When Words Move Markets: Predictive Insights from BoE Communications

Presented by Team BEACON | LSE Data Analytics Employer Project

Objectives

Main research question:

- Can sentiment help predict market economic indicators?

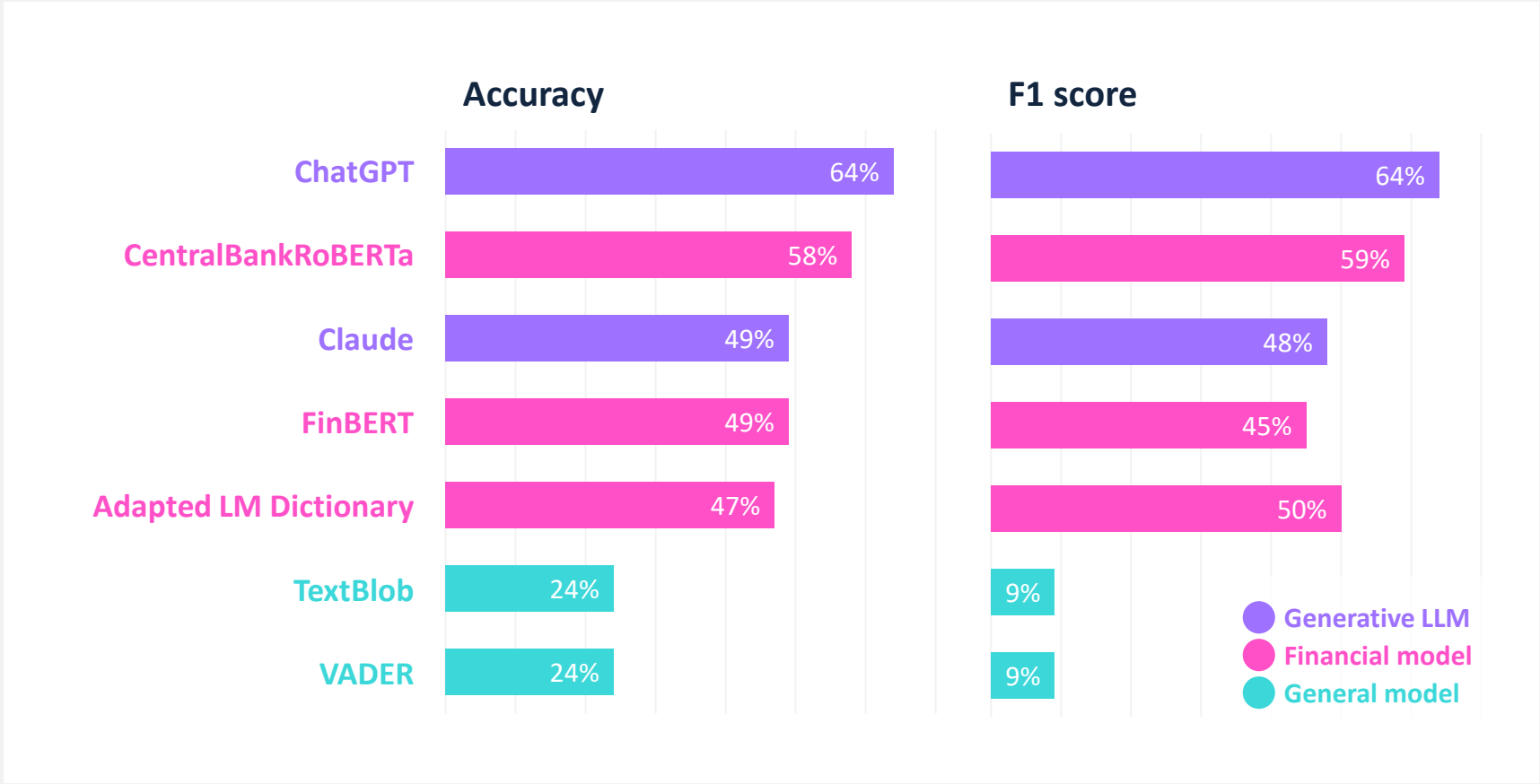
Supporting questions:

- Which sentiment analysis model is most effective?
- How can sentiment best be incorporated into predictive models?
- What are some next steps for the Bank of England?

Selecting the Best Sentiment Model

CBRoBERTa and ChatGPT outperform other models

7 models tested
against a sample of
59 manually labelled
speeches



CentralBankRoBERTa

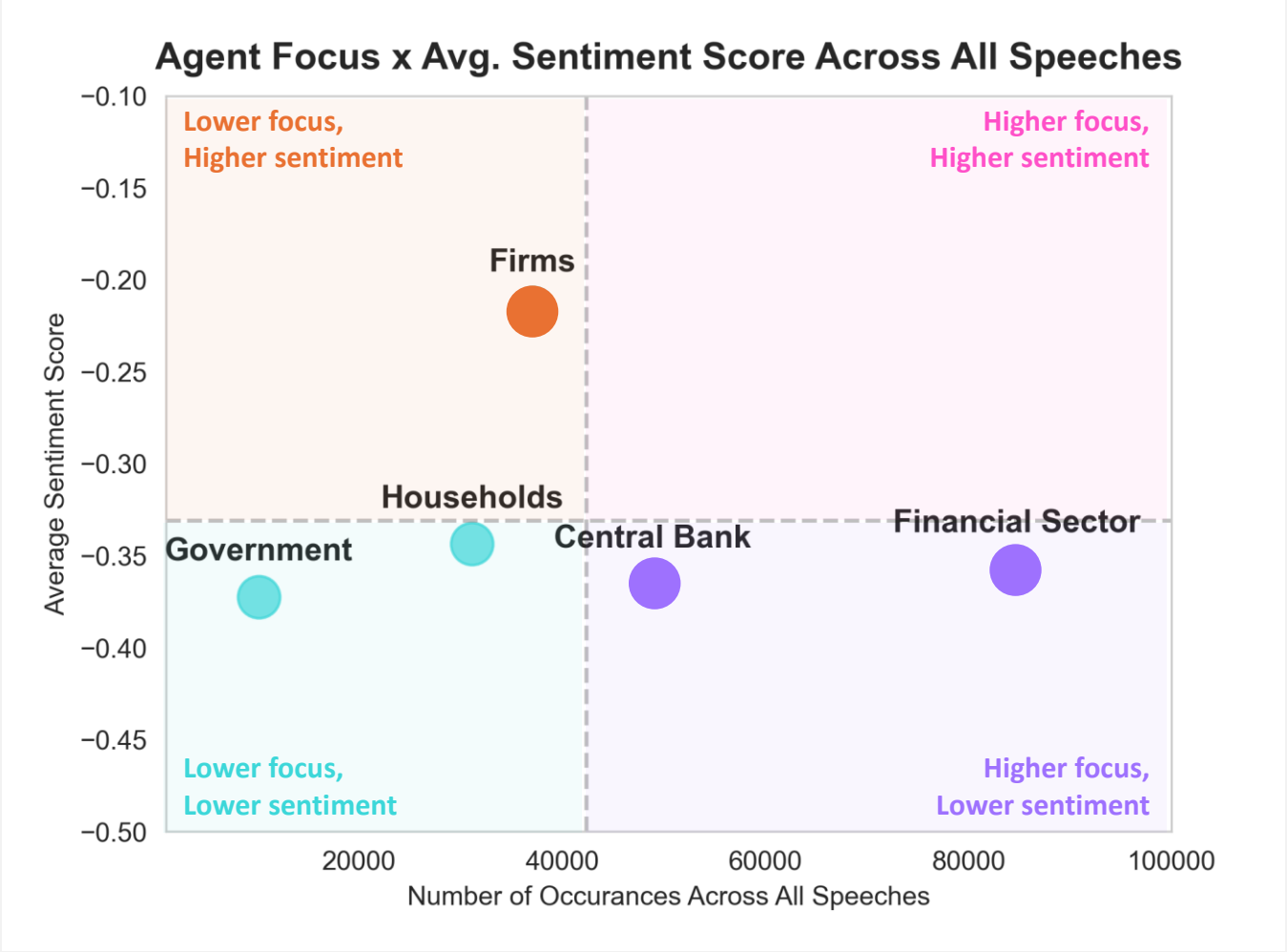
Offers advantages over other models – especially identification of economic agents

Benefits over other financial models:

- Highly domain specific
- Context-aware (vs. bag-of-words)
- 2nd Dimension (agent identification)

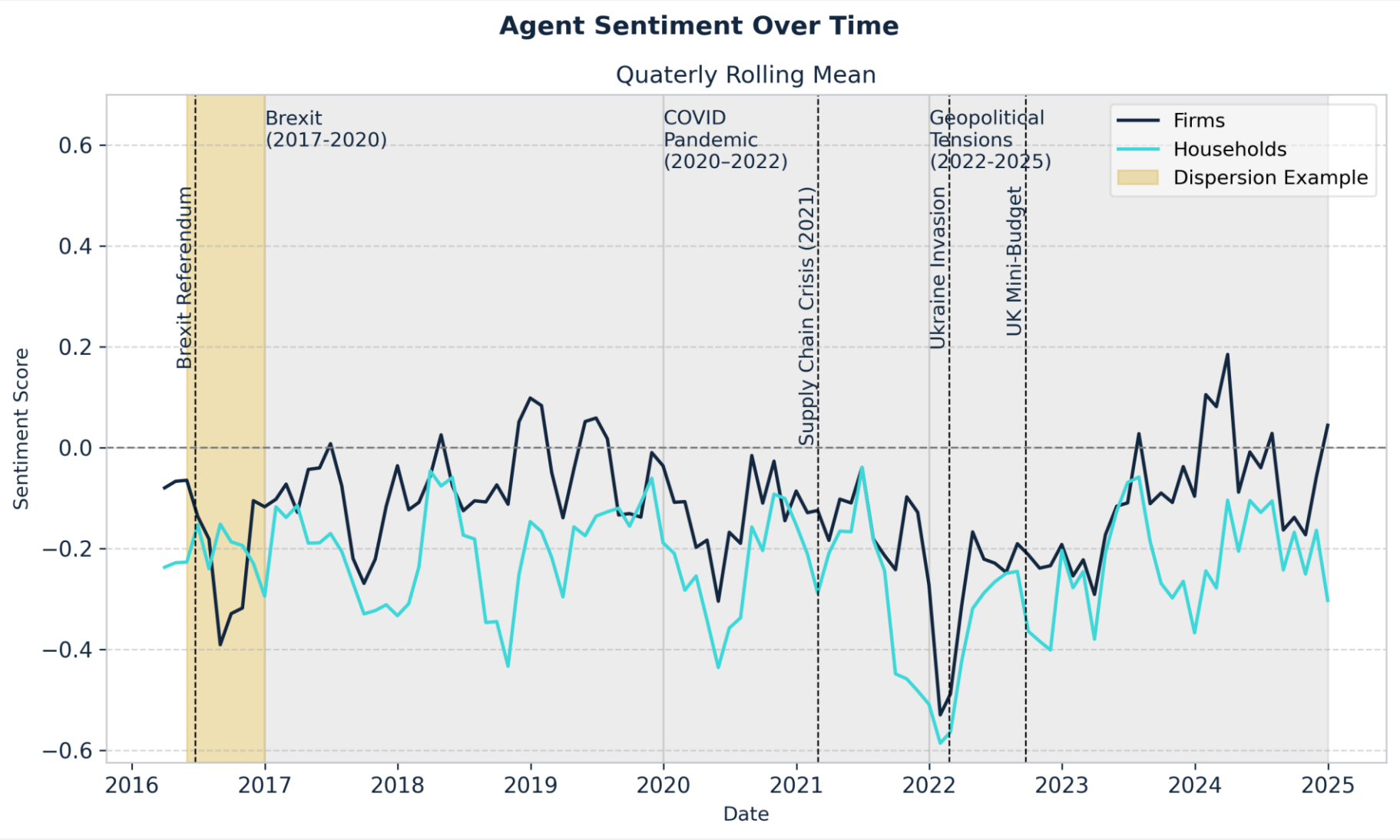
Benefits over generative LLMs:

- Cost
- Stability & reproducibility



Sentiment Differs Across Agents

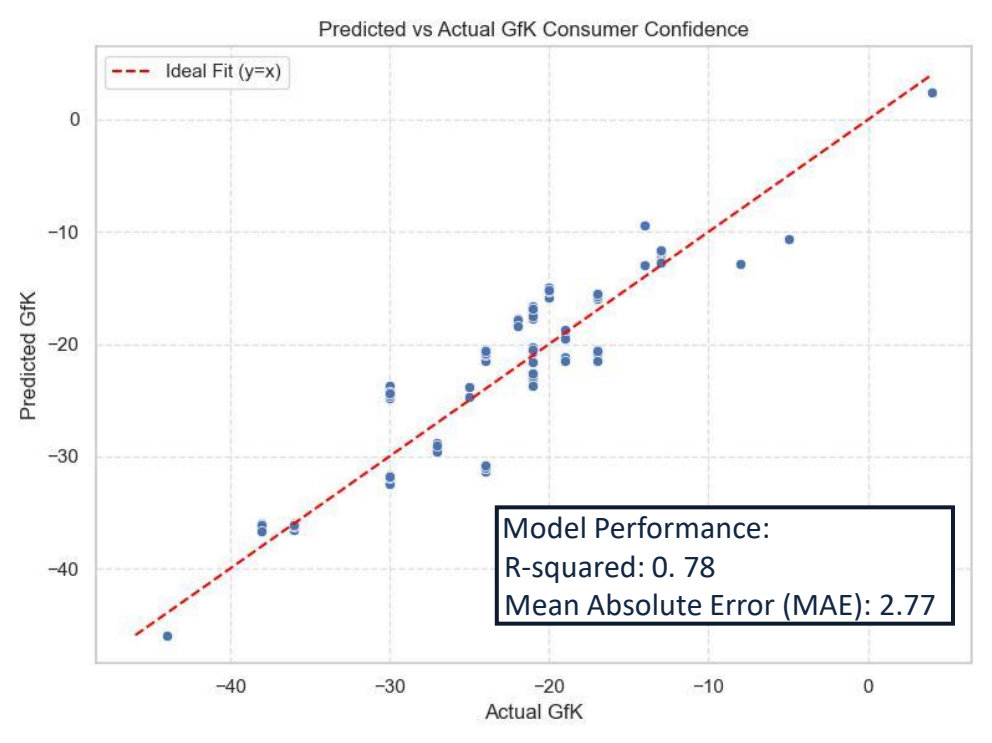
CBRoBERTa allows us to see agent divergence at key periods



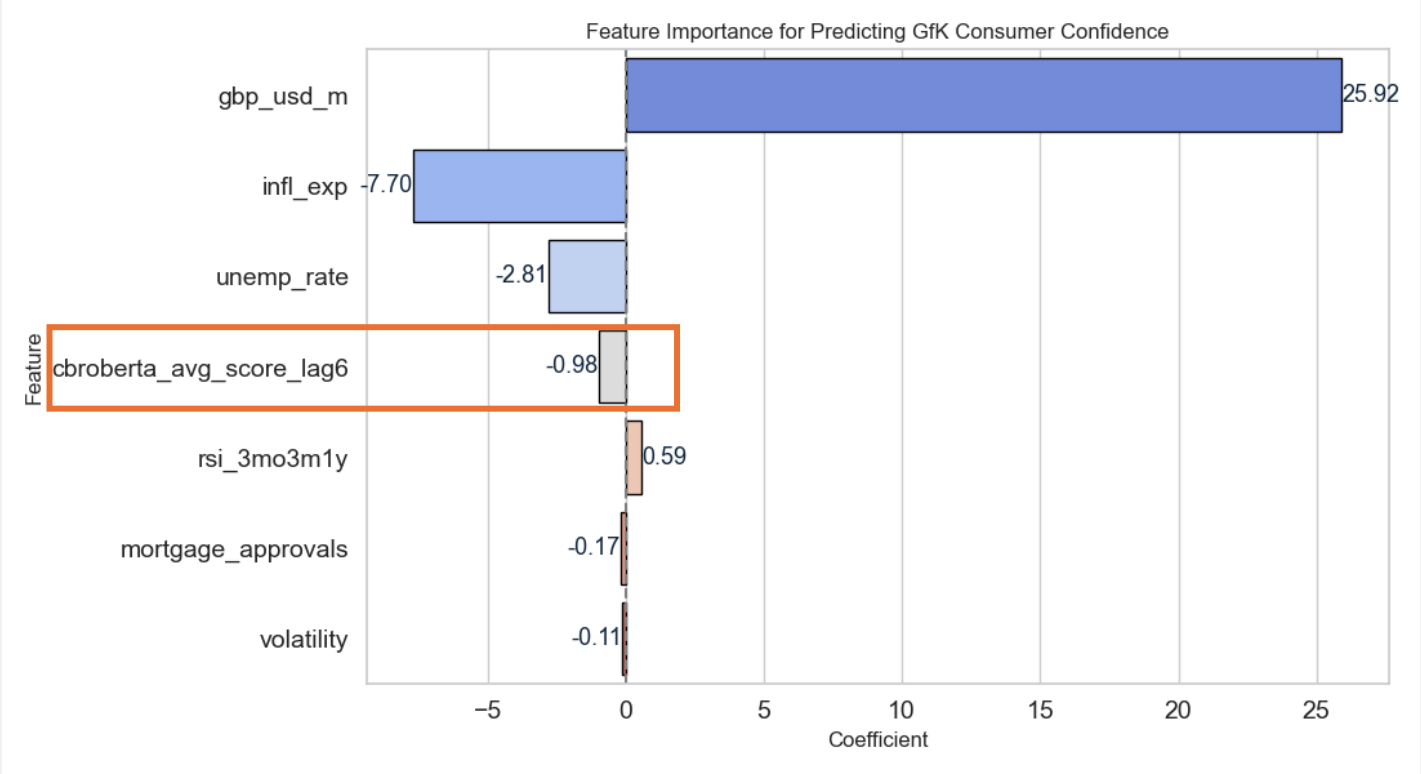
Predictive Power of Sentiment

Sentiment is a statistically significant predictor for movements of GfK Consumer Confidence

Model target: GfK Consumer Confidence
Features: Lagged Sentiment (+6 months) + Economic Indicators

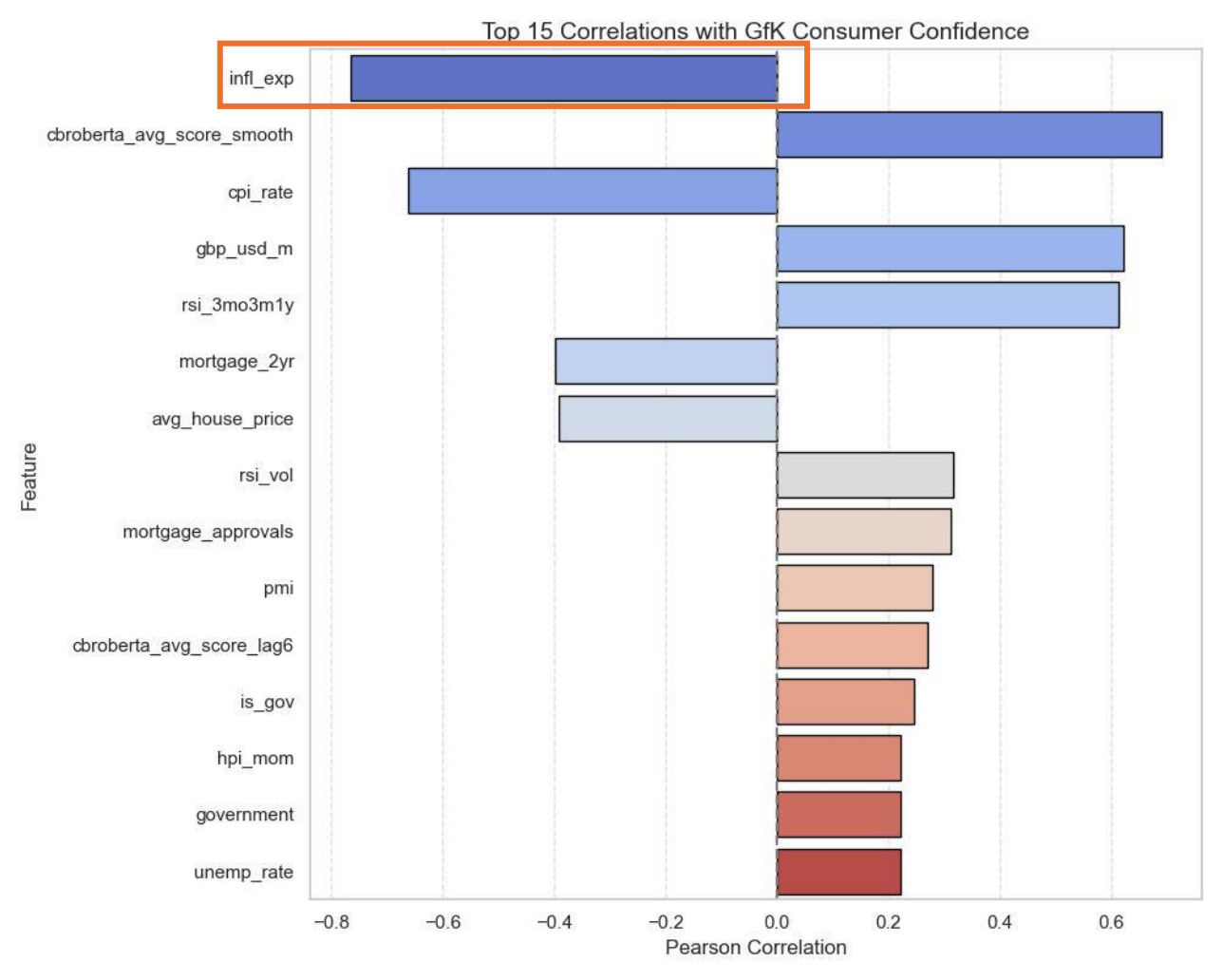


Feature Importance:



Choosing the Right Features

Correlations with GfK

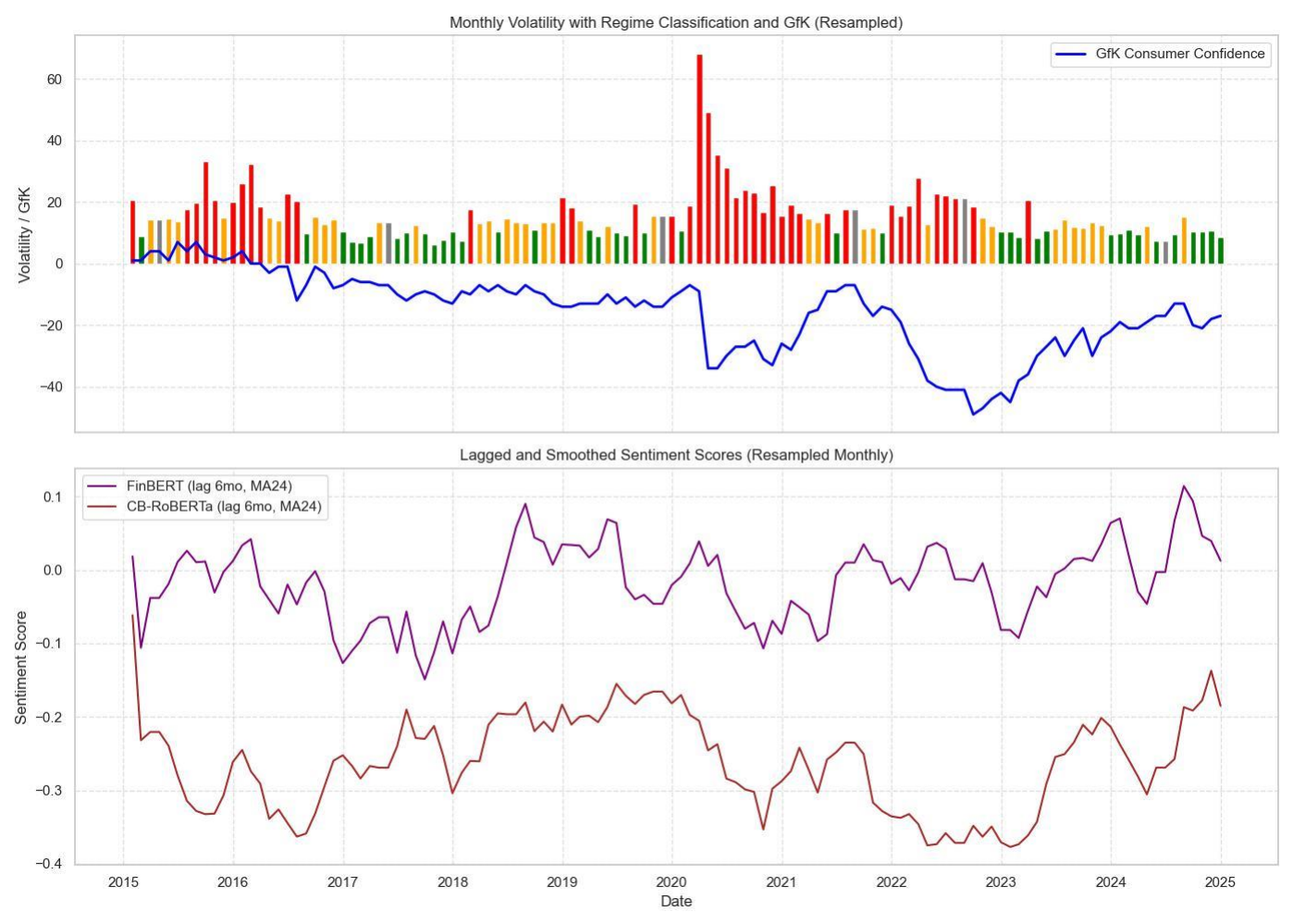


VIF helps to discard multicollinearity effects

	Feature	VIF
0	const	515.817590
1	infl_exp	12.086859
2	cpi_rate	10.279303
5	gbp_usd_m	3.278573
3	unemp_rate	2.900813
4	rsi_3mo3m1y	2.423719
6	mortgage_approvals	2.388070
8	volatility	1.230691
7	cbroberta_avg_score_lag6	1.033511

Crises Affect Predictive Power

Volatility episodes significantly affect model performance. Neutral periods are most predictable



Although BoE speech sentiment contains forward-looking information,
Linear Regression Models and smoothed sentiments struggle to capture sudden shifts during volatile periods.

	Volatility Regime	MAE	R2	n_samples
0	crisis	7.348943	-1.013763	204.0
1	neutral	3.656209	0.447694	234.0
2	calm	4.634563	-0.116240	219.0

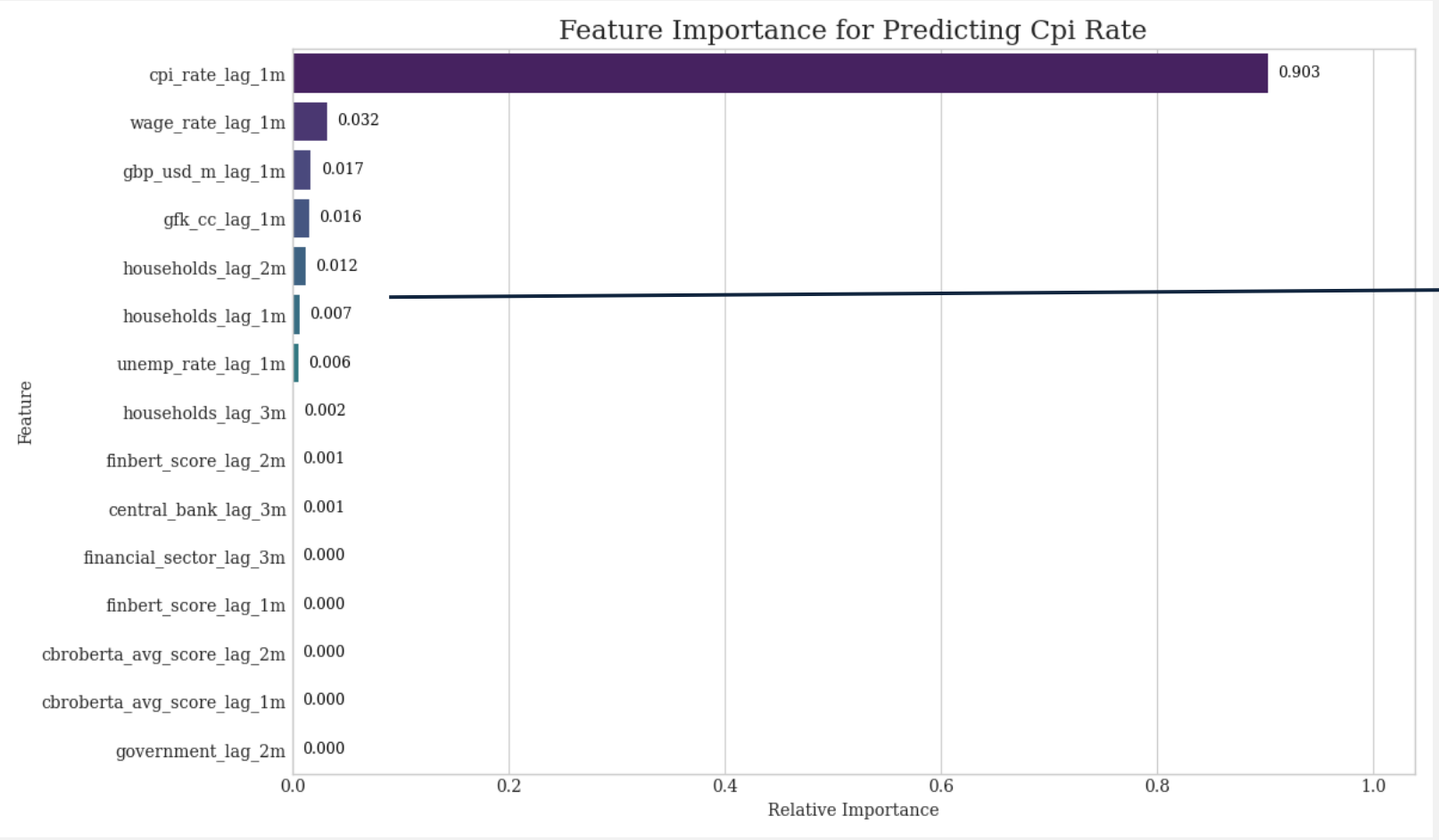
Takeaways

- **Economic Indicators are more important than Sentiment**
- **Communications matter**
- **Account for timing (lags)**
- **Explore more complex models**




Gradient Boosting Regression – Predicting Monthly CPI Rates

Bank of England's tone about households significantly contributes to predicting future inflation



For inflation (CPI Rate), key sentiment predictors were: how the Bank spoke about households, with a 2-month delay (Importance: 0.012), a 1-month delay (Importance: 0.007), and a 3-month delay (Importance: 0.002).

R-Squared = 57%

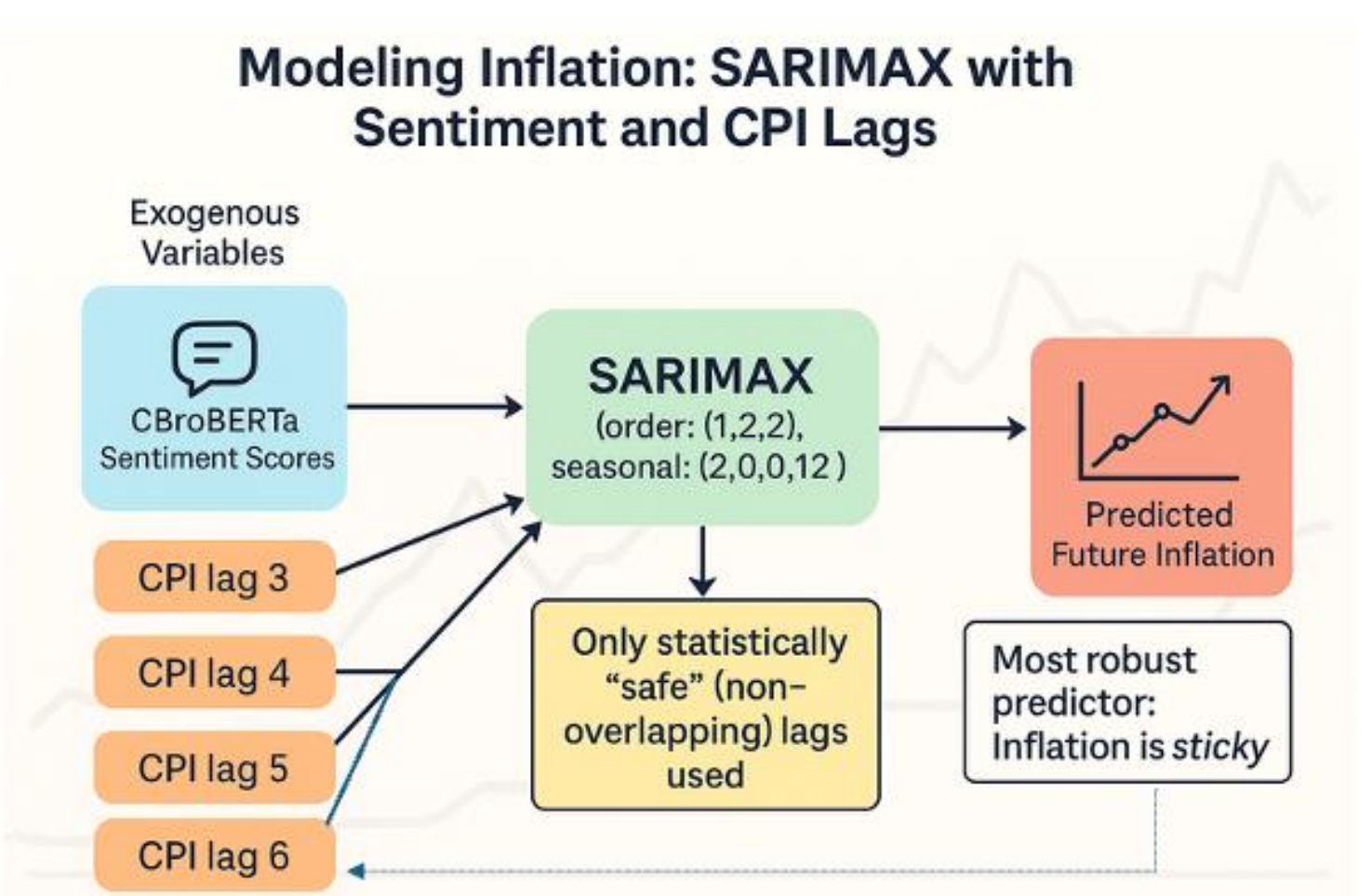
Mean Suared Error = 3.73

Recommendation

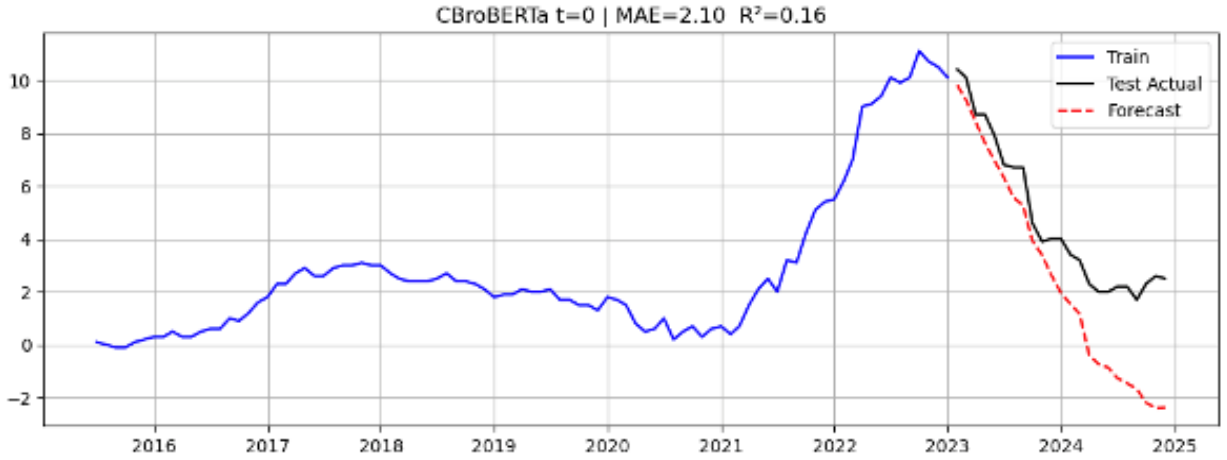
- **Implement a proactive sentiment intelligence system and integrate sentiment metrics directly into banks economic analysis tools.**
- **Track overall sentiment and granular sentiment toward key economic agents (e.g., financial sector, households).**
- **Incorporate lagged sentiment indicators (e.g., sentiment from 1–3 months prior)**




Time Series Modeling – SARIMAX Using CBroBERTa Speech Sentiment Scores



Contemporaneous Economic Agent Speech Sentiment Matters



Using CBroBERTa economic agent sentiment scores strongly improves forecasting accuracy compared to model using CBroBERTa sentiment average.

	Feature	Statistically Significant
0	firms	
1	central_bank	✅
2	households	
3	gfk_cc_lag1	
4	hpi_mom_lag1	
5	infl_exp_lag1	✅
6	wage_rate_lag1	
7	unemp_rate_lag1	
8	cpi_rate_lag3	
9	cpi_rate_lag4	
10	cpi_rate_lag5	
11	cpi_rate_lag6	✅

Adding lagged economic indicators (lag1), worsens the performance of the model. Poor lag structure? Indicators not truly exogenous?

Recommendations

- Use models that blend long inflation lags with CBroBERTa–derived central-bank speech sentiment to capture both persistence and communication effects.
  Orphanides & Williams (2005) emphasise that monetary policy affects inflation with long and variable lags, which must be explicitly modelled to avoid mistimed policy stances.

- Continuously recalibrate lags and feature sets to maintain robustness through rapid shifts.
  Primiceri (2005) introduces time-varying parameter VARs (TVP-VARs) that allow coefficients—and thus lag structures—to evolve over time, yielding more reliable forecasts when structural breaks occur.

- Prioritise central-bank messaging: The tone, emphasis and unexpected wording of BoE speeches can move expectations and thereby influence inflation outcomes, even in the absence of formal guidance.
  “Signalling” channel in BoE Staff Working Paper No. 978

Next Steps

1. **Integrate speech sentiment into predictive models**
2. **Experiment using lagged and contemporaneous features in predictive models**
3. **Track and compare perceived vs intended sentiment**
4. **Build real-time dashboards for sentiment monitoring**
5. **Incorporate market reactions into speech sentiment**




Thank You

LSE Team BEACON

Chris Buck, Germán de la Fuente,

Harshdeep Kohli, Kate Jacobs,

Kelvin Dhondee, Victoria Pogonyaylova