

# An Insight into Twitter Networks of Central Banks

---

CT0540 - Social Network Analysis

28<sup>th</sup> February 2023

André Ramolivaz

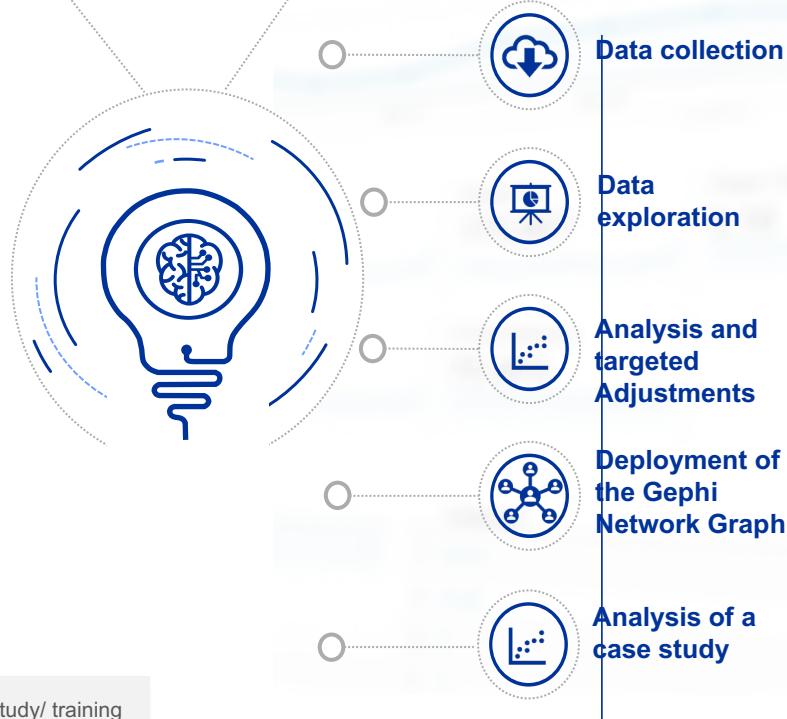


# Overview

## Aim and objectives

- Examine the **neutrality** of **central banks** during the social media era.
- Analyze the **twitter network** (using as a case ECB, FED and BoE)
- Evaluate the **sentiment of tweets** and most discussed topics
- [Tentative] Find **correlation** between stock market and sentiment on Twitter.

## Methodology



- ✓ Comprehension of the main goals of the project, identifying the variables needed, research of the technology available
- ✓ Understand variables used, treating missing values, transforming data into a suitable form for analysis, identifying relevant correlations among values
- ✓ Sentiment Analysis, Topic Modeling, Hashtag Interpretation, removing stop words, lemmatization, lowercasing the tweet text ...
- ✓ Classify users and nodes, export data into csv and uploaded for Gephi, applied layout for colour and visualization
- ✓ Sentiment Analysis, correlation with the stock market, personal interpretation of the results

Software development

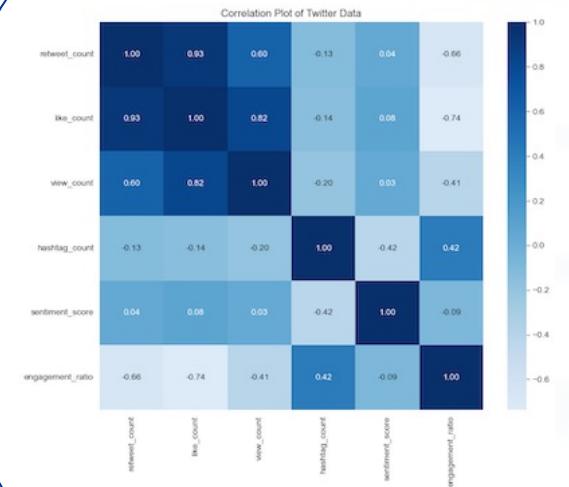
Study/ training  
Data Analysis

# Data Collection and Data Exploration



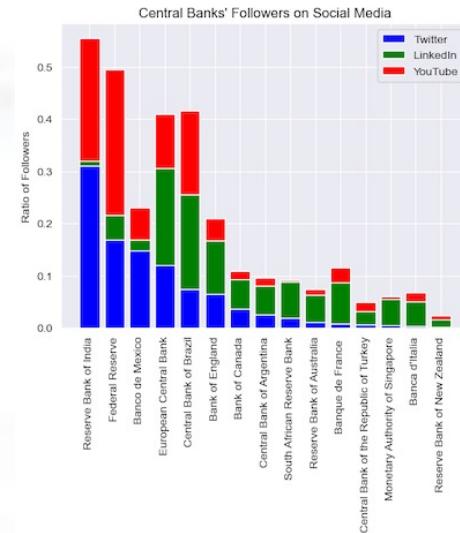
## Tweets

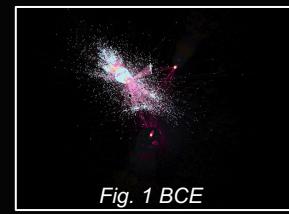
- Snscreape python library



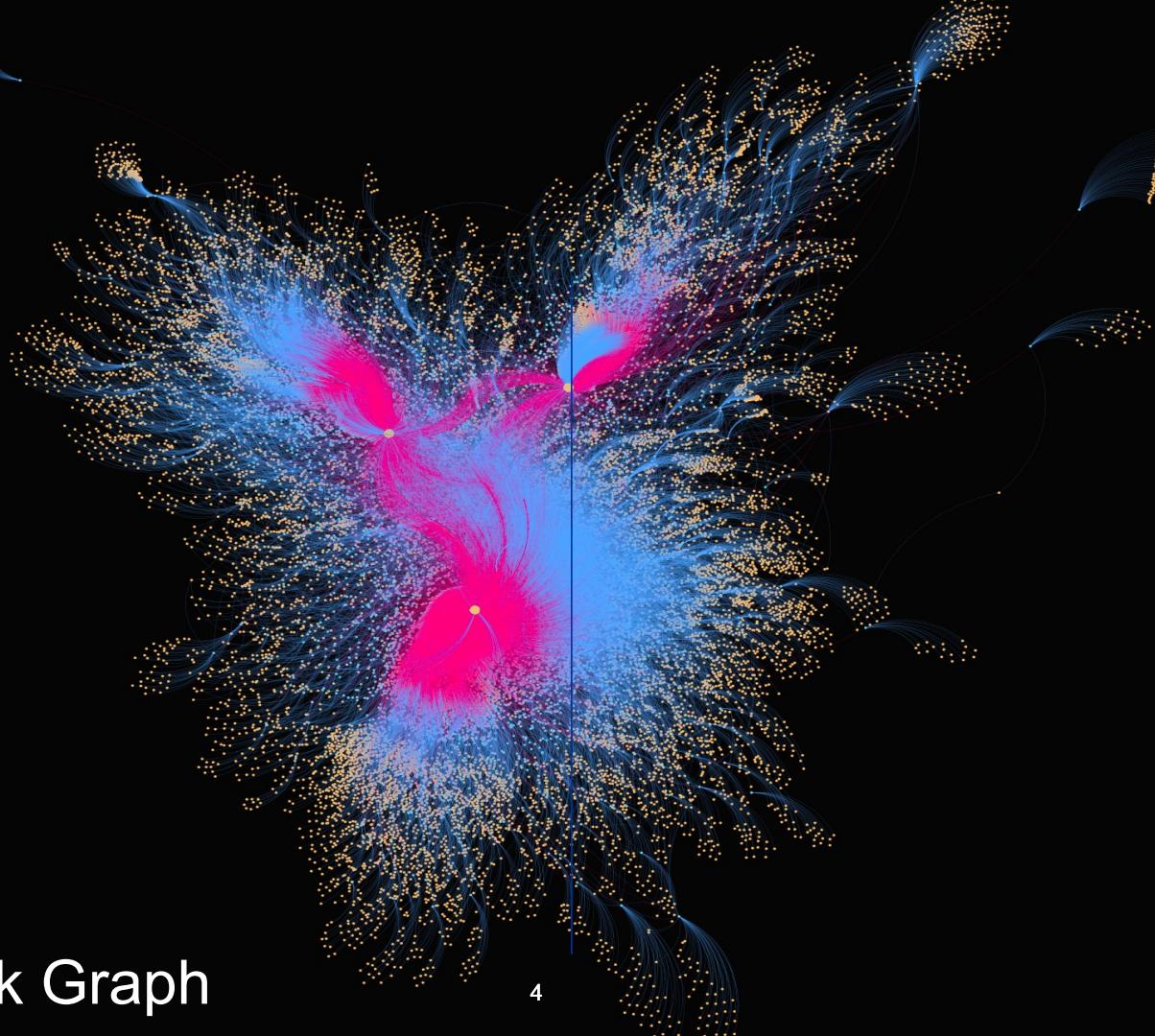
## Followers

- Official Twitter API





# Gephi Network Graph



Edges
Tweet
Mention
Follow

Nodes
Politic
Unknokwn
Inestimable
Finance expert
Analyst
Supporter
Curious
Critic
Conpirator

# Sentiment Analysis

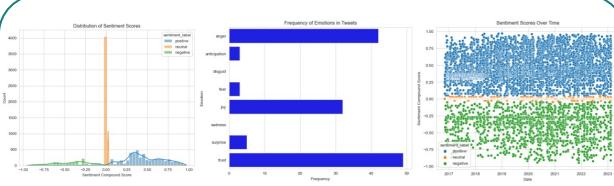


Fig. 1 European Central Bank's tweet Sentiment Analysis

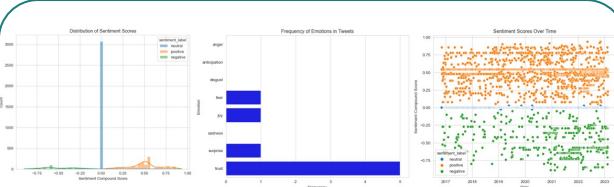


Fig. 2 Federal Reserve's tweet Sentiment Analysis

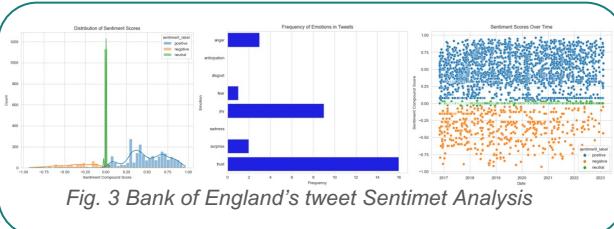


Fig. 3 Bank of England's tweet Sentiment Analysis

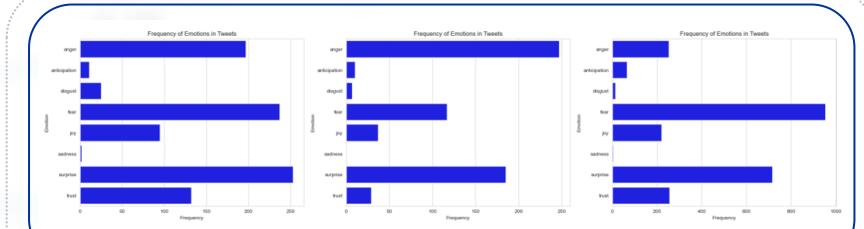


Fig. 4 Sentiment Analysis among all users

# Topic Modeling

Nodes	148
Edges	300
Density	0.02758
isConnected	true
Avg. Shortest path	3.9261

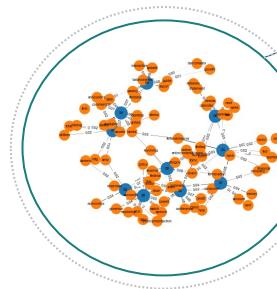


Fig. 1 Federal Reserve's Topic Modeling Network Graph

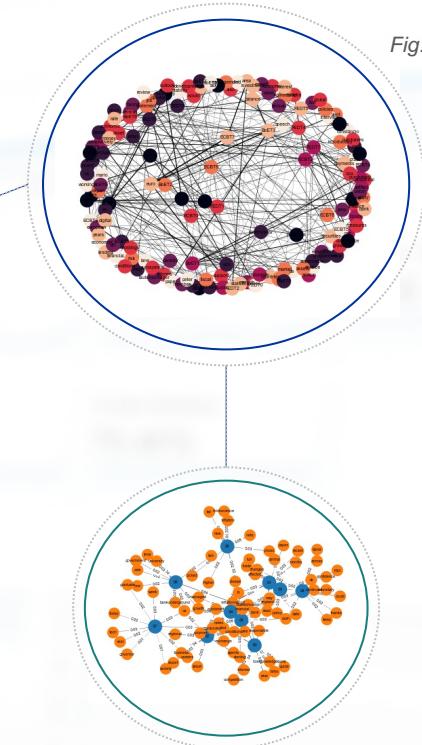


Fig. 2 Bank of England's Topic Modeling Network Graph

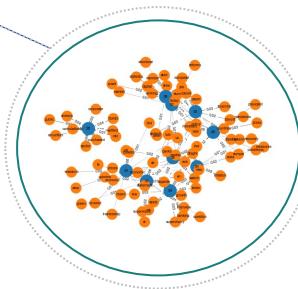


Fig.3 European Central Bank's Topic Modeling Network Graph

Fig. 4 Connection of topics among the three banks

Oct 5

# Hashtags Analysis

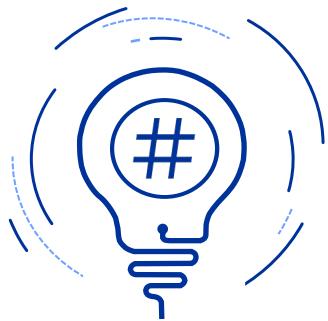


Fig. 1 ECB  
Hashtag  
(top 10,  
frequency  
and  
sentiment)

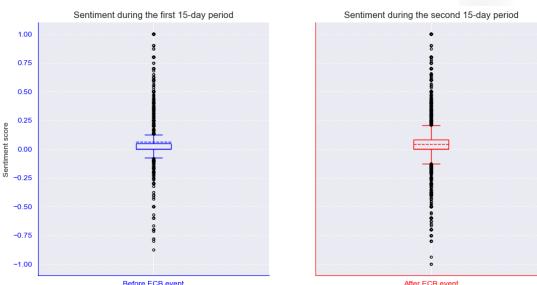
Fig. 2 FED  
Hashtag  
(top 10,  
frequency  
and  
sentiment)

Fig. 3 BoE  
Hashtag  
(top 10,  
frequency  
and  
sentiment)

# A Case Study the: “whatever it takes”



## Sentiment Analysis



## Stock Market

The recovery was slow, but it is real  
Annual change in real GDP (%)





**Thank you  
for your attention!**