Bank of England Employer Project

Team: BEACON 28 April 2025

Project Scope and Plan

Predictive Analysis of the Impact of Bank of England Speeches on the Economy

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Background/Context

The Bank of England (BoE) plays a vital role in maintaining financial stability, with communication—especially speeches by senior officials—being a key tool (Pastorella, 2023). These speeches aim to provide transparency and reassurance, particularly during periods of uncertainty. This project explores how the sentiment of these speeches' changes over time and whether it correlates with key economic indicators such as GDP growth, inflation, and labour market trends. It also examines the potential predictive power of speeches on market behaviour, including asset price movements and volatility. Using historical transcripts, sentiment analysis, and correspondence with policy and economic events, the goal of this project is to conduct a holistic study to deliver evidence-based insights into the effectiveness of central bank communication. These findings may help improve future communication strategies to enhance clarity, trust, and policy transmission in the UK economy. A fishbone diagram was used as the core **Problem-solving framework** (see Appendix 1).

Problem Statement

To what extent can the sentiment of central bank communications predict financial market movements, and can the sentiment of these communications be anticipated based on macroeconomic trends?

Project Scope

Objectives

1. **Contextual Correlation:** Track sentiment in BoE speeches over time and analyse correlations with key economic indicators and BoE-specific events (see Appendix 2.1)
2. **Speech Sentiment as Leading Influence:** Evaluate if speech sentiment serves as a predictor of market behaviour (see Appendix 2.2)
3. **Speech Sentiment as Lagging Response:** Investigate whether macroeconomic indicator changes (see Appendix 2.3) are followed by sentiment shifts in BoE speeches
4. **Predictive Modelling:** Predict market responses to sentiment (leading influence model); forecast speech sentiment from prior macroeconomic data (lagging response model)

Deliverables

- Technical report detailing methods, insights, and strategic implications
- Final presentation to BoE stakeholders

Inclusions

- Sentiment analysis of 'all_speeches.csv'
- Recent speeches to cover tariff volatility
- Time series analysis linking sentiment with macroeconomic/BoE events
- Correlation with macroeconomic and market data
- Predictive models (e.g. linear regression, decision tree, random forest) exploring the leading influence of speech sentiment on markets and its lagging response to macroeconomic conditions
- Further insights and analyses related to speech sentiment and associated factors (e.g. seniority of speech author)

Exclusions

- Deep linguistic analysis
- Real-time forecasting or speechwriting advice

Assumptions

- Public economic datasets (ONS, BoE) are accurate and accessible
- Provided data accurately represents official BoE communications
- Sentiment tools suit UK financial context

Constraints

- 6-week project timeline
- Team members' external commitments

Stakeholders and their Responsibilities

- **BoE:** provide periodic feedback, ensure alignment with their expectations
- **Course Facilitator:** technical guidance and support
- **BEACON Team:** see Team Roles section

Risks and Mitigations

- **Analytical Risk:** Use multiple methods; highlight strong results
- **Timeline Risk:** Prioritise key indicators
- **Interpretation Risk:** Emphasise limitations
- **Expectation Risk:** Update stakeholders regularly

Managing Scope Creep

- Formal documentation of changes
- All scope modifications to be approved by majority of four team members
- Weekly reviews
- Final report to log all scope changes

Team Roles, Strengths, and Ways of Working

The team includes:

- **Chris Buck, Team Leader:** experienced coordinator and compiler
- **Germán De La Fuente, Finance Specialist:** domain expert and cool-headed task completer
- **Kelvin Dhondee, Scenario Analyst:** critical and analytical thinker and writer
- **Kate Jacobs, Insight Communicator:** presentation structuring and designing specialist
- **Harshdeep Kohli, Data Visualiser:** detail-oriented coder of plots
- **Victoria Pogonyaylova, Technical Analyst:** forward-thinking technical specialist

We are an agile and flexible team. Our roles are not fixed, and all team members will have the opportunity to use their wide range of talents and develop new skills.

Work is organised according to the Team Charter to address any blockers.

Project Management / Collaboration Tools

Tool	Purpose	Rationale
Asana	Project management	Granular task management beyond capabilities of static tools like Excel, streamlines workflow, avoids confusion
GitHub Repository	Code storage/organisation	Version control, change tracking, backup, coding collaboration
Google Drive / Microsoft shared documents	Document storage/collaboration	Central storage, shared document editing
WhatsApp	Ongoing communication	Instant messaging and built-in polls facilitate quick resolution of questions/issues

Meetings

Regular team meetings scheduled:

- Tuesdays 19:15-20:00
- Fridays 12:00-13:30

Times have been chosen based on availability and to ensure even spacing throughout the week.

Meeting agendas are set in advance using a shared document. **Meeting minutes** capture tasks and deadlines agreed during meetings.

Additional stakeholder meetings:

- EP Facilitator sessions: weeks 2, 4, 5 and 6
- Employer Partner meetings: weeks 3, 5 and 6

Project Plan

Phases

The project consists of five phases, each with an objective that informs the next stage:

1. Project setup
Purpose: Align on vision and plan

- Initial data acquisition
- Define scope/plan

2. Data Processing
Purpose: Ensure data consistency; enable valid time-based analysis and comparisons

- Additional data acquisition (i.e. recent speeches and economic indicators)
- Cleaning/preprocessing
- Temporal mapping/timeline alignment

3. Analysis
Purpose: Answer core research questions

- Exploratory Data Analysis (EDA)
- Sentiment analysis
- Correlation analysis
- Predictive modelling (e.g. regression modelling)
- Create initial pitch for BoE

4. Reporting
Purpose: Communicate findings to BoE stakeholders

- Synthesise key insights
- Deliver final presentation to BoE

5. Reflection
Purpose: Consolidate learnings

- Individual reflection report

See a detailed roadmap in Appendix 3.

Agreed Procedures to Keep the Project on Track

- Phases will start on time
- Progress and findings will be discussed early and often to ensure we are on the right path and adjust if needed
- Team members will flag when a task is completed or roadblocks arise
- Each phase will be finalised midday on the due date (at the latest) to accommodate last-minute adjustments
- Primary business questions will be addressed before pursuing secondary analyses

Analytical Approach

Analysis will be conducted predominantly in Python due to its flexibility and comprehension amongst all team members.

Intermediate statistical analysis such as correlations and regression modelling may be done in R.

Length of each analytical stage is 4-6 days on average (see Appendix 3: Roadmap).

Detailed analytical approach, milestones and tools:

Due Date (all 2025)	Stage	Approach and Tools
27/04	**Project Setup – Define the Questions**	Break down the business objective into analytical questions (see further details in 'Background and Context' section of this report)
29/04	**Project Setup – Collect the Data**	- BoE speeches dataset provided by LSE in .csv - Sentiment labelled wordlist provided by LSE in .xlsx - Macroeconomic indicators – GDP, CPI, interest rates etc. to be obtained from ONS and BoE websites. - Web scraping of additional speeches using **BeautifulSoup**
04/05	**Data Processing – Clean/Explore the Data**	- Import data with **Python/Pandas**, address missing and duplicated values, introduce proper column names and data types - Descriptive statistics and exploratory visualisations using **Matplotlib** and **Seaborn** - Text preprocessing: Clean (e.g. lowercase, remove punctuation), tokenize, lemmatise using **NLTK** modules - Temporal mapping: group time periods; calculate moving averages; link speeches to corresponding reporting periods of macroeconomic indicators using **Pandas** built-in capabilities
25/05	**Analysis**	- Apply general sentiment models: **VADER**, **TextBlob** - Apply financial sentiment models: **FinBERT**, BoE custom wordlist and/or **Loughran-McDonald,** alternatives identified throughout research - Evaluate model accuracy via manual labelling and **Scikit-learn** metrics - Correlation analysis: compare sentiment and macroeconomic indicators using **Pandas** (.corr()) and **Seaborn** heatmaps

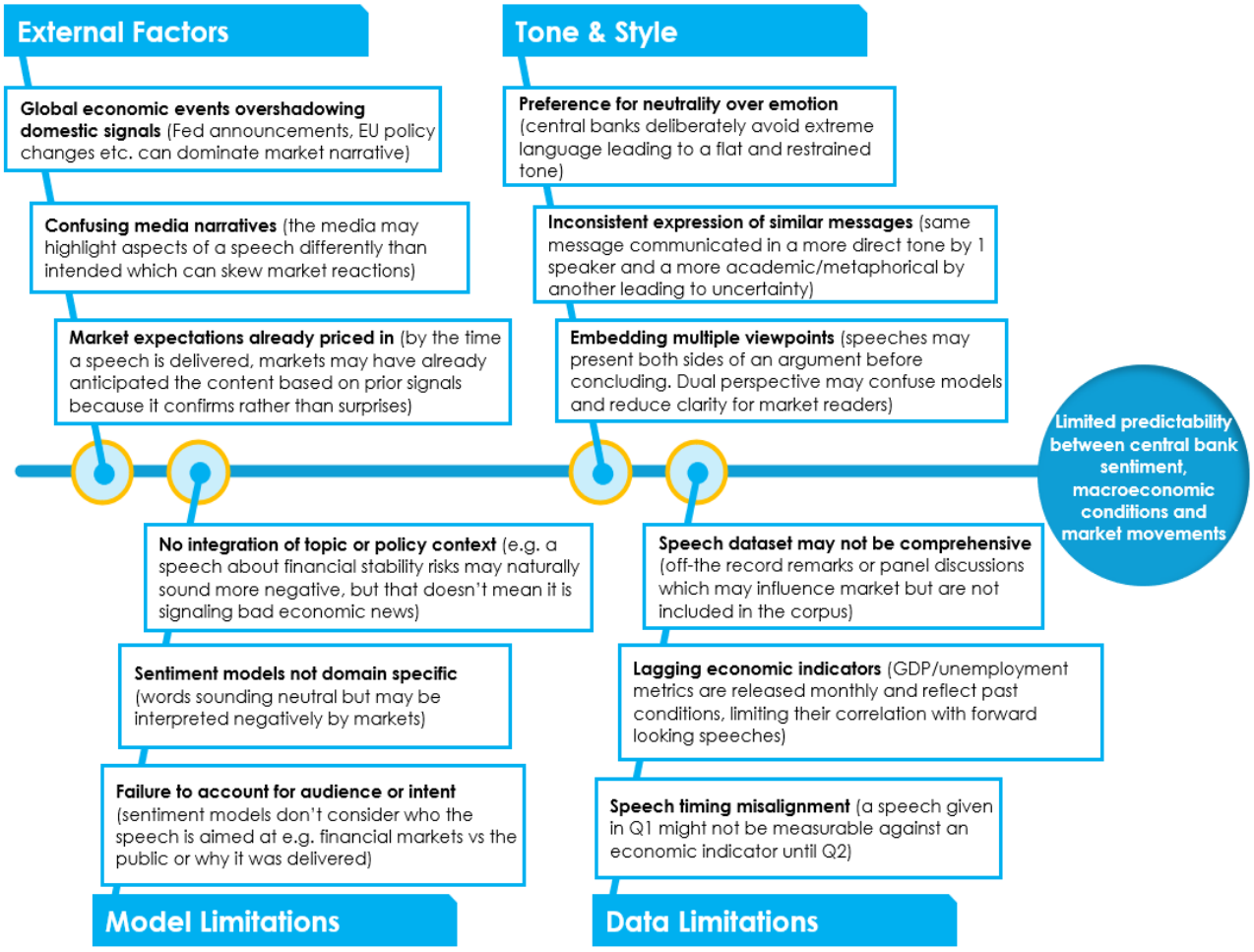
		- Time series analysis: align sentiment scores alongside macroeconomic indicators; further analysis upon findings and research - Predictive analysis (**Python/R**): regression of sentiment vs macroeconomic indicator. - *Note: Cleaning and analysis may be revisited throughout project life cycle depending on process and findings*
25/05 – 01/06 Team deadline	**Reporting**	- Clear, compelling visualisations in Jupyter, refined in PowerPoint (25/05) - Initial pitch in a prerecorded .mp4 presentation (submit 26/05) - Presentation to BoE (28/05) - Final presentation, report and Jupyter notebook (submit 02/06)
05/06 Submission deadline	**Reflection**	Reflection of the project experience by each team member in **PDF**

Note

The style of this document is based on the Bank of England logo and website guidelines (Bank of England, 2022).

Appendices

Appendix 1: Problem solving framework using fishbone diagram



Appendix 2: Indicators

2.1: Core Indicators:

- Inflation (CPI, RPI)
- Unemployment rates
- GDP growth
- Interest rates (e.g. BoE Bank Rate)

Secondary Indicators: Include only if they contribute to relevant insights.

- Business Confidence Index (BCI)
- Consumer Confidence Index (CCI)
- S&P Global UK Consumer Sentiment Index
- Gilt yields
- FTSE 100 performance (quick reactions - 1 day and 1 week post speech)
- FTSE 100 volatility (VFTSE)
- Exchange rate (e.g. USD/GBP)
- PMI

2.2 Leading Influence Indicators

We will assess the reaction of the following indicators to BoE sentiment:

- Yield curve shifts
- GBP exchange rates
- Equity market performance (e.g. FTSE indices)

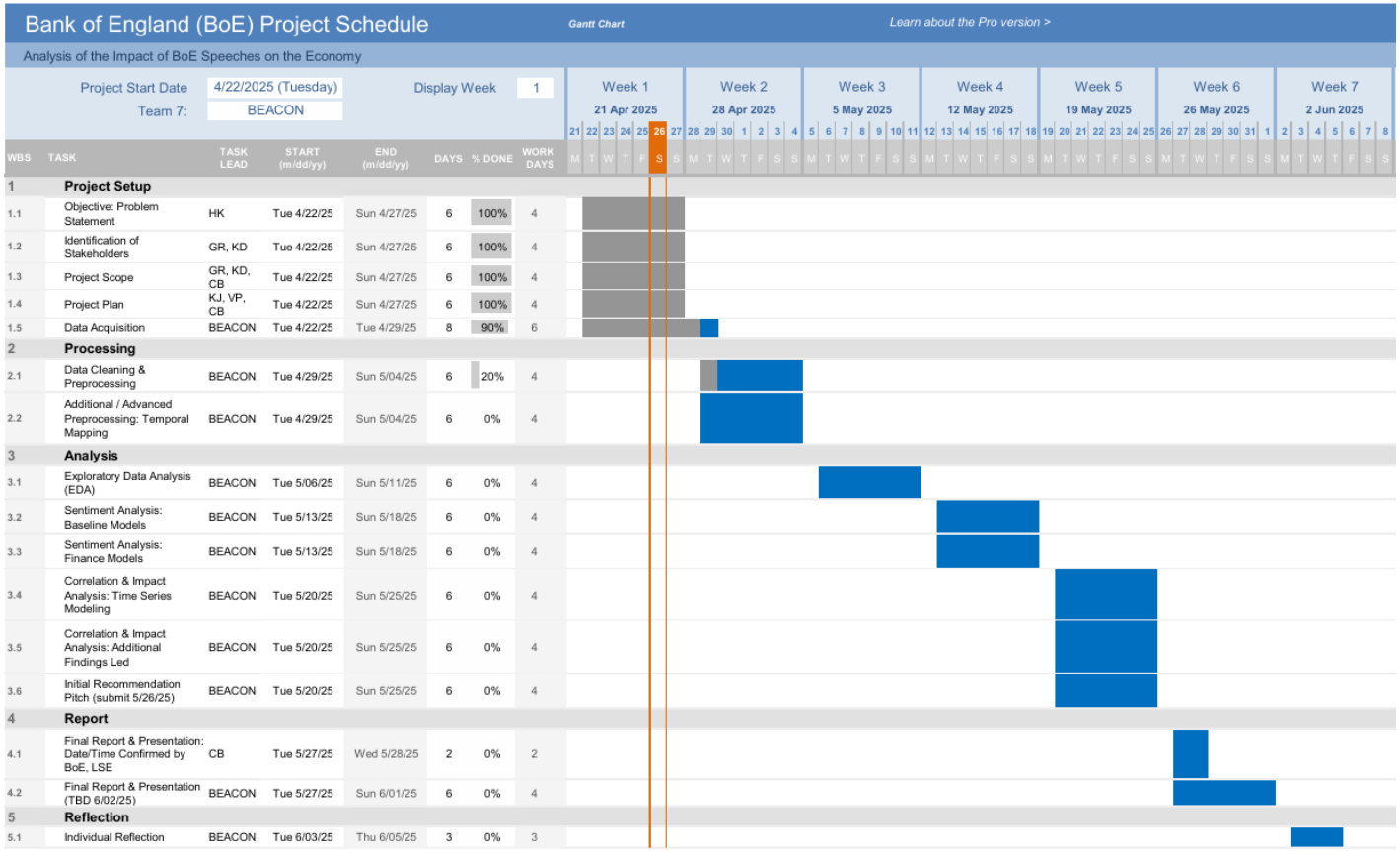
2.3 Lagging Response Indicators

We will analyse the sentiment's reaction to the following data:

- Inflation (CPI, RPI)
- Unemployment rates
- GDP growth
- Interest rates
- Geopolitical or financial shocks (e.g. Great Recession, Brexit, COVID pandemic, Truss/Kwarteng budget, and Trump tariffs)

Appendix 3: Roadmap

This Gantt chart is organised by phase and project milestone with intermediate realistic deadlines and team roles. It will inform higher-level stakeholders (BoE, LSE) on the structure of the process and also facilitates progress tracking. It outlines the time, resources, and methodology required to implement comprehensive data analysis that examines sentiment correlation with economic indicators, while incorporating targeted research to deliver actionable, value-added insights.



Bank of England (BoE) Project Schedule

Gantt Chart

Learn about the Pro version >

Analysis of the Impact of BoE Speeches on the Economy

Project Start Date: 4/22/2025 (Tuesday) | Display Week: 1 | Team 7: BEACON

WBS	TASK	TASK LEAD	START (m/dd/yy)	END (m/dd/yy)	DAYS	% DONE	WORK DAYS
1	**Project Setup**						
1.1	Objective: Problem Statement	HK	Tue 4/22/25	Sun 4/27/25	6	100%	4
1.2	Identification of Stakeholders	GR, KD	Tue 4/22/25	Sun 4/27/25	6	100%	4
1.3	Project Scope	GR, KD, CB	Tue 4/22/25	Sun 4/27/25	6	100%	4
1.4	Project Plan	KJ, VP, CB	Tue 4/22/25	Sun 4/27/25	6	100%	4
1.5	Data Acquisition	BEACON	Tue 4/22/25	Tue 4/29/25	8	90%	6
2	**Processing**						
2.1	Data Cleaning & Preprocessing	BEACON	Tue 4/29/25	Sun 5/04/25	6	20%	4
2.2	Additional / Advanced Preprocessing: Temporal Mapping	BEACON	Tue 4/29/25	Sun 5/04/25	6	0%	4
3	**Analysis**						
3.1	Exploratory Data Analysis (EDA)	BEACON	Tue 5/06/25	Sun 5/11/25	6	0%	4
3.2	Sentiment Analysis: Baseline Models	BEACON	Tue 5/13/25	Sun 5/18/25	6	0%	4
3.3	Sentiment Analysis: Finance Models	BEACON	Tue 5/13/25	Sun 5/18/25	6	0%	4
3.4	Correlation & Impact Analysis: Time Series Modeling	BEACON	Tue 5/20/25	Sun 5/25/25	6	0%	4
3.5	Correlation & Impact Analysis: Additional Findings Led	BEACON	Tue 5/20/25	Sun 5/25/25	6	0%	4
3.6	Initial Recommendation Pitch (submit 5/26/25)	BEACON	Tue 5/20/25	Sun 5/25/25	6	0%	4
4	**Report**						
4.1	Final Report & Presentation: Date/Time Confirmed by BoE, LSE	CB	Tue 5/27/25	Wed 5/28/25	2	0%	2
4.2	Final Report & Presentation (TBD 6/02/25)	BEACON	Tue 5/27/25	Sun 6/01/25	6	0%	4
5	**Reflection**						
5.1	Individual Reflection	BEACON	Tue 6/03/25	Thu 6/05/25	3	0%	3

Appendix 4: Timeline

Start Date: April 22, 2025
End Date: June 5, 2025
Duration: ~6.5 weeks

References

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