MFIN 7036 Midterm Exam project
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1. **Data Source**
   a) Scrap the Historical Exchange rates from Money Policy Department of PBOC
   b) It includes daily quotes for USD, EUR, JPY, HKD, GPB, AUD, NZD, SGD, CFH, CAD
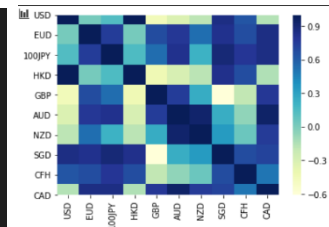   c) [Data Source Webpage](#)

2. **Data Collection and Cleaning**
   a) Web Sraping: Mainly use python packages "**re, seleniumrequests, BeautifulSoup**"
   b) Data Cleaning: All the available quotes are saved into a DataFrame in "float" format, and saved into local file "**all_quots.pkl**"
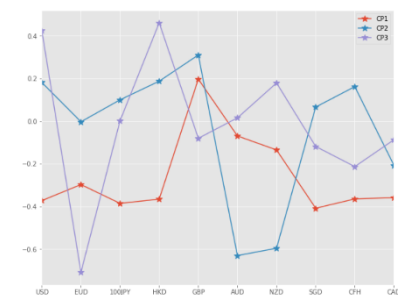
3. **Data Analysis**
   a) In this part, we try to use Principle Component Analysis to find out the main risk-factors of various exchange rates.
   b) More specifically, for the ten exchange rages given, we try to find out the first 3 components.
   c) Original Quotes and Correlation:

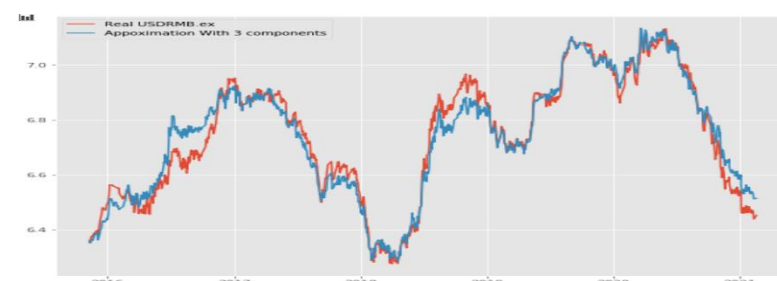|	USD	EUD	100JPY	HKD	GBP	AUD	NZD	SGD	CFH	CAD
2021-02-05	6.4710	7.7423	6.1296	0.83466	8.8478	4.9207	4.6342	4.8402	7.1568	5.0462
2021-02-08	6.4678	7.7891	6.1361	0.83426	8.8836	4.9642	4.6590	4.8482	7.1936	5.0699
2021-02-09	6.4533	7.7750	6.1301	0.83245	8.8657	4.9700	4.6586	4.8408	7.1778	5.0643
2021-02-10	6.4391	7.7996	6.1574	0.83064	8.8920	4.9806	4.6579	4.8560	7.2126	5.0711
2021-02-18	6.4536	7.7734	6.0968	0.83245	8.9464	5.0048	4.6418	4.8592	7.1832	5.0796

   d) Fist 3 Components（After mean-normalization）

   i. **CP1**: An increase in GBP, and decreases in USD,EUD,JPY,HKD,SGD,CFH,CAD

   ii. **CP2:** Huge Decrease in AUD NZD

   iii. **CP3**: Huge Dcrease in EUD, Incrase in USD and HKD

   e) Here is How much information of USDRMB.ex can be explained by these 3 components:
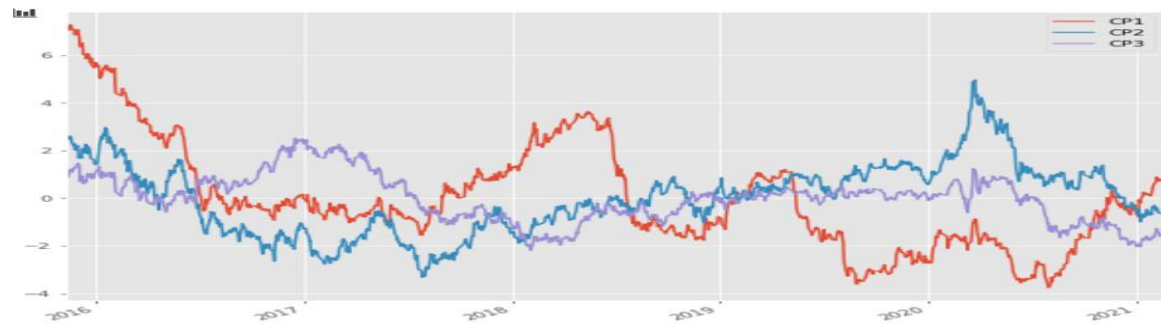
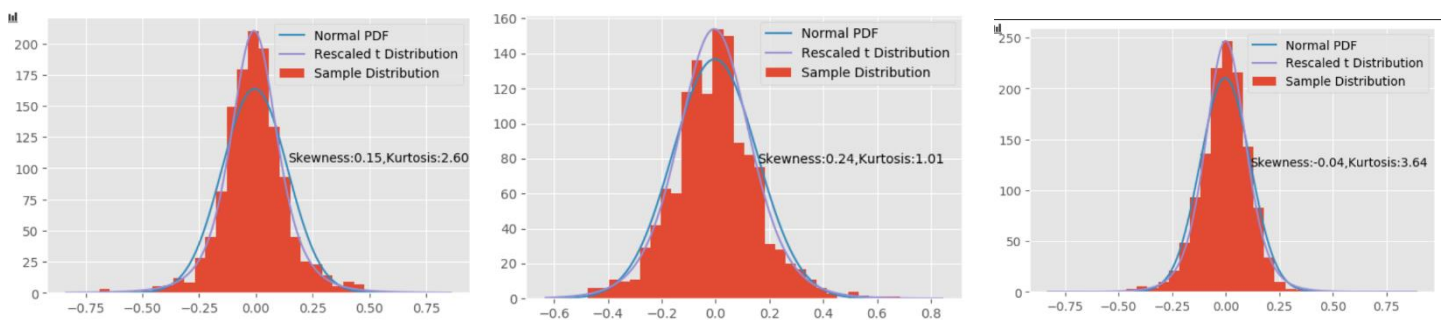

4. **Risk Analysis:**
   1) 1%, 5%, 10%, 90%,. 95%, 99% percentiles of daily change in each currency are given. (See Appendix)
   2) The correlation between risk factors are considered through the simulation process

Appendix:

1. How these risk-factor changes

2. Distribution of Daily Changes for CP1 CP2 CP3:

3. Value At Risk
   a) With Montecarlo simulation with the 3 components:

	USD	EUD	100JPY	HKD	GBP	AUD	NZD	SGD	CFH	CAD
1%	-0.031209	-0.064366	-0.038321	-0.004278	-0.042997	-0.048832	-0.043357	-0.019092	-0.040160	-0.027316
5%	-0.022306	-0.045558	-0.026545	-0.003029	-0.029654	-0.034648	-0.030947	-0.013669	-0.028661	-0.019674
10%	-0.017374	-0.035608	-0.020920	-0.002341	-0.023566	-0.026980	-0.024284	-0.010745	-0.022324	-0.015628
90%	0.017766	0.035445	0.020835	0.002432	0.023824	0.026849	0.023748	0.010623	0.022105	0.015224
95%	0.022835	0.045387	0.026454	0.003104	0.030348	0.034162	0.030612	0.013588	0.028105	0.019197
99%	0.031322	0.064859	0.037233	0.004218	0.041928	0.048894	0.043956	0.018668	0.039784	0.026946

   b) With historical quotes for each individual currency

	USD	EUD	100JPY	HKD	GBP	AUD	NZD	SGD	CFH	CAD
1%	-0.040006	-0.069168	-0.080368	-0.004987	-0.134385	-0.073006	-0.064408	-0.030817	-0.069351	-0.054195
5%	-0.024355	-0.043985	-0.046555	-0.003077	-0.074485	-0.042980	-0.042385	-0.019185	-0.040670	-0.034700
10%	-0.017900	-0.032670	-0.033870	-0.002307	-0.054140	-0.030900	-0.030670	-0.014070	-0.029840	-0.026240
90%	0.016970	0.034070	0.035570	0.002160	0.054310	0.030870	0.032280	0.013170	0.033380	0.025470
95%	0.023400	0.044770	0.050120	0.003089	0.072885	0.041225	0.041285	0.018485	0.041985	0.034570
99%	0.038934	0.076980	0.093995	0.004770	0.126075	0.067553	0.059685	0.032251	0.081551	0.059402