Exchange rate Analysis

TEAM Z

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1 INTRODUCTION

An exchange rate is the rate at which one country exchanges currency with another.In our application we have tried to capture the exchange rate of one country and found out other exchange rates which are most closely correlated with its behavior.We have considered G20 countries from a time frame of Dec 1998 to Dec 2017.As team we had first decided on a different topic "Will I live longer if I cycle to work?" . But in the process of trying to collect data it was seen that there was a lot of scientific studies associated with the topic but no real proof. We could not find out any scientific method that directly links the factors we were considering(amount of oxygen intake, pollution,BMI etc)to the increase in life expectancy[].Combining all these factors into one prediction model became a challenge.So ,after spending almost 4 weeks in trying to collect data we had to shift our focus to some other topic where at least we could get a significantly high volume of data.Now we are trying to predict the top three indicators affecting the currency of that country.We have taken into account several factors like exchange rates,interest rates, employment, population, trade networks,GDP and inflation.The annual factors,like the employment, population, trade networks,GDP and inflation are taken in the time range of 1991-2016.

2 IMPLEMENTATION

2.1 Data Cleaning with python
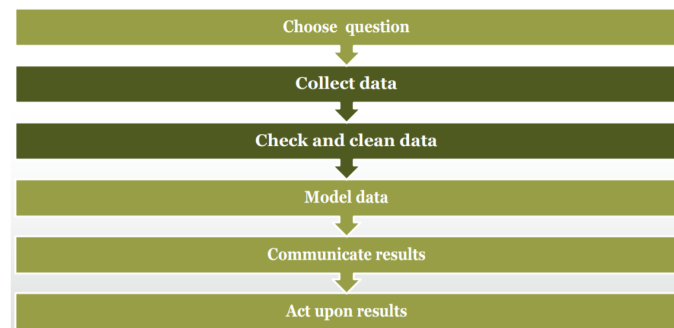
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2.1.1 . First step : Download The data that we have collected are from oanda.com,Bank of England and World Bank websites. It contains employment rates,population,GDP,trade network import,export,inflation,interest and currencies of all G20 countries. Considering 16 exchange rates and 9 indicators, we have 144 indicator to look up.For the currency exchange data ,it was about weekly average exchange rates from December 1998 to December 2017. We considered all currency of the G20's countries and downloaded all data considering the GBP as base currency. Every file downloaded was made in this way :

For currency exchange data below technique was observed

- Size of table : 1240 x 4 columns
- Col[0]= Week(1,2,3,4)
- Col[1]= Month-Year(i.e may 2002)
- Col[2]= Bid (Bid is the price a buyer is willing to pay for a security)
- Col[3]= Ask (Ask is the price a seller is willing to accept for a security)

We had 16 files(16 because in the G20 group there is France Italy and Germany where currency is Euro and also there is one member called European union that is a representative of UE). Using python we gave in input a file formed by 1240(included blank space between rows) x 4 columns and received the below output
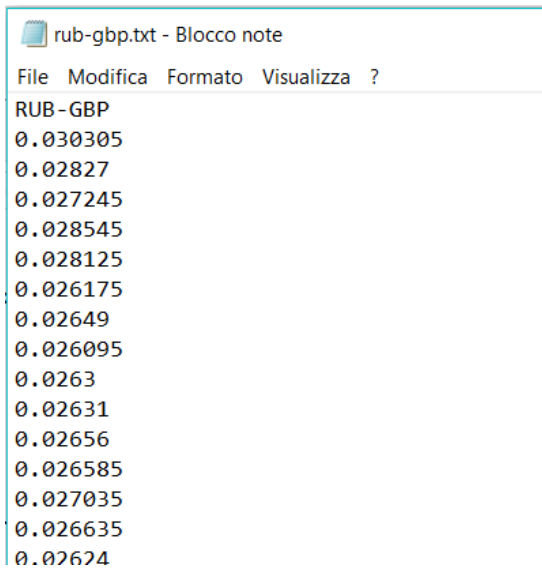
Using the python script all spaces were removed,saved in one different file, and an average between bid and ask was calculated.

2.1.2 . Third step : Creation of a complete matrix We wrote another py script called complete Matrix.py that was used to create all possible currency pair. Remembering that the currency were 16 , we had a output matrix with 16x16 column and 994 rows.

We followed a similar approach was taken for the high frequency data that was collected yearly.All the high frequency data (employment,population,trade networks,GDP)were collected ,normalised using python script clean_data.py and then a spreadsheet containing all data ranging from 1991-2016 was combined and placed in a csv file called import.csv.

2.2 Framework with Flask

It a simple framework with no roadblocks which we are using as a web server

2.3 Frontend with D3

D3 is the best choice for interactivity.Hence we have used D3 in the front end

Our application is a tool to discover what factors correlate best with the exchange rates.We have a webpage where there are two drop downs giving currency for two countries. On selection of the two countries the result is a multiseries line chart containing the other exchange rates that mostly correlates with the behavior of the exchange rates.Also we find the top three economic indicators that correlate with the exchange rates.

3 RESULTS

As the data we have used is not very huge, we chose to find the strongest correlation between the exchange rates and the indicators which led to this correlation. We have used Pearson.s correlation coefficient as the mathematical approach since the data was not suitable for any mathematical regression or any other kind of predictive analysis. The result that we have found can be summarised in the following table

Table 1. My caption

Currency Code	Indicator	Value
JPY-USD	JPY GDP	0.99
JPY-SAR	JPY GDP	0.99
SAR-JPY	JPY GDP	-0.99
MXN-CNY	MXN Population	-0.98
AUD-TRY	TRY Population	0.98
CAD-TRY	TRY Population	0.98
SAR-CNY	SAR imports	-0.98
AUD-IDR	IDR Population	0.98
AUD-TRY	AUD Population	0.98
MXN-CNY	CNY Population	-0.98
RUB-CAD	CAD Population	-0.98
CAD-TRY	CAD Population	0.98
CNY-SAR	SAR Imports	0.97
TRY-MXN	MXN Inflation	0.97
RUB-AUD	AUD Population	-0.97
AUD-IDR	AUD Population	0.97
AUD-ZAR	AUD Population	0.97
AUD-ZAR	ZAR Population	0.97

From the table above, a few things can be concluded

- GDP,Population,Imports and Inflation have been the strongest indicators in the past. These factors have played the most important role in determining the exchange rates for the two currencies
- A high correlation value indicates that the corrosponding indicator is the strongest factor in determining the exchange rates between those two countries. For example, We find a very strong correlation value (0.99) between Japanese Yen and US Dollar and also between Japanese Yen and South African Rand .The strongest indicator being Japan GDP. In the past,as the Gross Domestic Product of Japan has increased, the exchange rates between Japan and USA and also between Japan and South Africa have increased.An increase of Japanese population has led to more US Dollar and South African Rand in exchange for Japanese Yen.

4 CONCLUSION

5 LIMITATIONS AND FUTURE WORK

6 TYPICAL REFERENCES IN NEW ACM REFERENCE FORMAT

A paginated journal article [?], an enumerated journal article [?], a reference to an entire issue [?], a monograph (whole book) [?], a monograph/whole book in a series (see 2a in spec. document) [?], a divisible-book such as an anthology or compilation [?] followed by the same example, however we only output the series if the volume number is given [?] (so Editor00a's series should NOT be present since it has no vol. no.), a chapter in a divisible book [?], a chapter in a divisible book in a series [?], a multi-volume work as book [?], an article in a proceedings (of a conference, symposium, workshop for example) (paginated proceedings article) [?], a proceedings article with all possible elements [?], an example of an enumerated proceedings article [?], an informally published work [?], a doctoral dissertation [?], a master's thesis: [?], an online document / world wide web resource [???], a video game (Case 1) [?] and (Case 2) [?] and [?] and (Case 3) a patent [?], work accepted for publication [?], 'YYYYb'-test for prolific author [?] and [?]. Other cites might contain 'duplicate' DOI and URLs (some SIAM articles) [?]. Boris / Barbara Beeton: multi-volume works as books [?] and [?].

A couple of citations with DOIs: [??].

Online citations: [???].

REFERENCES