

An Insight into Twitter Networks of Central Banks

CT0540 - Social Network Analysis

28th February 2023

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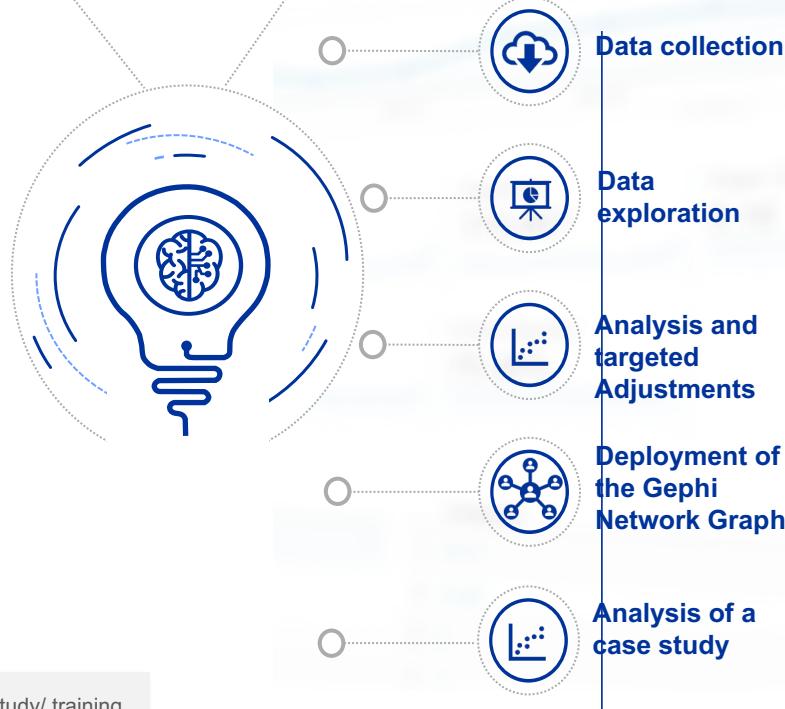


Overview

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

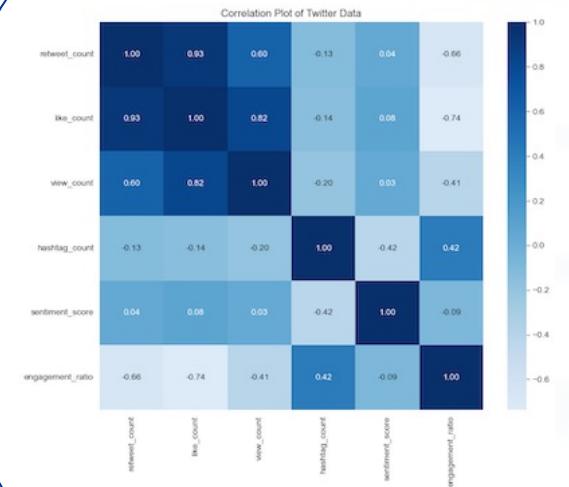
Study/ training
Data Analysis

Data Collection and Data Exploration



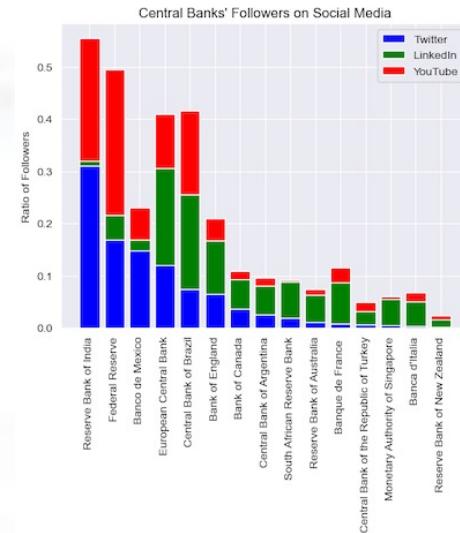
Tweets

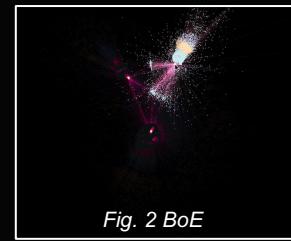
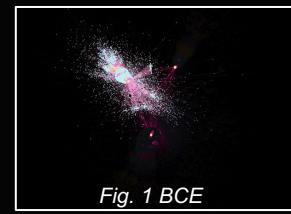
- Snscreape python library



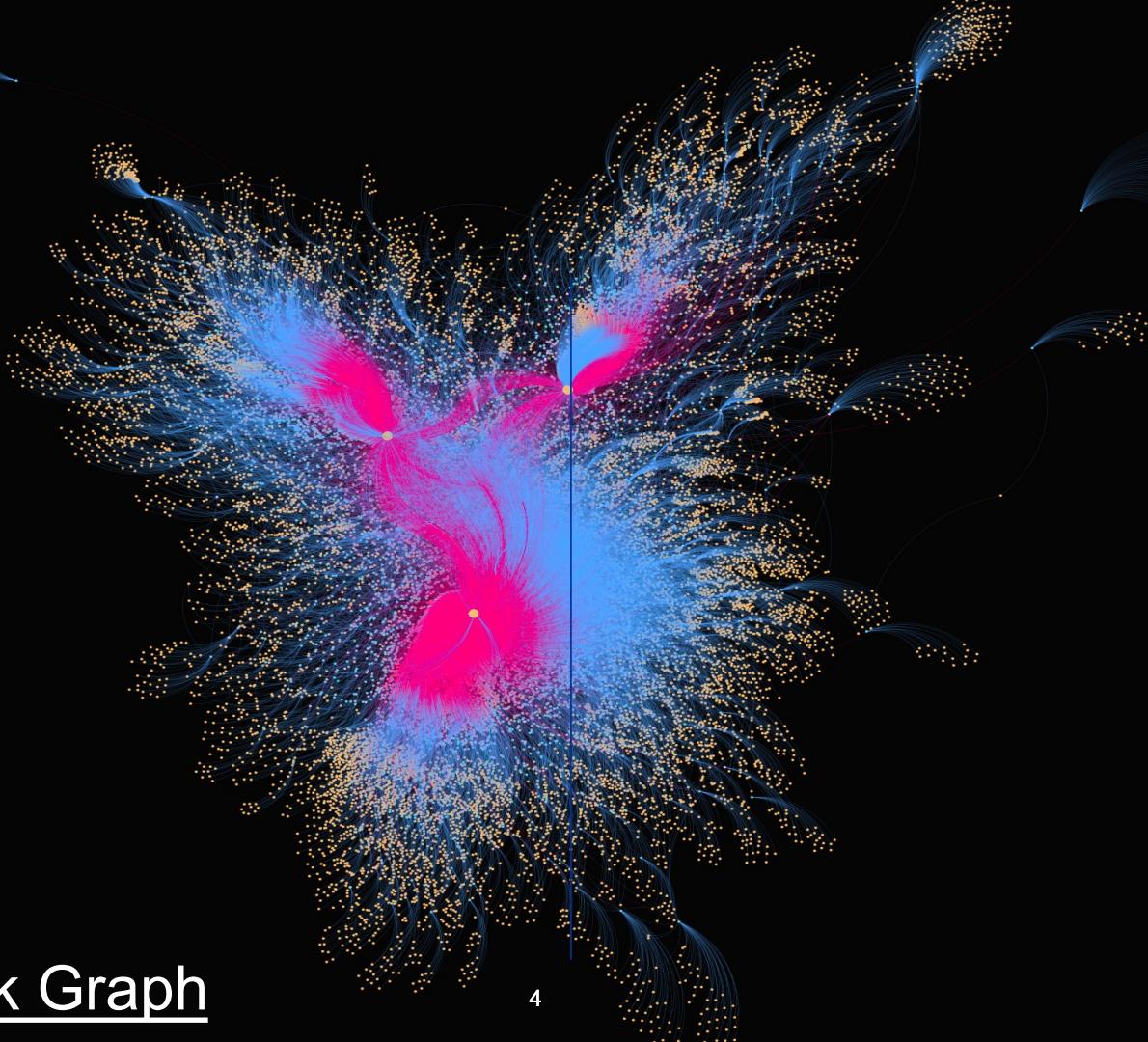
Followers

- Official Twitter API





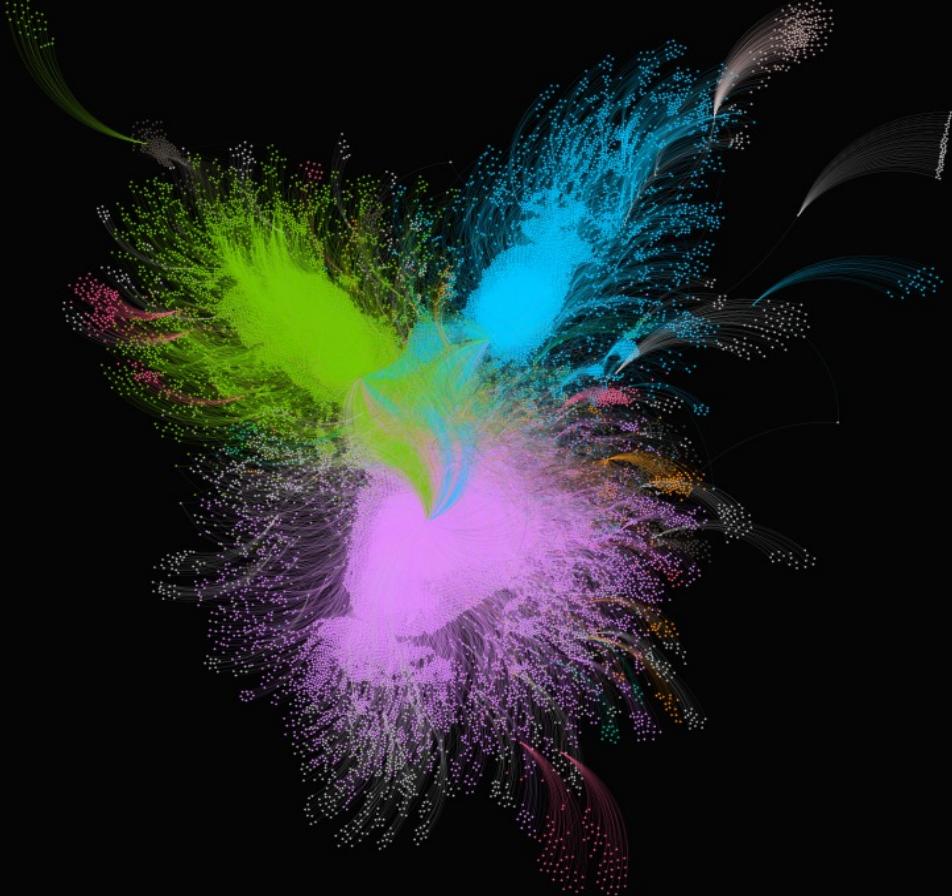
Gephi Network Graph



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Edges: 91519
Tweet
Mention
Follow

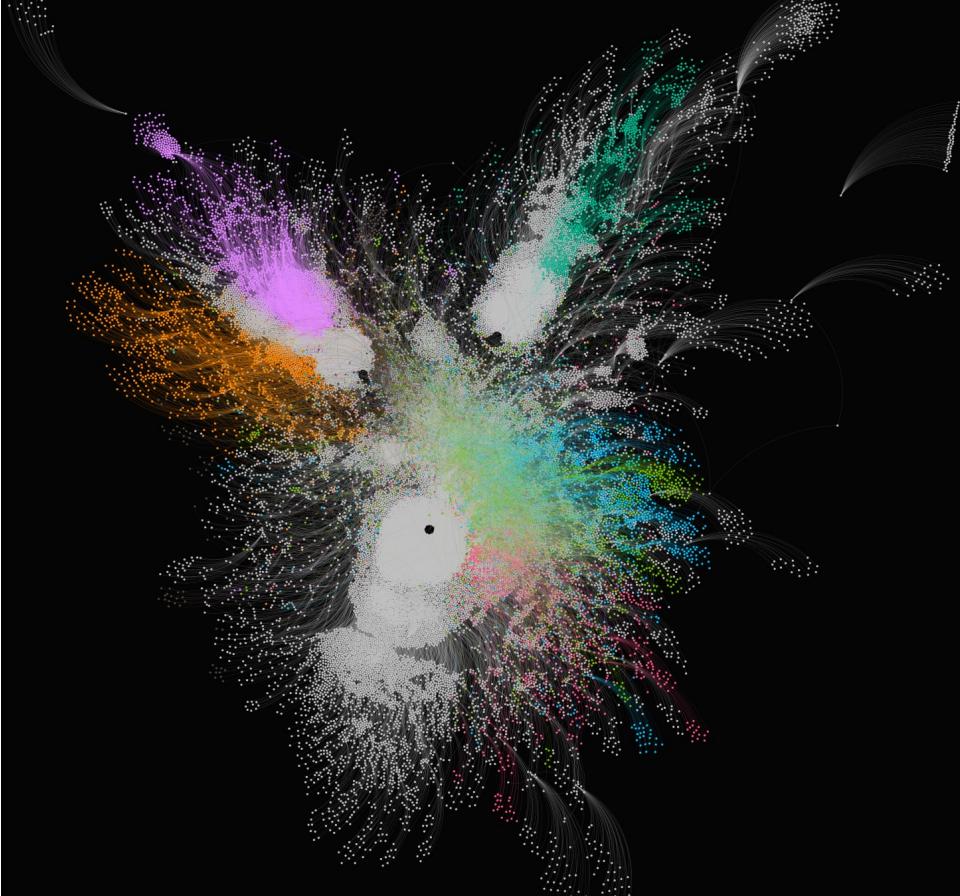
Nodes: 63590
Politc
Unknokwn
Inestimable
Finance expert
Analyst
Supporter
Curious
Critic
Conpirator

**With hubs:**

Modularity: 0,515

Number of Communities: 293

Average Degree: 2,878

**No hubs:**

Modularity: 0,826

Number of Communities: 36875

Average Degree: 1,191

Modularity community detection

Topic Modeling

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

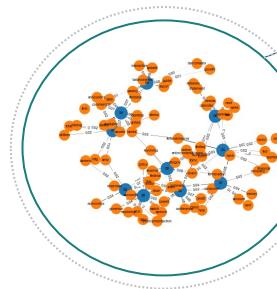


Fig. 1 Federal Reserve's Topic Modeling Network Graph

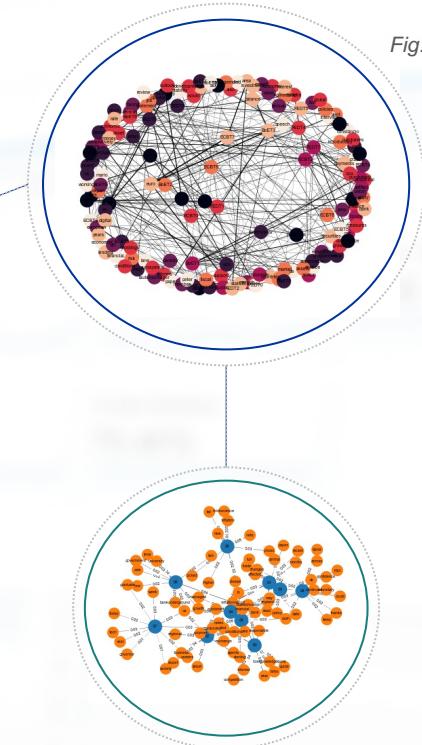


Fig. 2 Bank of England's Topic Modeling Network Graph

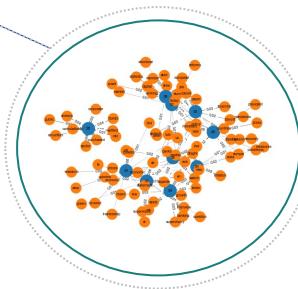
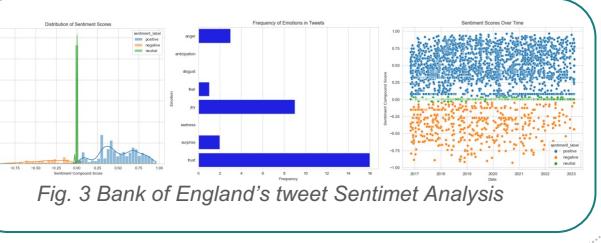
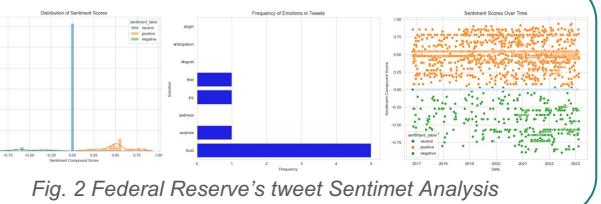
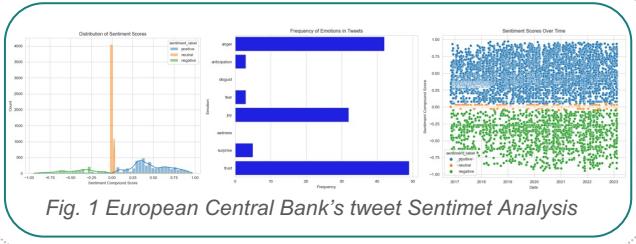


Fig. 3 European Central Bank's Topic Modeling Network Graph

Fig. 4 Connection of topics among the three banks

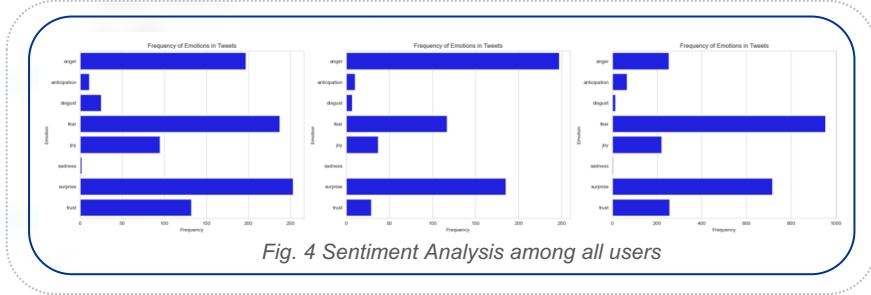
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Sentiment Analysis



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Fig. 4 Sentiment Analysis among all users



Hashtags Analysis

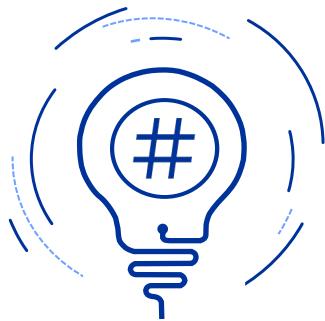


Fig. 1 ECB
Hashtag
(top 10,
frequency
and
sentiment)

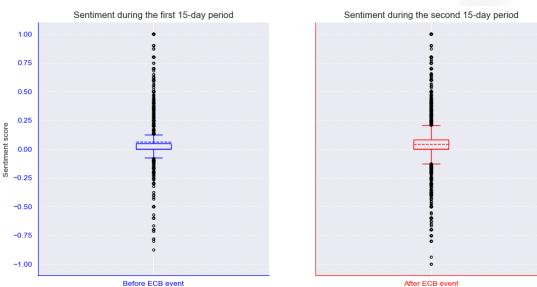
Fig. 2 FED
Hashtag
(top 10,
frequency
and
sentiment)

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!**