Currency Variability and Measurement

Venu Gopalrao Chowdary

GITAM (Deemed to be University), Department of Finance, Bengaluru, Karnataka, India

Abstract

Currency variability and evaluating exchange rate risk unveiling is essential for reducing a firm's susceptibilities from major exchange rate movements, which could negatively affect profit margins and the value of assets. This paper reviews the diverse types currencies and important indicators to measure volatility of currency pairs. Traditional types of exchange rate risk managed by firms, namely transaction, translation and economic risks, present the VaR approach as the currently leading method of evaluating a firm's exchange rate risk exposure. Understanding price relationships between various currency pairs allows getting a deeper insight on how to develop high probability forex trading strategies. Understanding of currency correlation can help to reduce risk, enhance hedging and diversify trading instruments. In addition, it outlines most volatile currencies pairs and currency pair correlation. The volatility of currency is a measure of the change in price over a given time period and will not necessarily remain consistent from one time period to another. The MNC's assessments of a currency's future volatility will not be exact when a previous time period is used as an indicator. However, the MNC can benefit significantly from the provided past information, even the MNC may not be able to predict a currency's future volatility with perfect accuracy. It can recognize currencies, whose values are most likely to endure stable vis-à-vis highly volatile currencies. The paper also suggested management of exchange rate risk and various forex trading strategies based on correlation among currencies.

KEYWORDS: vulnerabilities, risk exposure, currency pairs, MNC's, volatile currencies, forex trading

Introduction:

Variability is the extent to which data points in a statistical distribution or data set diverge from the average, or mean, value as well as the extent to which these data points differ from each other. There are four commonly used measures of variability:

- Range, Mean,
- Variance and Standarddeviation (S.D).

Volatility is the difference in the returns of a currency pair over a specific period, annualized and described in percentage terms. The larger the number, the greater the price movement over a period of time. There are a number of ways to measure volatility, as well as distinct types of volatility. Volatility can be used to measure the variability of a portfolio, or help to determine the price of options on currency pairs. Awareness and

learning how to measure volatility in the foreign exchange markets is a must for every serious trader.

Objectives:

- ➢ To discuss variability and various methods used to measure the variability.
- ➢ To explain main indicators for measuring the variability of currency pair;
- ➢ To study 7 major currency pairs and draws up a comparison; and
- ➢ To interpret the covariance among Asian Currencies.

Research Methodology:

In this paper an attempt has been made to through the concept of Currency variability and measurement particularly on the relevance of MNC's. the topic considered for this paper is purely a descriptive and therefore only secondary sources i.e., books, reports, research papers & surfing the net are used.

Review of Literature:

Biswajit Maitra, (2010) Formulated a monetary model of exchange rate determination and justified that the domestic monetary policy impacts the value of national currency. The outcomeof test of co-integration of regression model supports that exchange rate and monetary supply are co-integrated critically. VEC Model's result discloses that the money supplies with even seven and nine month lagged money supplies cause depreciation in exchange rate. Thus, this research treats exchange rate as a completely monetary occurrence but understands the exchange rate to be trade neutral. Variance disintegration and intervention analysis shows consistency between money supply and variation of exchange rate. There are such other elements of exchange rate determination as interpolation interest rates and inflation.

Chee-Wooi Hooy, (2010), studied the impact of exchange rate volatility on world and intra-trade streams of SAARC countries. The author interpreted that long run continues state equilibrium among exports, income, price variance and exchange rate volatility in Bangladesh, India, Pakistan and Sri Lanka. Exchange rate impacted exports but it does not affect all the South Asian countries. This examination lends credibility to this fact that exchange rate volatility causes intra region-trade flows among South Asian countries. But how much is trade variation and how much is it trade creation or contraction under exchange rate fluctuations remains unrequited.

Saubarna Pal, (2011), investigates whether India's liberalization had any impact on the long run relationship between the real exchange rates of India and Japan vis-à-vis dollar. The effect of Johansen method of co integration shows a substantial change in relationship among these two real exchange rates before and after India's liberalization of 1911.

According to Manish Kumar (2010), studies, the fluctuation in exchange rate are challenging, as they display high volatility, intricacy and noise. Most traditional models cannot forecast exchange rates, with considerably higher accuracy, than a random walk model. Thus, author used a non-linear model called artificial neural network (ANN) to project short term (daily weekly) movements of United States Dollar (USD)/Japanese Yen (JPY). ANN"s out-of-sample performance is yardstick against the traditional Autoregressive Integrated Moving Average (ARIMA) model. Performance of both models is thoroughlyassessed using three different penalty-based criteria: Directional Accuracy (DA), Correct Upward (CU), and Correct Downward (CD) trends and two non-penalty-based criteria: mean square error (MSE), and normalized mean square error (NMSE). Furthermore, the sturdiness of the two models is tested for diverse sampling periods. Empirical result shows that NN performs are better than ARIMA and presented constant results across all periods of research. This strengthens ANN's sturdiness and also the fact that it can be used to frame stratagem for trading in USD/JPY.

CLASSIFICATION OF CURRENCY BASED ON SIGNIFICANCE

1. Major currencies:

Currencies that have high liquidity and are freely accessible in spot and forward markets are major currencies. The major currencies are US dollar, Euro, Swiss franc, Japanese yen and Great Britain pound.

2. Minor currencies:

Currencies those are less freely available as the major currencies, as they lack the liquidity. They are characterized by the limitations on the maturity of the forwards. The liquidity in the spot market varies from time to time. The minor currencies are Norwegian krone, Singapore dollar, Danish krone, Swedish krona and Hong Kong dollar.

3. Emerging market currencies:

These are currencies of the emerging markets. They are characterized by constant government involvement to shield the economy. There could be problem on the liquidity of the currency of emerging markets. These currencies often have Non-Deliverable Forwards traded in international markets. The major emerging currencies are Indonesian rupiah, Thai baht, Malaysian ringgit, Vietnam dong, Chinese renminbi, Philippines peso, South African rand and Indian rupee.

4. Cross currency:

In cross currency the Forex exchange price is designated in two different currencies, without encompassing the home currency. The causes for cross currency are many. Now consider a Japanese company which sells goods to the European Union, and it receives the payment in US euro. In the absence of a cross currency, the company requires to sell the Japanese yen and buy the dollar, followed by selling the dollar to buy the euro. This will place the company in the risk of unwanted exposure to dollar and the difficulties of forwards and options if any. The Euro plays an important role in the cross currency transactions. This is because the Euro forms the major trade counterparty to majority of the nation's after the USA. The major traded Euro currencies are as follows:

EUR_JPY, EUR_GBP, EUR_CHF, GBP_CHF, GBP_JPY

Different Types of Volatility

There are two distinctive types of volatility. What has already happened is recognized as historical volatility, whereas what market participants think is going to happen is referred to as implied volatility. The former, can be used to forecast the latter, but the latter is a market input, regulated by the people that are participating in the forex options market.

The market's evaluation of how much a currency pair will vary over a certain period in the future is known as implied volatility. Option traders can use a currency volatility index to price options on currency pairs. Implied volatility is generally considered a measure of sentiment. When the currency markets are complacent, implied volatility is relatively low, but when fear intrudes the market environment, implied volatility rises.

IMPORTANT INDICATORS FOR MEASURING THE VOLATILITY OF A CURRENCY PAIR.
1. The Average True Range (ATR)
The **Average True Range** or **ATR** in general computes the range of a session in pips and then etermines the average of that range over a particular number of sessions.

For example, if the ATR is set to 15 on a daily chart, it would give the average trading range for the previous 15 days. As such, this indicator gives the present reading on the volatility of a particular currency pair.

- ➤ When the **indicator is falling**, it signifies that **the volatility of the pair is reducing**, and
- ➤ **When it is rising**, it signifies that **the volatility of the pair is increasing**.

It is important to note that this volatility forex indicator does not offer an inference for the direction of price trend; however, it basically gauges the level of price volatility, from high – low for the day.

2. Bollinger Bands

Bollinger bands are an exceptional indicator at showing volatility. In general, these bands are two lines drawn two standard deviations above and below a moving average for a K amount of time (with K representing any figure you choose).

For example, if it is set at 30, there would be a 30 Simple Moving Average and two lines in which one line would be drawn +3 standard deviations above it and other line 3 standard deviations below it.

Key Takeaways

- Bollinger Bands are a technical analysis tool developed by John Bollinger.

- There are three lines that compose Bollinger Bands: A simple moving average (middle band) and an upper and lower band.
- The upper and lower bands are typically 2 standard deviations +/- from a 20-day simple moving average, but can be modified.

3. Moving Averages

Another crucial and oldest volatility forex indicator is the moving average.

In general, moving averages are lines drawn on charts to give the average price at a given point over a definite period of time such as minutes, hours, days, or weeks. For example, if a 30 Simple moving average is plotted on a daily chart; it would give the average movement of the market for the past 30 days.
There are distinct kinds of averages, however. The major types most used by traders are: **Moving Average Convergence Divergence (MACD)**, **Exponential Moving Average (EMA)** and **Simple Moving Average (SMA)**.

All of these averages perform similar functions and because of that, all of the averages turn out to be pretty much similar. The function they perform is to eliminate or minimize the noise that is connected to the day-to-day price movements and the alluring forex trends along with whatever is plotted on the charts.

Meaning of currency pairs correlation in Forex

Correlation is a statistical measure of the association between two trading assets. Currency correlation shows an extent to which two currency pairs have moved in the same, opposite, or totally random directions within a particular period. Analysis of two assets relationships using a past statistical data has a prognostic value; it can recognize potential forex trading opportunities and manage your exposure to risk. Correlation is typically measured in decimal form on scale of -1 to +1 to give you a figure named a correlation coefficient.

❖ A correlation of +1 show that two currency pairs will move in the same direction 100% of the time. That is a perfect positive correlation. Correlation between EUR/USD and GBP/USD is an accurate example, as if EUR/USD is trading up, then GBP/USD is moving the same direction.

❖ A correlation of -1 indicates that two currency pairs will move in the opposite direction 100% of the time. EUR/USD and USD/CHF have a perfect negative correlation, thus if EUR/USD moves upwards, then USD/CHF goes downwards.

❖ A correlation of zero takes place if relationship between currency pairs is totally random, which means they have no link at all.

Naturally, the stronger a positive or negative correlation, the greater a predictive value drawn from an analysis. Longer time frames used for a technical analysis shows more accurate information. Correlations over a 1 minute period have a little value, while monthly and yearly data provides the most reliable insight.

Forex trading strategies based on correlation

❖ When two pairs are highly correlated, one can serve as a prominent indicator to the price movement of the other. If you see a sharp move in one pair of two positively correlated pairs, you can anticipate a possible move in the other.

❖ Correlation can be even more effective forex tool for analysis in conjunction with other forex indicators. For instance, if one pair breaks out above or below a major technical level of support or resistance, the closely positively correlated pair has a high probability of following risk.

❖ Price reversals: If you see two negatively correlated currency pairs and a substantial upward price reversal in one pair takes place, then you can anticipate a potential downward reversal in the other pair.

Non-directional arbitrage style strategy using currency correlations. In this forex strategy you wait for an abnormal divergence between two highly correlated currency pairs and buy one and sell the other, with the expectation that they will converge in price movement again.

THE VULNERABILITY OF VOLATILITY

The allure of high-volatility conditions can be observable: Just as we said above, higher levels of volatility mean larger price movements; and larger price movements mean more prospects. But traders need to see the other side of this coin: Higher levels of volatility also mean that price movements are even less expected. Reversals can be more assertive, and if a trader finds themselves on the wrong side of the move, the likely loss can be even higher in a high-volatility environment as the increased activity can necessitate larger price movements against the trader as well as in their favor.

What does volatility of any currency pair depends on?

The main cause for volatility is liquidity. A standard rule expresses that: the higher the liquidity, the lower the volatility, and vice versa. In fact, liquidity is the amount of supply and demand in the market. It means that the larger the supply and demand, the harder is to get the price moving. According to the rule, we can make a deduction that exotic currency pairs are the most volatile ones in the Forex market because their liquidity is often lower than that of major pairs.

For the purpose of research let's take 7 major currency pairs, cross and exotic currency pairs, and draws up a comparative table on the basis of the obtained data.

Table of the Most Volatile Currency Pairs

Major Pairs		Cross Pairs		Exotic Pairs	
Currency pair	Volatility (in point per day)	Currency pair	Volatility (in point per day)	Currency pair	Volatility (in point per day)
EUR/USD	75.35	AUD/CAD	90.95	USD/BRL	418.50
GBP/USD	138.60	AUD/CHF	85.20	USD/DKK	428.60
USD/JPY	130.05	AUD/JPY	94.95	USD/HKD	31.85
USD/CHF	78.30	AUD/NZD	111.20	USD/ILS	244.75
AUD/ USD	82.90	CAD/CHF	72.25	USD/INR	241.25
NZD/ USD	89.75	CAD/JPY	106.00	USD/SEK	723.90
USD/CAD	109.70	CHF/JPY	129.85	USD/SGD	76.10
Average	**100.66**	EUR/AUD	147.45	USD/TRY	377.20
		EUR/CAD	119.20	**Average**	**317.77**
		EUR/CHF	64.95		
		EUR/GBP	85.90		
		EUR/JPY	132.85		
		EUR/NZD	176.65		
		GBP/AUD	225.25		
		GBP/CAD	205.10		
		GBP/CHF	152.20		
		GBP/JPY	217.90		
		GBP/NZD	266.45		
		NZD/JPY	99.95		

Average	136.01

https://fxssi.com/most-volatile-currency-pairs, The Most Volatile Currency Pairs – Table (data from 26-01-18)

The Most Volatile Currency Pairs – The table shows that today the most volatile Forex pairs are exotic ones. Namely, USD/SEK, USD/BRL, and USD/DKK. All of them move for more than 400 points per day on average.

The volatility of the major currency pairs is much lower. Only GBP/USD, USD/JPY and USD/CAD move for more than 100 points per day. EUR/USD turned out to be the least volatile currency pair.

As for the cross rates, GBP/NZD, GBP/AUD, GBP/JPY, and GBP/CAD refer to the currency pairs with highest volatility. All of them move for more than 200 points per day on average.

EUR/CHF, CAD/CHF, AUD/CHF and EUR/GBP differ like less volatility Forex pairs among the cross rates. The amplitude of their movements doesn't exceed 90 points per day.

Measurement of Currency Variability:

The standard deviation statistic measures the degree of movement for each currency. In any given period, some currencies noticeably fluctuate much more than others. For example, the standard deviations of the monthly movements in the Japanese yen and the Swiss franc are typically more than twice that of the Canadian dollar. Based on this information, the potential for substantial deviations from the projected future values is greater for the yen and the Swiss franc than for the Canadian dollar (from a U.S. firm's perspective). Some currencies in emerging markets are very volatile.

The following illustrates the covariance among the Asian currencies for the period 1993.-2000, which is a measure of the relationship between two ranges of data. Covariance have been used to determine whether two ranges of currency data move together i.e,

- ➢ Whether small values of one set are associated with large values of other (**positive covariance**);
- ➢ Whether small values of one set are associated with large values of other (**negative covariance**), or
- ➢ Whether values in both sets are unrelated (**covariance zero**).

Covariance among the Asian Currencies (1993-2003)

Currency Pair	Taiwanese Dollar	Chinese Remnimbi	Japanese Yen	South Korean Won	Hong Kong Dollar	Thai Bhat	Singapore Dollar	Indian Rupee
TWD/USD	1.000							
CNY/ USD	0.700	1.000						

JPY/ USD	22.817	-0.356	1.000					
KRW/ USD	652.453	46.193	1853.068	1.000				
HKD/ USD	0.046	0.003	0.053	3.264	1.000			
THB/ USD	21.756	1.621	53.210	1751.038	0.142	1.000		
SGD/ USD	0.301	-0.014	0.761	23.822	0.002	0.868	1.000	
INR/ USD	14.9444	1.532	30.446	1076.206	0.115	39.737	0.557	1.000

Analysis of above table reveals that

➢ **Remnimbi shows hardly any covariance with any Asian Currency.**
➢ **The Won shows a strong covariance with the Thai Bhat and Japanese Yen.**
➢ **Most of the covariance among the Asian currencies is positive.**
➢ **The Indian rupee shows a strong covariance with South Korean won.**
➢ **Both the Singapore dollar and the Hong Kong dollar show insignificant covariance with any other currency. In fact the Singapore dollar has a negative covariance with Remnimbi.**

Thus, both the covariance and correlation analysis appear to allude that the Asian countries are grappling to handle the rough international competition. Recent times have observed increasing currency volatility. The performance of India may be pulled down by its political complication and the presence of large population outside the mainstream economy. The prediction for the yen is pessimistic and it is believed to lessen due to the slowdown in both the business sector and the domestic demand.

Conclusion:

Currency volatility has been a prominent and well considered issue in the present unforeseen financial world for all MNC's. To develop an enhanced understanding of global firms' procedures in this area, more experimental studies would require being undertaken to search their exchange rate risk measurement and hedging performances. The currency correlation factor can act as an influential indicator in the determination of movement of exchange rates of foreign currencies (with respect to some base currency). While exchange rates are often highly volatile, the degree to which they are a source of uncertainty and risk vary on the degree to which exchange rate movements are anticipated. This indicates that the suitable measure of risk should be related to deviations between actual and envisaged exchange rates. In the voluminous literature on currency volatility, there is no unanimity on the appropriate method for measuring such volatility. Besides, the scope of the analysis will to some degree influence the type of measure used. In addition, one needs to study the time horizon over which variability is to be measured. Although an MNC may not be capable to envisage a currency's future variability with absolute precision, it can identify currencies like the British Pound or the Canadian Dollar whose values are most likely to remain stable vis-à-vis highly variable currencies like the Philippian peso or Italian Lira in the future.

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