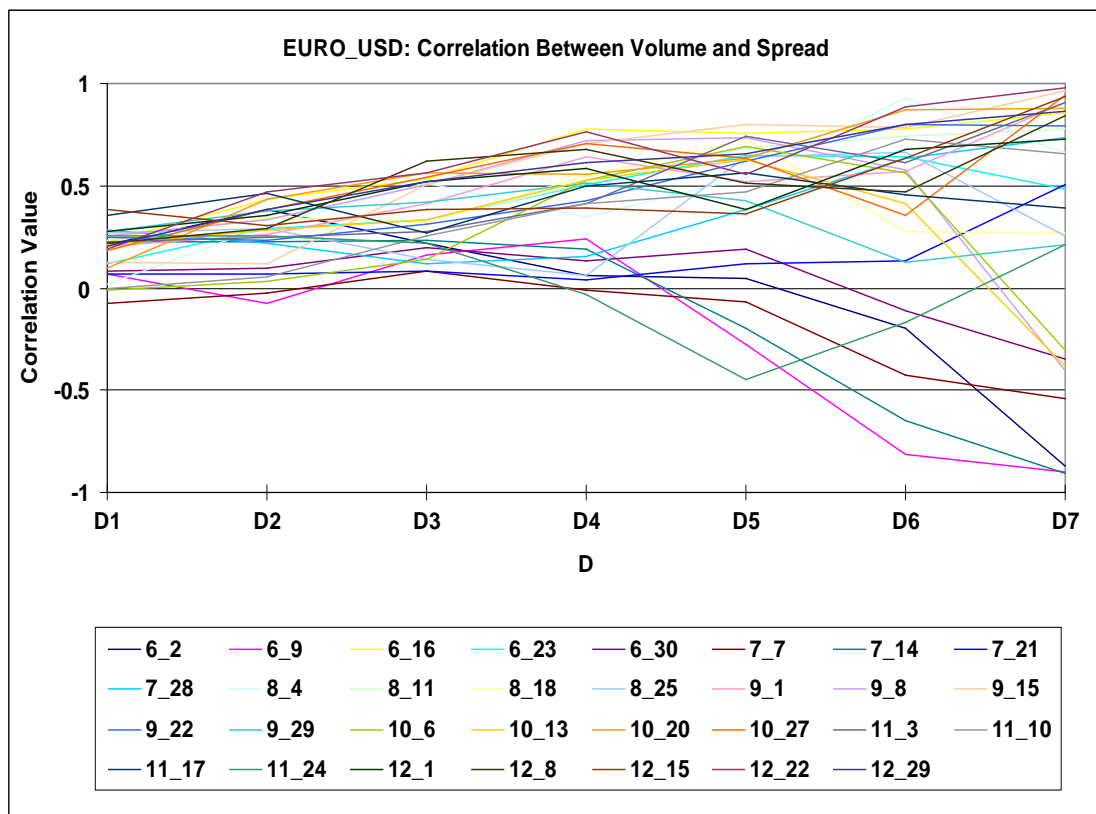


Figure 14: GBP/USD - Correlation of spread and volume

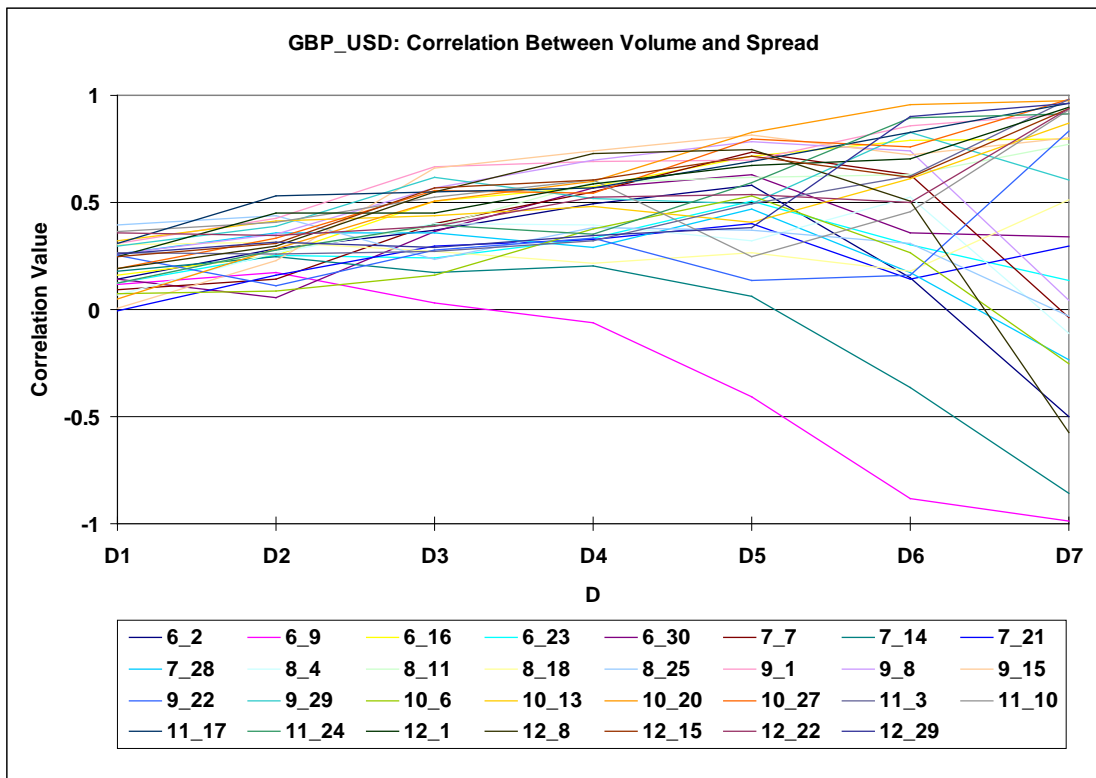


Figure 15: YEN/USD - Correlation of spread and volume

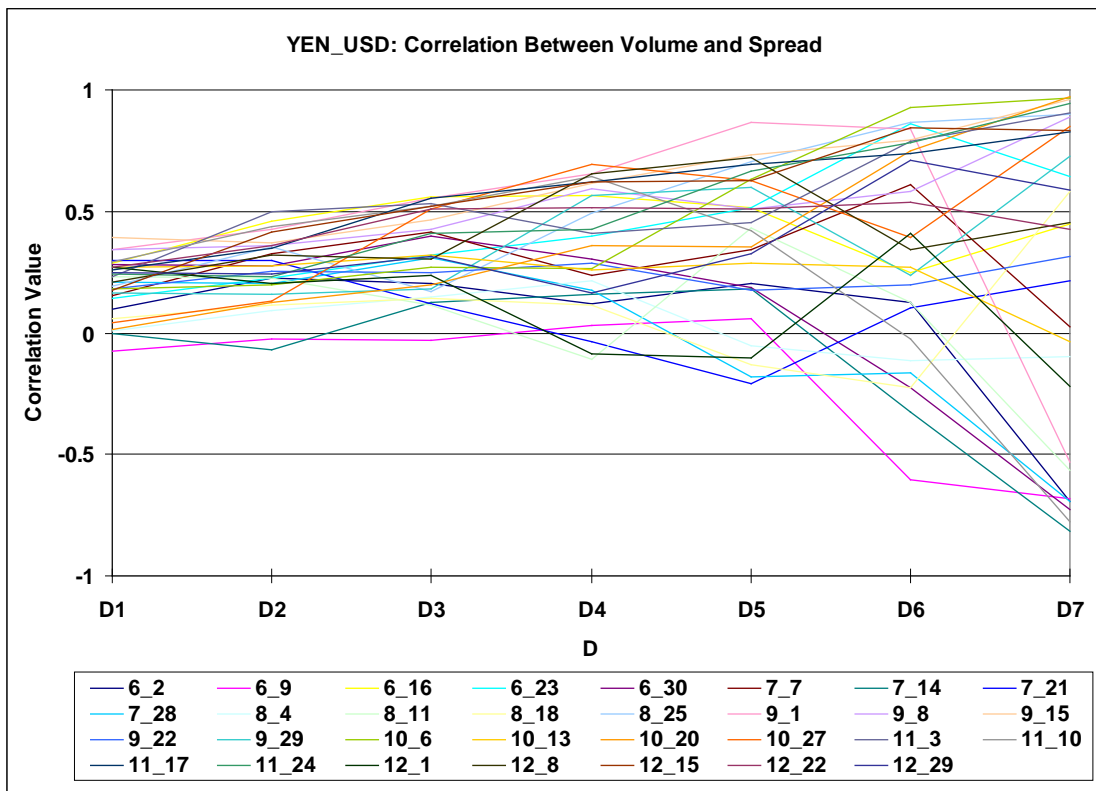
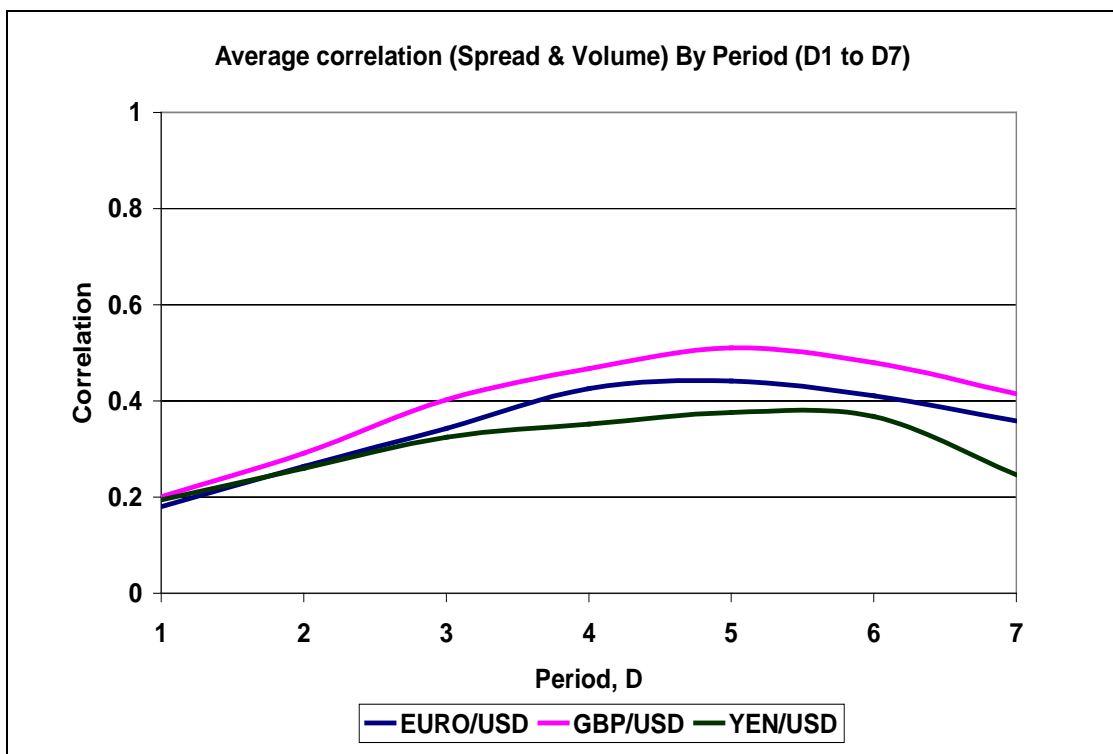


Figure 16 shows the movement of the average correlation values for all D1 of all dates until all D7 of all dates. It shows that the average correlation of volume and spread for all the currency pairs starts around 0.2 at D1 and moves in a highly similar trend, but GBP/USD volume and spread is slightly higher correlated compare with the other two currency pairs. It is also noted that from period D1 to D5 shows an upward trend but exhibit downward trend from D5 to D7, which the New York financial market opens in the time period between D5 and D6.

Figure 16: Spread and Volume – Average correlation values of all dates against D1 to D7



This observation from D5 to D7 may be due to the rule of thumb of forex trading which says as the market volume increases, the spread gets narrower. Interestingly, it is noted that EURO/USD and GBP/USD pairs moves in the

same pattern but YEN/USD pair dips at a higher rate after D5 compared to the other two currency pairs. Thus this gives a better option to the investors to time their investment in YEN/USD pair after the opening of New York financial market knowing that the spreads gets much lower as the volume grows.

Figure 17: Spread and Volume – Average correlation values across D1 to D7 against the dates

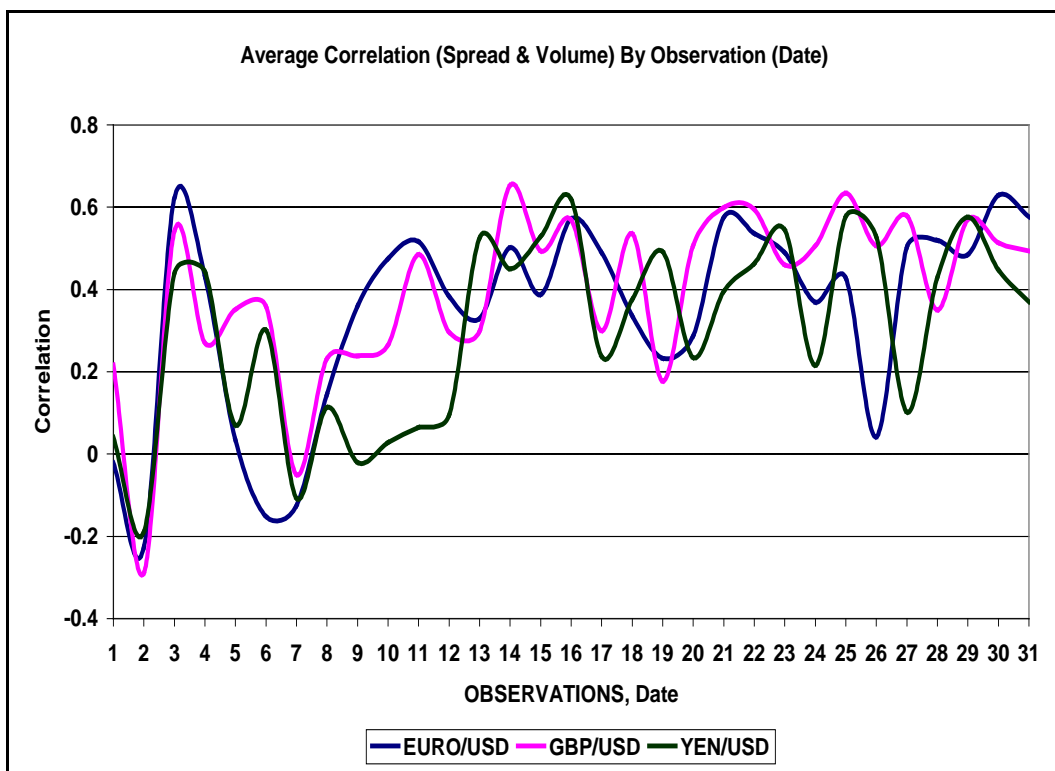


Figure 17 shows an upward trend in the daily average correlation (volume and spread) movement for all the 3 currency pairs. This shows that the volume and spread of each currency pairs becomes higher correlated from June 2008 to December 2008.

4.4 Variance of the Daily Average Correlations

Taking the data used in Figure 7, 12 and 17, which is the average daily correlation value, the variance is calculated. Table 1, 2 and 3 summarizes the variance of each of the average daily correlation.

Table 1: Variance of the daily average spread correlation values (currency pairs combo)

Currency Pair Combination	Variance	
EURO/USD and GBP/USD	0.0330	SPREAD
GBP/USD and YEN/USD	0.0374	
EURO/USD and YEN/USD	0.0475	

Table 2: Variance of the daily average volume correlation values (currency pairs combo)

Currency Pair Combination	Variance	
EURO/USD and GBP/USD	0.0066	VOLUME
GBP/USD and YEN/USD	0.0241	
EURO/USD and YEN/USD	0.0166	

Table 3: Variance of the daily average spread and volume correlation values
(single pair)

Currency Pair	Variance	
EURO/USD	0.0577	SPREAD and VOLUME
GBP/USD	0.0428	
YEN/USD	0.0515	

From the tables, it is observed that:

- i) The variance of daily average correlation of spread for EURO/USD and YEN/USD is the largest at 0.0475 but just slightly higher than GBP/USD and YEN/USD (0.0375 and EURO/USD and GBP/USD (0.0330)
- ii) The variance of daily average correlation of volume for EURO/USD and GBP/USD is the smallest at 0.0066 Variance for GBP/USD and YEN/USD (0.0241) and EURO/USD and YEN/USD (0.0166) are relatively larger.
- iii) The variance of daily average correlation of spread and volume for EURO/USD is the largest at 0.057733, followed by YEN/USD at 0.0515 and GBP/USD at 0.0428.

The volatility can be represented by the variance, thus relatively the risk for the EURO/USD and YEN/USD (Table 1 - spread) is the highest. As traders

rely on spread to make gain, in forex, the higher the variance the better is it for the trader because they can bet on the spread. If the spread doesn't fluctuate, there are little opportunities for the trader to make a gain.

4.5 Summary

The analysis results show that, on average and compared with the other currency pair combinations, the spread of GBP/USD and EURO/USD is the most highly correlated. The correlation value becomes higher as the time period moves from D1 to D7. This shows that as the New York financial market opens, both GBP/USD and EURO/USD gradually become more and more positively correlated. This potentially may allow the investor to anticipate the trend of either GBP/USD or EURO/USD by monitoring the movement of either one pair.

The spread of YEN/USD currency pair does not correlate highly with both GBP/USD and EURO/USD. Thus from risk diversification point of, YEN/USD may be a good asset to have in a portfolio which consist either or both GBP/USD and EURO/USD.

The correlation of volume for all the currency pair combinations is highly positively correlated. This shows that the market sentiment in the forex market will give the same effect on the liquidity of these three currency pairs. Logically, this is supported by the fact that EURO/USD, GBP/USD and YEN/USD are the top three most heavily traded currency pair.