**Effect of intervention on FX Rate**

**Summary**: In this project I created a model to capture the effect of intervention by Central banks of different countries on the foreign exchange rate. The idea is to quantify the impact of Balance of Payment , interest rate and Central Bank FX holding on the foreign exchange rate. I used a regression model to predict the relationship between the predictor variables (Balance of Payment , interest rate and Central Bank FX holding) and the fx rate. I used the free floating currency rates against USD rate to figure out this relationship. Using this relationship I predicted the fx values of some other currencies which are accused of manipulations in the international fx market. This predicted fx rate is the alternate fx rate that would have persisted in the market in the absence of any intervention from Central Bank

**Main Body**: Every year the Department of Treasury issues report for different currencies and their status if they are being manipulated by the governments or central banks. My project is based on similar motivation where I developed a model to figure out a model which would identify which currencies are being manipulated and by how much. As per latest report the countries that have been names as currency manipulators are Vietnam and Switzerland. Some other countries are put in watch list. These countries are China, Japan, Korea, Germany, Italy, and India.

Balance of Payment consist of following attributes

Table

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A free floating currency is not intervened by the central back and hence determined by the first three attributes of the BOP i.e Current Account, Capital Account, Financial Account. While some countries try to manipulate the fx rate for their currencies by increasing or decreasing the Reserve account. Hence for these countries the Fx rate depend on the Current Account, Capital Account, Financial Account and Reserve Account.

I used the following two step approach to identify the effect of intervention in FX rate.

Step1 : In this step I created a linear regression model for predicting the relationship between dependent and independent variables. The data set (Quaterly BOP, Interest rates) used here were for free floating cuurencies such as GBP and Euro. For each of these datasets I calculated the change in values over the previous values. For example for Current account balance, I created another attribute chgInCurrAcct that contains the change in current aacount balance for current quarter when compared to previous quarters. Then I created a linear regression model to calculate the relation between the fx rate and change in values of the independent variables. I also used lasso regularization technique for variables shinkage.

Step 2 : In this step I followed the same step for data preparation for the currencies that are suspected to be intervened by the central banks. Then based on the relationship between independent variables and dependent variables for free floating currency I predicted the fx rates for these currencies. I then plotted the predicted fx rate alongside the actual fx rate.

**Conclusion**: The model used to predict the alternate fx rates or capture the effect of intervention on the fx rate has a real world application to identify the countries that are manipulating their currencies for several reasons such as export boost, international corporate competition etc. The following results from the model shows the aacumulated effect of the interventions for two currencies : Vietnamese dong **VND** and Swiss Franc **CHF.**

Graphical user interface, chart

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As seen from above results the predicted VND and CHF values shows that these currencies would have been stronger against dollar. The widening gap between the actual and predicted values suggests a consistent and increasing intervention by the central bank.