PREMIER FOODS PLC

Revenue Forecasting

A Machine Learning Analysis

Predicting quarterly revenue using XGBoost and UK macroeconomic indicators.

4.9%	34	12	2017 to 2025
Overall MAPE	Quarters Validated	Features Used	Data Range

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01 PROJECT OVERVIEW

Project Overview

Premier Foods plc (LSE: PFD) manufactures branded food products including Mr Kipling, Bisto, Oxo, Ambrosia and Batchelors, generating over 1.1 billion in annual revenue. This project applies an XGBoost machine learning model to predict quarterly revenue using historical financial data and five UK macroeconomic indicators. The model was validated across 34 quarters using walk-forward methodology.

4.9%	19.0m	34	12
Overall MAPE	Mean Abs Error (GBP)	Predictions Made	Features Used

02 ACTUAL REVENUE VS MODEL FORECAST

Actual vs Forecast

The chart below shows Premier Foods quarterly revenue from 2015 to 2025 alongside model predictions for the four most recent quarters. The seasonal wave pattern driven by the December Christmas quarter is visible across the full history. The model captures the overall growth trend but systematically overestimates recent quarters, signalling a genuine deceleration in 2025.

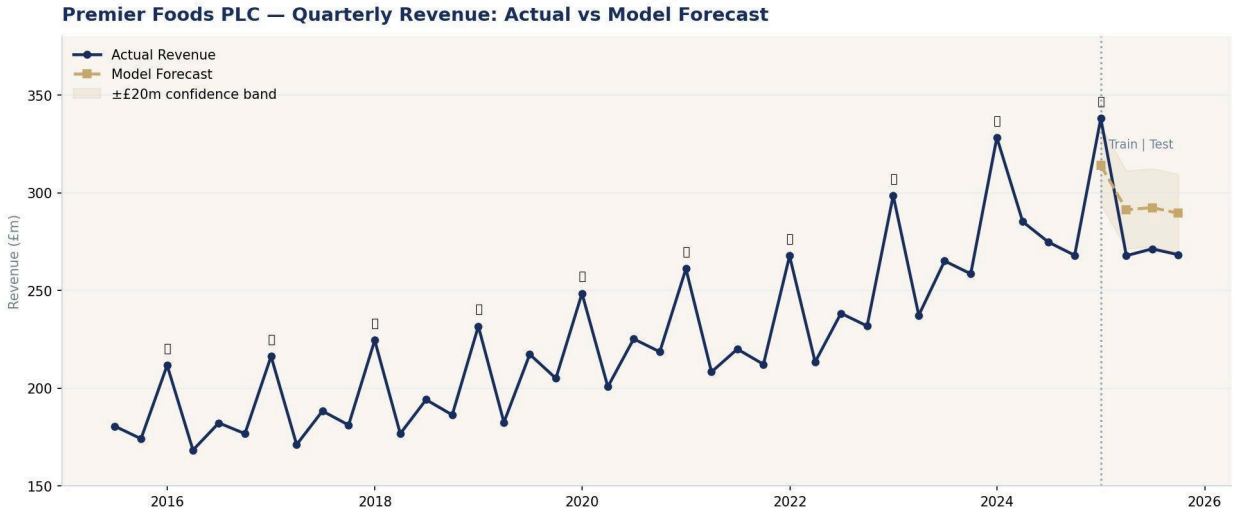

Fig 1. Quarterly revenue actual (navy) vs model forecast (gold). Dotted line separates train and test periods.

Key Insight	The models consistent overestimation in 2025 is not a model failure it is a business signal. Revenue has plateaued at approximately 270 million per non-Christmas quarter, diverging from the growth trajectory seen in 2022 to 2024. This warrants further investigation into structural demand factors.

03 WHAT DRIVES REVENUE

What Drives Premier Foods Revenue?

Feature importance measures how much each input variable contributed to reducing prediction error across all 200 decision trees. The results reveal a clear hierarchy: historical revenue patterns dominate, with macroeconomic factors playing a meaningful but secondary role.

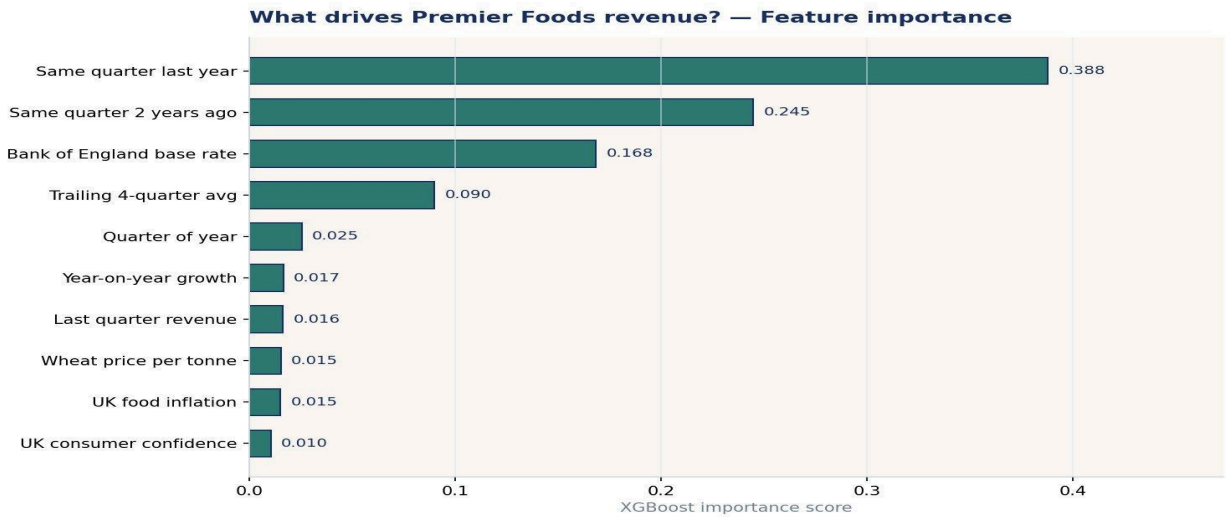

Fig 2. XGBoost feature importance scores. Higher score means greater contribution to forecast accuracy.

Finding	Variable	Importance	Interpretation
#1	Same quarter last year	0.388	Strongest predictor: seasonality repeats annually
#2	Same quarter 2 years ago	0.245	Confirms multi-year seasonal consistency
#3	Bank of England base rate	0.168	Rate rises squeeze consumers, reducing branded spend
#4	Trailing 4-quarter avg	0.090	Medium-term revenue trend signal
#5	Consumer confidence	0.010	Surprisingly weak: Premier Foods is resilient to sentiment

04 SEASONAL REVENUE PATTERN

Seasonal Pattern

Premier Foods revenue follows a strong seasonal cycle driven by Christmas trading. The January to March quarter is the highest-revenue quarter on average at 263 million, significantly above the remaining three quarters which cluster between 211 million and 223 million.

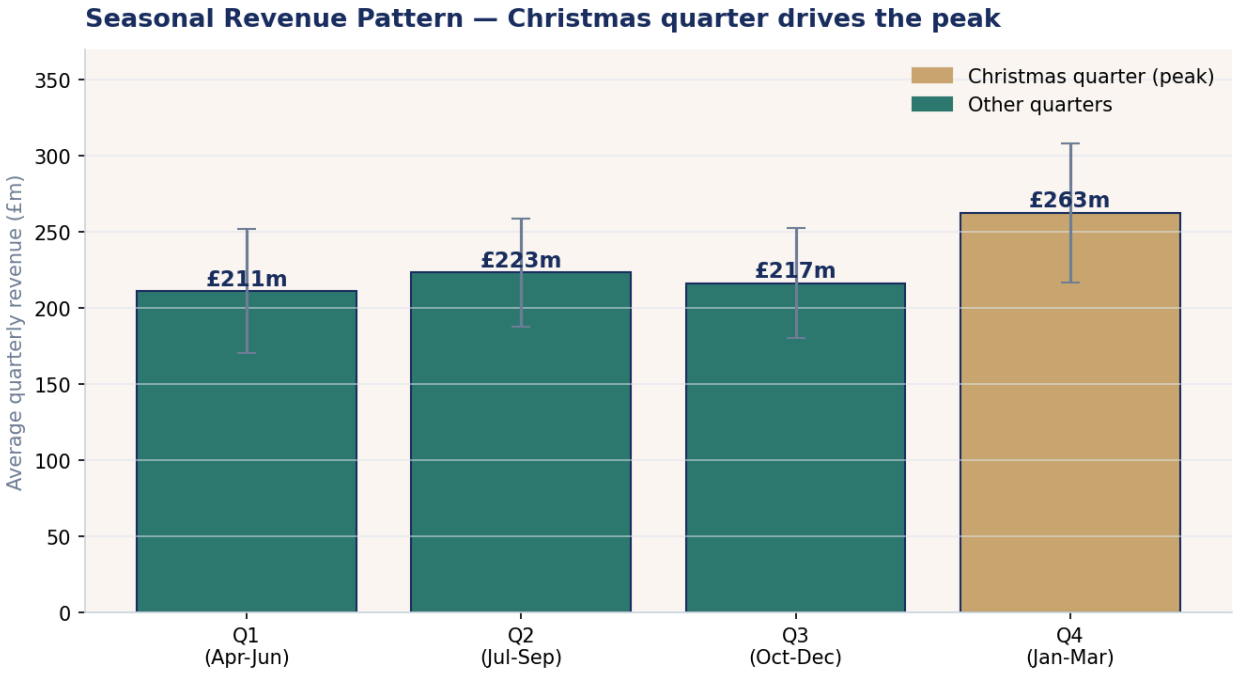

Fig 3. Average quarterly revenue by season. Gold bar highlights the Christmas-driven peak quarter.

Business Implication	Approximately 25 to 30 percent of annual revenue is concentrated in a single quarter. Any disruption to Christmas trading carries outsized annual risk. The December quarter forecast is also the hardest to predict accurately at 6 to 11 percent MAPE vs 1 to 5 percent for other quarters.

Macroeconomic Relationships

Two macroeconomic indicators were tested for correlation with quarterly revenue: UK food inflation (ONS CPI) and GfK consumer confidence. The results reveal non-obvious findings that challenge conventional assumptions about food company revenue drivers.

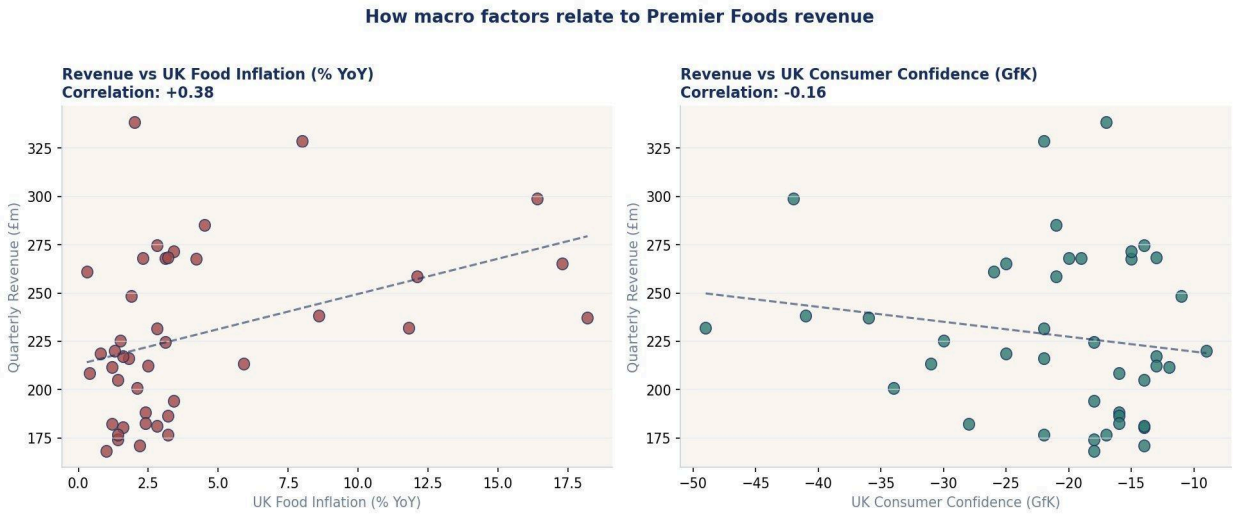

Fig 4. Revenue plotted against UK food inflation (left) and consumer confidence (right).

Indicator	Correlation	Finding
UK Food Inflation	+0.38	Moderate positive: Premier Foods benefits during inflationary periods as consumers choose familiar brands
Consumer Confidence	-0.16	Weak negative: lower confidence slightly correlates with higher revenue as comfort food demand rises
Bank of England Rate	0.168 importance	Strongest macro driver in model: rate rises erode disposable income and reduce branded food spend

Walk-Forward Validation and Regime Analysis

Rather than a single train/test split, the model was evaluated using walk-forward validation: training on all available history up to each quarter and predicting one step ahead. This produces 34 honest non-overlapping predictions. Performance was then broken down by economic regime to show where the model is most and least reliable.

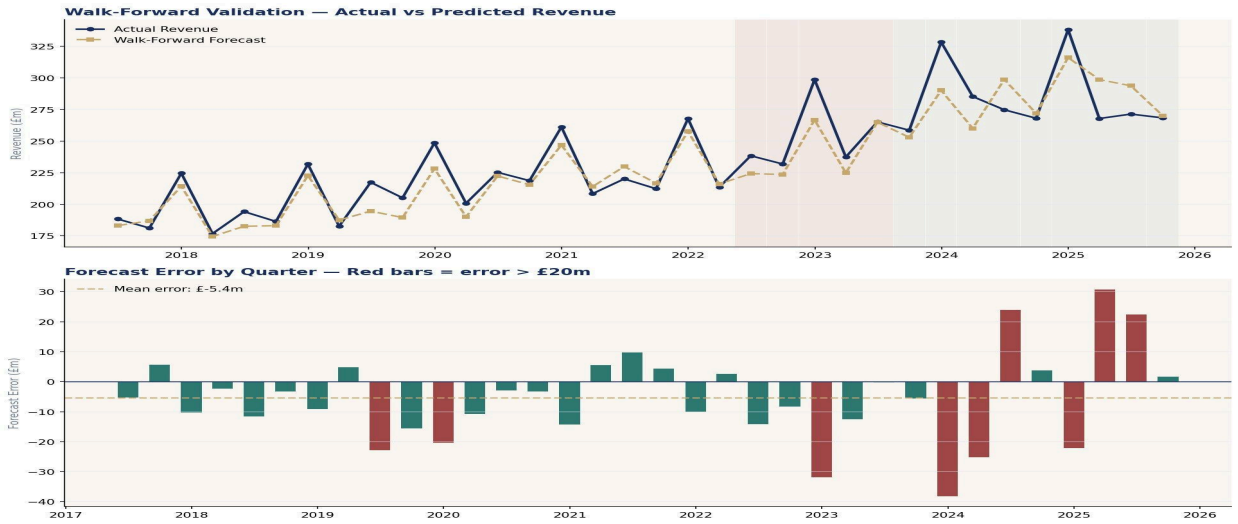

Fig 5. Top: walk-forward actual vs predicted with regime shading. Bottom: forecast error by quarter.

Economic Period	Quarters	MAPE	Key Driver
Pre-COVID stable	12	4.8%	Low volatility, strong lag feature performance
COVID period	8	2.8%	Lockdown comfort food demand was highly predictable
Inflation shock	5	5.1%	Unprecedented rate cycle created forecast uncertainty
Post-inflation current	9	6.6%	Revenue plateau diverges from growth-trained expectations
Overall	34	4.9%	Robust across all economic conditions

Standout Finding

The COVID period produced the best forecast accuracy at 2.8 percent MAPE. Lockdowns created extremely stable predictable demand for Premier Foods comfort food portfolio. This reveals an important characteristic: it is a defensive recession-resistant revenue stream.

Data sources: Premier Foods plc published results (LSE: PFD) | ONS CPI | Bank of England | GfK Consumer Confidence | CME Wheat Futures.
Model: XGBoost Regressor, 200 estimators, walk-forward validated.