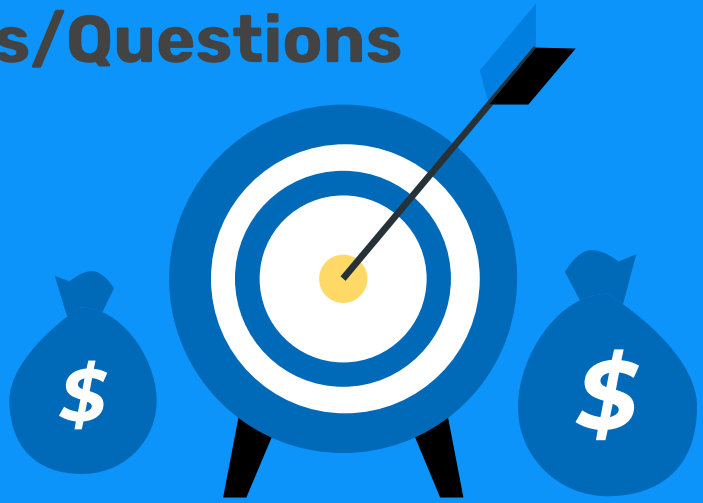
Analysis of the foreign exchange market

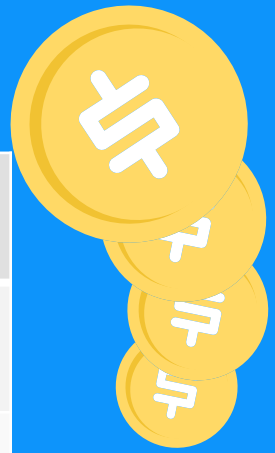
Goals/Questions



1. Which are the most affecting indicators to explain FX market?
2. Can we predict the value of the exchange rate for the next years?
3. Which are the possible ways to group different countries?
4. How do big events influence the market? Can we explain them in terms of outliers or weird patterns?

Country-wise dataframe

	Exchange rate	Population	Unemployment rate	Inflation	GDP	Interest rate
1998						
1999						
2021						



Most influential geographical areas:

EU, China, Russia, USA

Our countries: Italy, Norway, Turkey

Currency-wise dataframe

	Euro	US Dollar	Yen	Ruble	Norwegian Crown	Turkish Lira
1998						
1999						
2021						

Preliminary results

Europe PCA

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Importance of components:
                          Comp.1    Comp.2    Comp.3     Comp.4       Comp.5 Comp.6
Standard deviation     1.293597 0.5266622 0.4761572 0.08327823 3.321904e-03      0
Proportion of Variance 0.766052 0.1269768 0.1037913 0.00317485 5.051661e-06      0
Cumulative Proportion  0.766052 0.8930288 0.9968201 0.99999495 1.000000e+00      1
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Loadings:
                                Comp.1 Comp.2
FX.rate                          0.530  0.279
Inflation.rate                         -0.717
Long.term.nominal.interest.rate  0.306 -0.411
GDP.current...                  -0.612
Unemployment.rate                       0.426
Population                      -0.491  0.231

               Comp.1 Comp.2
SS loadings     1.000  1.000
Proportion Var  0.167  0.167
Cumulative Var  0.167  0.333

$rotmat
          [,1]       [,2]
[1,] 0.8818417 -0.4715455
[2,] 0.4715455  0.8818417
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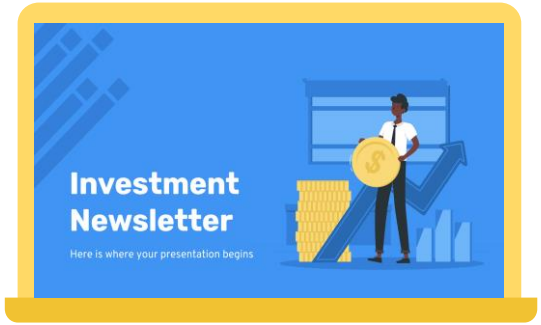

Two groups of factors can be drawn:

1. **Hints that population and GDP are most impacting for Euro**
2. **Allows to focus on only 2 components**
3. **Tells about Economic indicators interdependencies, specific for EU**
4. **Role of inflation and unemployment for EU**
5. **Allows to reduce impact of “Curse of dimensionality” for future clustering**

Preliminary results

```
Coefficients:
                          Estimate Std. Error t value Pr(>|t|)
(Intercept)             -7.815e+02  1.776e+02  -4.401 0.000307 ***
Population               6.044e+00  1.184e+00   5.104 6.31e-05 ***
Unemployment.rate       -7.076e+00  2.029e+00  -3.488 0.002461 **
Inflation.rate           2.629e-01  1.561e-01   1.684 0.108535
GDP                     -2.109e-04  7.070e-04  -0.298 0.768650
Short.term.interest.rate -6.273e-01  5.857e-01  -1.071 0.297568
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 8.548 on 19 degrees of freedom
Multiple R-squared:  0.8407,    Adjusted R-squared:  0.7988
F-statistic: 20.06 on 5 and 19 DF,  p-value: 5.524e-07
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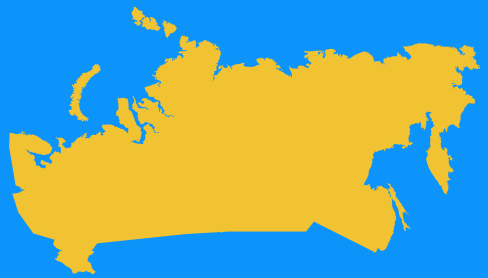

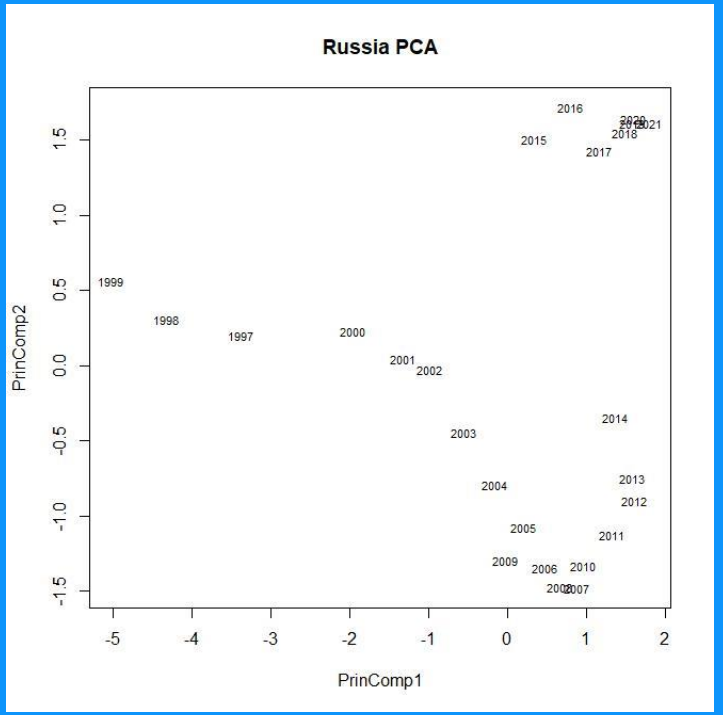

Ideas for future work

1. Is our data compliant with the economic laws?
2. Can clustering algorithms find interesting grouping by means of the most relevant features?
3. Can we study each feature over years by using some time lags?

References

1. https://data.oecd.org/
2. https://data.worldbank.org/