Inflation Anxiety, Social Media Sentiment, and Mental Health Demand in the UK

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Background and Motivation

High inflation has re-emerged as a pressing concern in the aftermath of the COVID-19 pandemic. In the UK, the inflation rate surged from about 1.5% in early 2020 to nearly 9% by early 2023 – levels not seen in decades . This spike in the cost of living has provoked widespread public anxiety. Surveys indicate that in mid-2022, 87% of Americans reported feeling anxious about inflation, and similarly in the UK, about 31% of adults felt anxious in a given month due to their personal financial situation amid the cost-of-living crisis . Such "inflation anxiety" – distress over rising prices and eroded purchasing power – is more than an economic sentiment; it carries potential mental health ramifications.

There is growing concern that financial stress from inflation is translating into greater mental health needs. Historical evidence links economic downturns and financial hardship to deteriorating mental well-being . Recent research in England confirms a significant uptick in mental health service usage corresponding to the post-2020 inflation surge . In fact, a study found that as prices climbed (especially for essentials like food, housing and utilities), the number of people in contact with mental health services rose markedly, particularly among working-age and elderly adults . This suggests that inflation's impact on household finances is contributing to rising demand for mental health care. Corroborating this, a new U.S. survey study reports that over three-quarters of working-age adults felt moderate or

high stress from inflation, which was associated with significantly higher odds of anxiety and depression symptoms .

The UK's National Health Service (NHS) is already witnessing unprecedented mental health service demand. Referrals to NHS mental health services reached a record high of approximately 5 million in 2023, a 33% increase from 2019 . This surge has strained capacity, leading to longer wait times and underscoring the need to understand what is driving the rise . While the COVID-19 pandemic undoubtedly fueled a backlog and higher prevalence of mental distress, policymakers and clinicians are now concerned that the ongoing cost-of-living crisis may be an additional driver of new mental health cases. Financial worries – such as difficulty affording food, heating, or housing – can induce chronic stress, which in turn can precipitate anxiety disorders, depressive episodes, and other mental health issues.

However, little is known about perceived inflation pressure ("inflation anxiety") at high frequency and its causal effect on mental health demand. Traditional economic indicators (e.g., monthly Consumer Price Index) tell researchers when prices rise, but they do not capture the public's anxiety or sentiment about inflation in real time. It is possible that perceptions of inflation (and the media discourse around it) can overshoot or lag actual inflation, influencing public psychology. Likewise, mental health service data often come with reporting lags and limited insight into causes behind the aggregate trends. This motivates exploring new data sources and methods to gauge inflation anxiety in the population on a real-time basis, and to examine how such anxiety might predict or causally impact mental health service uptake.

Social media offers a promising, high-frequency lens on public sentiment. Platforms like Twitter capture millions of unfiltered reactions to economic news, personal financial struggles, and mental health concerns on a daily basis. Analyzing this unstructured "social listening" data can provide timely indicators of societal trends that traditional surveys or official statistics might miss. In particular, Twitter has been used successfully to measure public attention and emotions around health and economic topics. For example, some research showed that mining Twitter for inflation-related chatter can produce a daily sentiment index that anticipates official inflation trends.

Building on these frameworks, the project will develop a novel "inflation anxiety" index

from Twitter data and investigate its relationship with mental health service demand in the UK. In particular, the goal is to harness daily Twitter sentiment to forecast and causally infer the effects of inflation anxiety on new mental health referrals to the NHS. By combining deep learning for sentiment classification and time-series forecasting with econometric techniques for causal inference, this project addresses questions of both predictive and causal importance.

Data and Methodology

To achieve the stated objectives, the project will assemble multiple data sources and employ a mix of natural language processing, time-series modeling, and causal inference techniques. The approach is outlined in the following stages:

Data Sources

Twitter Data (Inflation Tweets in the UK): Tweets will be collected using the Twitter API or a historical archive from 2019–2024, filtered by keywords such as "inflation," "prices," "cost of living," "bills," and "rent," as well as hashtags like #CostOfLivingCrisis. Location filters (e.g., geotags, user metadata) and UK-specific terms ("Bank of England") will improve national relevance. Tweets will be time-stamped and aggregated by day and potentially region, preserving only public, anonymized data.

NHS Mental Health Referrals Data: The outcome variable will be NHS mental health service referrals, primarily from the NHS Digital Mental Health Services Monthly Statistics. These may include new referrals, treatment completions, or call volumes. If only monthly data is available, it will serve as the baseline. Any higher-frequency alternatives (e.g., weekly calls) will be considered. The dataset will focus on England or the entire UK.

Macro and Socioeconomic Data: Control variables will include:

- Monthly CPI/CPIH (ONS)
- Monthly unemployment (ONS)
- Interest rates (Bank of England base rate)

- Consumer confidence indices (GfK) or inflation expectations
- Pandemic indicators (e.g., COVID-19 stringency index)
- Seasonal dummies and economic policy announcements

All series will be aligned temporally, likely monthly. A data diary will track data transformations and preprocessing.

Construction of the Inflation Anxiety Index

NLP Pipeline: A transformer-based model (BERT/RoBERTa) will be fine-tuned to identify anxious sentiment in inflation-related tweets. Cleaning will remove noise (e.g., URLs, emojis). If necessary, a custom dataset will be labeled to train a classifier to distinguish anxiety from general negativity or sarcasm. The model may classify tweets or produce continuous sentiment scores.

Aggregation: A daily index will be constructed. For day t, let $s_{i,t}$ be the anxiety score of tweet i, and N_t the number of tweets. Then,

$$\text{AnxietyIndex}_t = \frac{1}{N_t} \sum_{i=1}^{N_t} s_{i,t}$$

Alternate forms such as share of tweets classified as "anxious" will also be tested.

Validation: The index will be validated against known events (e.g., October 2022 inflation spike, energy hikes), Google Trends ("inflation help"), and potentially via Granger-causality checks. Aggregation to monthly frequency will match NHS data.

Forecasting Mental Health Referrals

Baseline: A benchmark autoregressive model will regress current referrals on lags and macro controls:

$$\text{Referrals}_t = \alpha + \beta_1 \text{Referrals}_{t-1} + \beta_2 \text{CPI}_t + \beta_3 \text{Unemployment}_t + \epsilon_t$$

With Sentiment: The inflation anxiety index (lagged) will be added to the model:

$$\text{Referrals}_t = \alpha + \beta_1 \text{Referrals}_{t-1} + \beta_2 \text{AnxietyIndex}_{t-1} + \beta_3 \text{CPI}_t + \ldots + \epsilon_t$$

Machine Learning: LSTM or Transformer sequence models will forecast referrals using sequences of prior sentiment, macro, and referral data. Tree-based methods (Random Forest, XGBoost) will serve as benchmarks.

Evaluation: Forecast accuracy will be measured via cross-validation (e.g., MAE, MAPE). Models will be tested on whether they predict turning points (e.g., 2022–2023 spikes). Deep learning gains will be compared against interpretable models.