

Shared Shocks, Divergent Dynamics: A Comparative Analysis of Food Inflation in the UK and Euro Area

Angel Rai

Professional Economist BSc and Apprenticeship Level 6

School of Economics

University of Kent, 2026

Executive Summary

This paper examines whether the recent divergence between UK and euro area food inflation reflects shared global shocks or differences in domestic price transmission. Using monthly data for 2000-2025, it treats food inflation as a transmission process linking global food prices, Brent oil, effective exchange rates, unemployment and food producer prices to consumer food prices, estimated with HAC short-run regressions, VECMs, impulse responses, variance decompositions and Granger causality tests. Global food shocks matter in both economies: after 24 months they explain a similar share of consumer food price variation, around 47-48%. However, direct monthly pass-through from global to consumer food prices is weak once producer prices are included, pointing to an indirect chain in which global shocks raise upstream and producer costs that feed through to consumers. The short-run producer to consumer channel is larger and faster in the UK, with a cumulative effect of around 0.71 compared with 0.47 in the euro area. Chow tests do not identify a structural break in January 2021, suggesting the post-2021 surge was a large shock moving through existing channels rather than a change in regime. The UK's divergence is better explained by larger and faster domestic pass-through than by unique exposure to global shocks. For monetary policy, food producer prices offer a useful intermediate signal of persistence: if they remain elevated after global commodity prices ease, food inflation may prove more persistent and more relevant for inflation expectations. VECM results are interpreted cautiously given residual autocorrelation, ARCH effects and non-normality.

AI Statement

I acknowledge the use of generative AI in drafting this paper. However, the work reported remains my own.

Acknowledgements

I am grateful to my colleagues at the Bank of England for their guidance, patience and support during my apprenticeship, and to my family and friends for their constant encouragement and always being there for me. Above all, praise be to God for His grace and faithfulness every step of the way.

Chapter 1: Introduction

1.1 Motivation and policy relevance

Food inflation has become a central policy concern because it directly affects household real incomes and is highly visible in everyday consumption. The UK food inflation surge after 2021 was not a marginal price movement, with the ONS reporting that food and non-alcoholic beverage inflation reached 19.1% in the year to March 2023, its fastest pace for over 40 years (ONS, 2023a). The euro area faced a similar food price shock, with Eurostat reporting food and non-alcoholic beverage inflation of 17.5% in March 2023 (Eurostat, 2023). The question is therefore not only whether food prices rose, but why food inflation evolved differently across economies exposed to broadly similar global shocks.

This distinction matters for monetary policy: if food inflation mainly reflects a temporary global commodity shock, domestic interest rate policy may have limited direct influence over the initial impulse. However, if the shock is transmitted persistently through domestic producer and consumer prices, it becomes more relevant for inflation expectations and headline inflation persistence. Recent Bank of England research finds that food price changes have a strong and persistent effect on UK consumers' inflation expectations (Bonciani, Masolo and Sarpietro, 2024). Therefore, food inflation is not only a relative price issue, but it can also influence how households understand inflation and how policymakers assess whether price pressures are likely to fade or persist.

1.2 Research questions and scope

This paper examines food inflation through a price transmission framework. The central research question is:

To what extent is the recent divergence between UK and euro area food inflation explained by shared global shocks versus differences in domestic price transmission?

The scope is monthly UK and euro area data from 2000 to 2025. The analysis focuses on aggregate consumer food prices, global food prices, Brent oil, effective exchange rates, food producer prices and unemployment. It does not attempt to model every possible determinant of food inflation or examine distributional impacts across households or individual food categories. Instead, it focuses on the channels most relevant to the research question: common global shocks, energy and exchange rate pressures, and domestic producer to consumer pass-through. This keeps the empirical specification focused and testable, while still capturing the main channels identified in the economic framework.

The euro area is used as the comparator because it was exposed to many of the same external shocks as the UK, particularly after Covid-19 and the Russia-Ukraine war, but operates within a different domestic pricing and institutional environment. The comparison is not intended to claim that the UK was uniquely affected by global shocks; rather, it asks whether similar shocks were transmitted differently.

1.3 Hypotheses and contribution

The research question leads to three empirical expectations. First, global food prices should matter in both economies because food commodities are internationally traded and both regions are exposed to global cost shocks. Second, direct monthly pass-through from global food prices to consumer food inflation may be limited once food producer prices are included, because food prices move through several domestic pricing stages before reaching households. Third, if UK food inflation has diverged from the euro area, the difference is expected to arise more from domestic price transmission than from a completely different global shock.

These expectations are tested through three hypotheses:

- H1: Global food price shocks affect consumer food inflation in both the UK and the euro area
- H2: Global shocks affect consumer food inflation mainly through domestic food producer prices rather than immediate direct pass-through
- H3: UK food inflation divergence reflects stronger domestic producer to consumer pass-through relative to the euro area

The contribution of the paper is to compare UK and euro area food price transmission over 2000-2025 and assess whether divergence reflects common global shocks or differences in domestic pass-through. This contributes to the literature by combining recent UK and euro area policy evidence with a direct empirical comparison. It also separates direct external pass-through from producer to consumer transmission, which is important because a global shock can be common while its domestic inflationary effect differs. Closely related studies typically examine one economy at a time: Davidson et al. (2016) study world commodity prices and UK retail food inflation, while Ferrucci, Jimenez-Rodriguez and Onorante (2012) and Kuik et al. (2024) focus on the euro area. By estimating the same model for both economies over the same period, this paper can compare their transmission directly.

The rest of the paper proceeds as follows: Chapter 2 reviews the literature on food price pass-through, exchange rate effects, energy costs and the monetary policy relevance of food prices. It develops the framework linking global shocks, producer prices and consumer food inflation. Chapter 3 sets out the data and econometric approach. Chapter 4 presents the empirical results, comparing short-run pass-through, long-run dynamics and robustness checks across the UK and euro area. Chapter 5 concludes by drawing out the monetary policy implications, limitations and areas for future research.

Chapter 2: Literature review and economic framework

This chapter sets out the economic mechanisms through which global food and energy shocks can affect UK and euro area food inflation. The purpose of the review is to identify the strands of literature that motivate the empirical strategy used later: commodity price pass-through, producer to consumer transmission, exchange rate pass-through and the monetary policy relevance of food prices. The main gap is comparative: existing evidence is rich for the UK and euro area separately, but less often asks whether a common global shock is transmitted differently across the two economies.

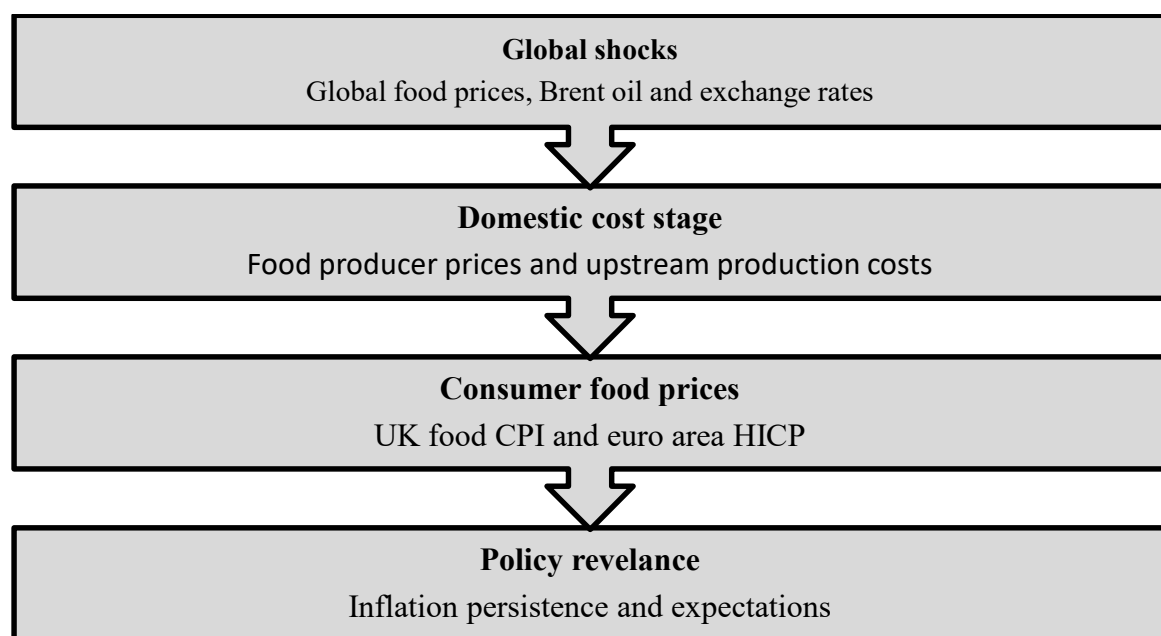
2.1 Food inflation as a pass-through problem

Economic theory offers two broad perspectives on inflation. In the demand pull view, inflation arises when aggregate demand grows faster than the economy's productive capacity, often supported by loose monetary conditions. In the cost push view, inflation arises when higher input costs, such as food commodities, energy or imported goods, are passed on to consumers even without excess demand. The post-2021 food price surge fits mainly within the cost push perspective, consistent with this paper's focus on the cost transmission chain. However, monetary conditions can still affect how persistent a cost shock becomes, and they differed across the two economies. Both central banks had expanded asset purchases during the pandemic, but the Bank of England began raising Bank Rate in December 2021, while the ECB first raised its key interest rates in July 2022 (Bank of England, 2021; ECB, 2022). The monetary policy stance is not modelled directly, which is noted as a limitation in Section 5.3.

Food inflation is best understood as a pass-through problem rather than a single shock story. Global food commodities, energy prices and exchange rates may create the initial cost pressure, but the effect faced by households depends on how those pressures move through domestic producer prices and into consumer food prices. This is why the paper treats food

inflation as a transmission process, rather than regressing consumer food prices on global food prices. Recent UK evidence supports this framing: ONS producer price data show that imported food material input prices rose by 25.7% in the year to January 2023, while food product producer prices rose by 17.1% (ONS, 2023b). These upstream pressures suggest that the recent food price shock was not limited to final consumer prices but was transmitted through the food production and pricing chain. For the euro area, ECB analysis shows that the post-2021 rise in consumer food prices reflected a combination of energy costs, global food commodities, farmgate prices and food sector producer prices (Kuik et al., 2024). These patterns motivate a model that includes both common external shocks and domestic upstream price measures. Figure 2.1 summarises this transmission mechanism.

Figure 2.1: Food price transmission mechanism



2.2 Commodity pass-through and the food price chain

The agricultural price transmission literature shows why pass-through is rarely full or immediate. Meyer and von Cramon-Taubadel (2004) survey evidence on asymmetric price transmission and show that adjustment costs, market power and imperfect competition can prevent upstream price changes from being passed on proportionately. Lloyd et al. (2006) make a similar point using UK food chain evidence: shocks can be transmitted unevenly between producers and retailers, so retail prices do not necessarily move proportionately with farmgate or other upstream prices.

The most relevant UK evidence is Davidson et al. (2016), who analyse world commodity prices and UK retail food inflation using a cointegrated VAR framework. Their key insight is directly relevant here: world agricultural prices are not the only determinant of retail food inflation; exchange rates, oil prices and the persistence of shocks also matter. This supports the inclusion of global food prices, Brent oil, effective exchange rates and domestic food producer prices in the empirical model. Ferrucci, Jimenez-Rodriguez and Onorante (2012) provide the closest euro area comparison. They examine food price pass-through along the euro area food chain and emphasise that global commodity prices may be an imperfect proxy for domestic cost pressures because institutional and agricultural market features shape the transmission process. This supports the paper's use of euro area producer prices rather than relying only on global commodity prices.

2.3 Energy and exchange rate channels

Food price shocks also interact with energy and currency movements. Baffes and Haniotis (2010) argue that the 2006-08 commodity boom reflected stronger links between energy and non-energy commodity markets, while Hamilton (2003) shows that oil shocks can have non-linear macroeconomic effects. However, the oil food price relationship should not be interpreted as an automatic direct pass-through channel. Baumeister and Kilian (2014) find little evidence that oil price shocks generated more than negligible increases in US retail food prices over the period they study, with similar results for other industrialised economies. This is important for interpretation: Brent oil is included because it captures energy, transport and input cost pressures, but the results should not be read as implying a clean positive oil to food inflation channel.

Exchange rate pass-through is also important in open economies such as the UK and euro area. Campa, Goldberg and Gonzalez-Minguez (2005) find that exchange rate pass-through to euro area import prices is substantial but incomplete in the short run. Burstein and Gopinath (2014) similarly emphasise that international price adjustment depends on invoicing, local costs and pricing behaviour. For food inflation, this means exchange rates can affect the domestic currency cost of imported food and inputs, but the effect may be delayed and incomplete. This motivates including effective exchange rates while interpreting them cautiously.

2.4 Recent UK and euro area policy evidence

Recent central bank evidence strengthens the policy motivation for this topic. ECB work on euro area food inflation shows that energy, global food commodities and farmgate prices contributed to the surge, while domestic factors such as wages and margins may help explain why food inflation remained elevated (Kuik et al., 2024). A later ECB blog argues that food prices are especially important because they form a large and visible part of the consumer basket, are purchased frequently by households and influence inflation expectations (Bobeica, Koester and Nickel, 2025).

For the UK, Bank of England research reinforces this interpretation. Bonciani, Masolo and Sarpietro (2024) find that food price changes have a strong and persistent effect on UK consumers' inflation expectations, with food shocks affecting expectations more than a representative inflation shock. Anesti, Esady and Naylor (2025) go further, showing that food prices matter more for household inflation expectations than other consumption categories, including energy. This is important for monetary policy: even if food inflation begins as a supply shock, it can become policy relevant if it affects expectations or is transmitted persistently through domestic producer and consumer prices. Table 2.1 summarises how each strand of the literature informs the analysis.

Table 2.1: Literature strands and relevance to this paper

Literature strand	Key sources	How it informs this paper
Food price chain	Meyer and von Cramon-Taubadel (2004); Lloyd et al. (2006)	Pass-through may be incomplete, delayed or asymmetric, so the analysis focuses on producer to consumer transmission rather than only global prices
UK food inflation	Davidson et al. (2016); ONS (2023a, 2023b)	World prices matter, but exchange rates, oil prices, shock persistence and food producer prices also shape domestic food inflation
Euro area food inflation	Ferrucci et al. (2012); Kuik et al. (2024)	Food price pass-through depends on farmgate, energy and producer price stages, supporting the euro area VECM specification
Policy relevance	Bonciani et al. (2024); Anesti et al. (2025); Bobeica et al. (2025)	Food prices influence inflation expectations, so persistent pass-through has monetary policy relevance

2.5 Implications for the empirical analysis

The literature implies that food inflation should be analysed as a transmission process rather than as a direct effect from global commodity prices to consumer prices. Global food prices, Brent oil and exchange rates capture common external pressures, while food producer prices capture the domestic cost stage through which these pressures may reach consumers. This distinction is key to the empirical analysis, so the paper tests not only whether global shocks matter, but also whether their impact on consumer food inflation passes through domestic producer prices.

This framing avoids assuming either that global shocks are irrelevant or that the UK is uniquely exposed to them. Instead, it allows the empirical analysis to compare whether common external shocks are transmitted differently through UK and euro area food producer prices. Chapter 3 sets out the data and econometric strategy used to test these transmission channels.

Chapter 3: Data and methodology

3.1 Data and variables

This chapter sets out the data and empirical approach used to examine whether the recent divergence between UK and euro area food inflation dynamics reflects shared global shocks or differences in domestic price transmission. The comparison is made by estimating the same food price transmission model for the UK and the euro area, then comparing the strength and persistence of the relevant pass-through channels.

The dataset is monthly and covers January 2000 to December 2025. Monthly data are appropriate because food price pass-through is dynamic rather than instantaneous, so global commodity, energy and exchange rate shocks may affect input costs and producer prices before feeding into consumer food prices. All variables are rebased to 2015=100 before estimation and then transformed into natural logarithms. For price indices, monthly inflation is measured as the first differences of logs (Equation 1):

$$\pi_{i,t} = \Delta \ln(P_{i,t}) = \ln(P_{i,t}) - \ln(P_{i,t-1}) \quad (1)$$

For unemployment, the same transformation is interpreted as a proportional change in the rebased unemployment index, not as an inflation rate. This distinction is important because

unemployment is included as a domestic macroeconomic control rather than as a price variable. Table 3.1 summarises the variables and their economic role.

Table 3.1: Variables used in the empirical analysis

Variable	Source	Economic interpretation
UK food consumer prices	ONS food and non-alcoholic beverages CPI	UK consumer food price outcome
Euro area food consumer prices	Eurostat food and non-alcoholic beverages HICP	Euro area consumer food price outcome
Food producer prices	ONS food PPI; Eurostat food manufacturing PPI	Domestic upstream food cost pressure
Global food prices	FAO Food Price Index	Common global commodity price shock
Brent crude oil	EIA Brent spot price	Energy, transport and input cost pressure
Effective exchange rate	BIS nominal effective exchange rate indices	Import price and currency pass-through channel
Unemployment	ONS and Eurostat unemployment series	Domestic macroeconomic control

The sample covers several major price shock episodes, including the 2007-08 food and energy price surge, Covid-19 and the Russia-Ukraine war. Covid-19 and Russia-Ukraine war dummies are included because these events were large and clearly dated. Earlier shocks remain in the sample but are not separately dummy coded, which avoids overloading the specification with deterministic controls and preserves degrees of freedom.

3.2 Model specification

The empirical specification distinguishes direct external pass-through from domestic producer to consumer transmission. The short-run robustness model is estimated in log differences (Equation 2):

$$\Delta y_{r,t} = c_r + \sum_{j=0}^p \beta'_{r,j} \Delta x_{r,t-j} + \sum_{j=1}^p \phi_{r,j} \Delta y_{r,t-j} + \theta'_r d_t + u_{r,t} \quad (2)$$

Here, r indicates the economy being estimated, either the UK or the euro area. y is the logged consumer food price index, while x contains global food prices, Brent oil prices, the relevant effective exchange rates, unemployment and domestic food producer prices. The vector d contains the Covid-19 and Russia-Ukraine dummies; in the VECM specification it also includes monthly seasonal dummies. Two monthly lags are used, consistent with the lag selection results.

The expected signs follow from the economics of price transmission theory. Higher global food prices and higher food producer prices are expected to raise consumer food inflation. Brent oil may raise food prices through energy, transport and input cost channels. Exchange rate effects depend on the direction of the index: if a higher effective exchange rate represents an appreciation, the expected effect on food inflation is negative because imported goods and inputs become cheaper. Unemployment is included to control for domestic macroeconomic conditions, but it is not expected to be the main driver or pass-through channel of food price movements.

3.3 Estimation approach

Estimation begins by establishing the time series properties of the data. Trending macroeconomic variables can generate spurious regression if they are treated as stationary. Plots, correlograms and Augmented Dickey Fuller (ADF) tests are therefore used to determine the order of integration (Dickey and Fuller, 1979). The stationarity tests indicate that the key variables are non-stationary in levels but stationary in first differences, so they are treated as integrated of order one. Therefore, the analysis combines short-run models in first differences with cointegration methods.

Lag length is selected using the Akaike Information Criterion (AIC; Akaike, 1974), Bayesian Information Criterion (BIC; Schwarz, 1978) and Hannan-Quinn Criterion (HQC; Hannan and Quinn, 1979). For the UK, all three criteria select two lags. For the euro area, BIC and HQC select two lags, while AIC selects three. The two lag specification is kept in both cases to keep the comparison consistent, capture short-run monthly dynamics and avoid excessive parameter loss in a six variable model.

Cointegration is tested using the Johansen approach (Johansen, 1988). This is appropriate because the analysis contains more than two potentially cointegrated variables. For each region, the logged variable vector is ordered as global food prices, Brent oil prices, the effective exchange rate, unemployment, the food PPI and the relevant consumer food price

index. Where cointegration is found, the preferred specification is therefore a vector error correction model (VECM) (Equation 3):

$$\Delta z_{r,t} = \alpha_r (\beta_r' z_{r,t-1} + \mu_r) + \sum_{j=1}^{p-1} \Gamma_{r,j} \Delta z_{r,t-j} + \Psi_r d_t + \varepsilon_{r,t} \quad (3)$$

In this model, z is the vector of logged variables, β contains the long-run cointegrating relationship with a restricted constant, and α measures adjustment back towards that relationship, while lagged differences capture short-run dynamics. The vector d_t contains the event controls and monthly seasonal dummies included through the deterministic terms. Since the selected lag order is 2, the model includes one lag of differenced variables. The VECM is preferred to a model only in first differences because it preserves long-run information where cointegration is present. The cointegrating vectors are not interpreted as one way elasticities, because their signs and magnitudes depend on normalisation. Therefore, economic interpretation focuses on the short-run equations, impulse response functions (IRFs), forecast error variance decompositions (FEVDs), Granger causality tests and robustness checks. IRFs trace the response path of consumer food prices following shocks to global food prices, Brent oil, exchange rates and domestic producer prices. FEVDs show how much of future consumer food price variation is explained by each shock. Granger tests are interpreted as evidence of predictive content rather than proof of structural causality (Granger, 1969).

3.4 Diagnostics and robustness

The main identifying assumption is that global food prices are external to UK and euro area consumer food inflation. This is plausible because domestic consumer food prices are unlikely to determine global food prices, and it is assessed using weak exogeneity tests. The exchange rate channel is interpreted more cautiously because effective exchange rates can also respond to monetary policy expectations, inflation news and wider macroeconomic conditions.

A range of diagnostic tests are used to assess whether the model estimates are reliable enough for economic interpretation. Variance inflation factors (VIFs) test for multicollinearity among the regressors. Residual autocorrelation tests assess whether the selected lag length captures remaining serial dependence in the VECM residuals, using multivariate LM tests (Lütkepohl, 2005). Autoregressive conditional heteroskedasticity (ARCH) tests examine time varying volatility clustering (Engle, 1982), while Doornik-Hansen tests assess residual normality (Doornik and Hansen, 2008). CUSUM and CUSUMSQ tests are used for parameter and variance stability (Brown, Durbin and Evans, 1975). Chow tests around January 2021 are

used to test whether the post pandemic period represents a formal structural break (Chow, 1960).

The results are interpreted through complementary evidence rather than a single coefficient. The VECM captures the long-run price relationship. IRFs and FEVDs show the timing and relative importance of shocks. Autoregressive Distributed Lag (ARDL) robustness equations and heteroskedasticity and autocorrelation consistent (HAC) regressions are then used to test whether the main short-run pass-through results remain robust under alternative dynamic specifications and weaker residual assumptions with more cautious inference. This step is important because the VECM diagnostics indicate residual autocorrelation and conditional heteroskedasticity, which are common in monthly food and commodity price data, where large shocks tend to generate volatility clustering. To avoid relying only on standard errors that may be too narrow, short-run dynamic regressions are estimated using Newey-West HAC standard errors with a Bartlett kernel and six lag bandwidth (Newey and West, 1987). These HAC regressions provide the main robustness check on short-run pass-through.

Overall, the methodology is designed to answer three linked questions: whether consumer food prices share a long-run relationship with global costs, whether global shocks reach consumers directly or through producer prices, and whether producer to consumer pass-through is stronger in the UK than in the euro area.

Chapter 4: Results and discussion

This chapter tests whether the UK's divergence from euro area food inflation is better explained by stronger exposure to global commodity shocks or by differences in how common shocks pass through domestic prices. The evidence is treated cumulatively rather than as a list of estimates. First, pre-tests establish why levels regressions cannot be used as pass-through evidence. Second, HAC regressions test short-run producer to consumer transmission. Third, VECM evidence, impulse responses, FEVDs and Granger tests assess longer-run propagation and the distinction between direct and indirect global food channels. The chapter's central result supports a 'common shock, different transmission' interpretation: global food shocks matter in both economies, but the strongest short-run difference is larger UK food PPI pass-through.

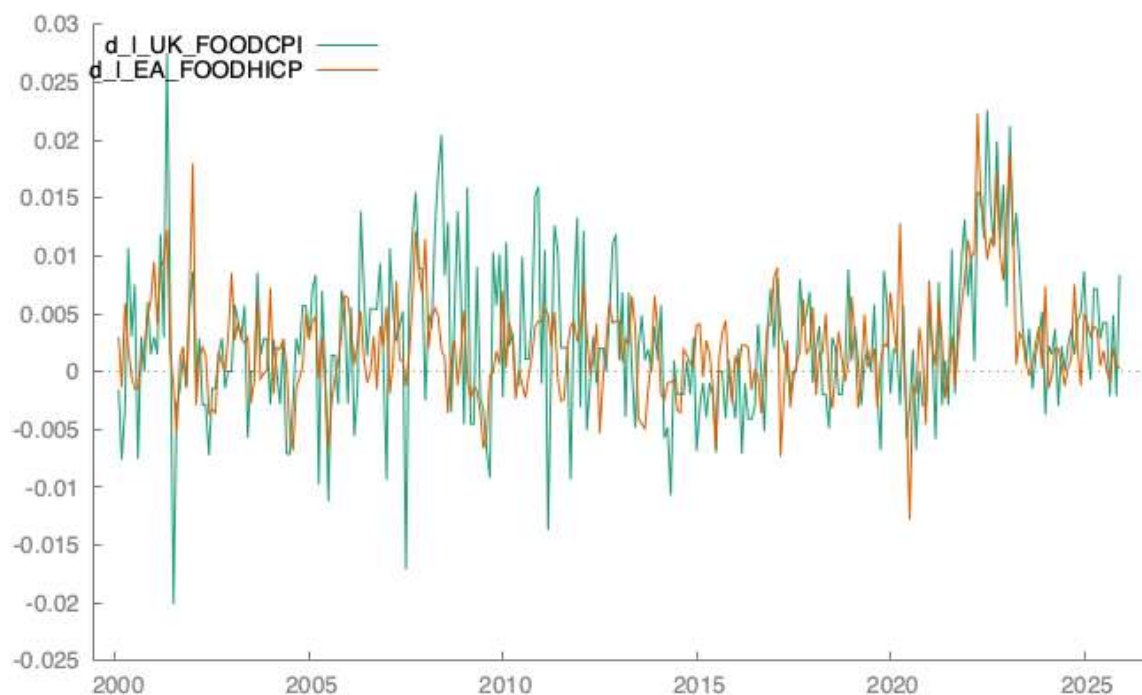
4.1 Preliminary evidence and time series properties

Figures 4.1 and 4.2 show why the research question cannot be answered by comparing headline food inflation rates alone. In logged levels, UK food CPI and euro area food HICP move together around the 2007-08 food and energy shock and again after 2021. In first differences, the UK series is visibly more volatile in several periods, especially during the late 2000s shock and the post-2021 surge. The preliminary evidence shows strong co-movement between UK and euro area consumer food prices. This points to a shared shock environment, but it does not reveal whether the later UK euro area gap came from global exposure, domestic pass-through or both.

Figure 4.1: Logged UK and euro area food consumer price indices, 2000-2025



Figure 4.2: Monthly UK and euro area food inflation, log differences, 2000-2025



Formal pre-testing (Table 4.1) confirms that this co-movement cannot be interpreted through levels regressions alone. ADF tests fail to reject the unit root null for the logged level variables, while first differences are stationary. Levels OLS regressions produce very high fit and low Durbin-Watson statistics close to zero, and the levels VIFs show multicollinearity in the commodity and price level variables. This makes levels coefficients unreliable as evidence on pass-through, so the short run regressions use monthly log differences, while the VECM is used for long-run co-movement among I(1) variables.

Table 4.1: Pre-testing results and specification evidence

Check	Main finding	Implication for estimation
ADF unit root tests	Logged price variables fail to reject the unit root null at 5%, first differences reject it.	Use cointegration for long-run relations and differenced models for monthly inflation
Levels OLS	Levels OLS has UK $R^2 = 0.994$ and euro area $R^2 = 0.990$; Durbin-Watson is about 0.15 in both.	High fit in levels is not pass-through evidence and risks spurious inference
Collinearity	Consumer and producer food-price levels are almost perfectly correlated; FAO VIFs are 12.9 in the UK and 10.7 in the euro area.	Levels coefficients are difficult to interpret separately
Differenced VIFs	All VIFs are low, around 1.0-1.4	The short-run HAC models are less exposed to multicollinearity
Lag and rank choice	UK: two lags by AIC/BIC/HQC. Euro area: two lags by BIC/HQC, three by AIC. Restricted constant evidence supports UK rank 1 and euro area rank 2.	Use two lags for parsimony and comparability but treat the rank choice as evidence based rather than mechanical

In levels, UK food CPI and UK food PPI are almost perfectly correlated, and the euro area consumer and producer food price series show the same pattern. This makes economic sense, but because these variables trend over time it cannot be treated as evidence of pass-through by itself. Once variables are first differenced, the VIFs fall to low levels. This supports the use of differenced models for short-run inference and cointegration methods for long-run dynamics.

4.2 Short-run pass-through evidence

The clearest short-run result is that domestic producer prices are the most significant driver of consumer food inflation. Table 4.2 reports the core short-run evidence. The HAC equations are estimated in monthly log differences with two lags of consumer food inflation, FAO food prices, Brent oil, the effective exchange rate, unemployment and domestic food PPI, plus Covid-19 and Russia-Ukraine event dummies; seasonal dummies are not included. HAC standard errors matter because the VECM diagnostics show residual autocorrelation, ARCH effects and non-normality.

Table 4.2: HAC short-run pass-through results

Variable	UK food CPI	Euro area food HICP	Interpretation
Food PPI, current month	0.466***	0.254***	Immediate producer to consumer pass-through
Food PPI, one month lag	0.246***	0.211***	Delayed producer price transmission
Food PPI, two month lag	0.084	-0.012	No significant second lag effect
Sum of significant food PPI terms	0.712	0.465	UK short-run producer to consumer pass-through is larger
Own consumer price lag 1	-0.031	0.323***	Euro area food inflation is more autoregressive in the HAC equation
Global food prices	Not significant	Not significant	Weak direct short-run global food effect once PPI is controlled for
Brent oil	Not significant	-0.007*** (lag 2)	Oil is not a straightforward positive consumer food price channel
Effective exchange rate	-0.039* (lag 2)	Not significant	Exchange rate effects are weaker and model dependent
Covid-19 dummy	-0.0038***	-0.0018***	Shock period control; negative conditional effect in both models
Russia-Ukraine dummy	0.0043***	Not significant	Additional UK inflation pressure during the war period

*Notes: HAC standard errors with Bartlett kernel and six lag bandwidth. ***, ** and * indicate significance at 1%, 5% and 10%. Results significant only at 10% are interpreted as weak evidence and are not used as the basis for the main conclusion.*

The main short-run result is the size of domestic food PPI pass-through. In the UK, a 1% monthly increase in food PPI is associated with a 0.47% same month increase in consumer food prices and a further 0.25% after one month. The equivalent euro area effects are 0.25% and 0.21%. Summing only the statistically significant current and one month lag terms gives 0.71 for the UK and 0.47 for the euro area. Including the insignificant second lags would widen rather than narrow this gap (0.80 against 0.45). This supports H3 in the short-run evidence, with the UK divergence consistent with larger short-run producer to consumer food price transmission.

The comparison is not simply that the euro area has weak pass-through. Both euro area PPI coefficients are highly significant. The difference is that the UK coefficient is larger on impact, while the euro area equation has a significant own lag of food HICP. That pattern suggests a faster UK upstream cost response and somewhat greater euro area consumer price persistence.

The direct global food terms are insignificant in both HAC equations once food PPI and other controls are included. This does not make global shocks irrelevant; it means the immediate

monthly commodity to consumer channel is not robust in this specification. A staged mechanism is more plausible, since commodity shocks first affect producer prices through input costs, contracts, processing and distribution costs, and only then feed into consumer prices. Brent oil and effective exchange rates proxy energy, transport and import price channels. The expected exchange rate sign is negative when a higher index means appreciation, but the channel is not as robust as food PPI.

4.3 Cointegration, VECM results and diagnostics

The Johansen evidence (Table 4.3) supports estimating VECMs because the variables are I(1) and share long-run relationships. The preferred restricted constant specification uses one cointegrating relation for the UK and two for the euro area. Some seasonal/event dummy specifications point to stronger rank evidence, so the rank decision is best defended through the Pantula evidence, the two lag specification and parsimony. The claim is that long-run food price relationships exist in both systems, not that every beta coefficient is a structural elasticity.

The VECM consumer price equations are consistent with the short-run PPI finding. Lagged food PPI is significant in the UK food CPI equation (0.256, $p = 0.006$) and in the euro area food HICP equation (0.222, $p < 0.001$). The consumer price error correction terms are also significant, indicating adjustment to long-run disequilibria, although the signs depend on the normalisation of the cointegrating vectors. These results are supportive rather than decisive because the residual diagnostics are not clean.

Table 4.3: VECM specification and diagnostic summary

Item	UK	Euro area	Interpretation
Preferred VECM rank	Rank 1, restricted constant	Rank 2, restricted constant	Long-run price relationships are present in both systems
Food PPI in consumer equation	Lagged PPI = 0.256***	Lagged PPI = 0.222***	VECM evidence is consistent with producer to consumer transmission
Global food prices weak exogeneity	Fail to reject, p=0.219	Fail to reject, p=0.500	Supports treating global food prices as weakly external to domestic adjustment, not fully structurally exogenous
UK Brent restriction	Reject Brent exclusion, p=0.008	n/a	Weak short-run Brent coefficients do not imply long-run irrelevance
Residual autocorrelation LM	Reject at lags 1-12	Reject at lags 1-12	Lag structure does not fully absorb serial dependence
ARCH effects	Present; lag 12 p=0.006	Present; lag 12 p=0.001	Volatility clustering remains.
Normality	Rejected	Rejected	Large shocks make residual normality unlikely. Use VECM dynamics cautiously and rely on HAC for short-run coefficient inference
Chow test at 2021:01	p=0.108	p=0.119	No formal 5% structural break in 2021
ARDL/ECM robustness	p<0.001	p<0.001	Robustness check supports long-run co-movement.

Notes: VECM models are estimated in logged levels with a restricted constant, event dummies and seasonal dummies. ARDL/ECM figures refer to joint tests on lagged level terms.

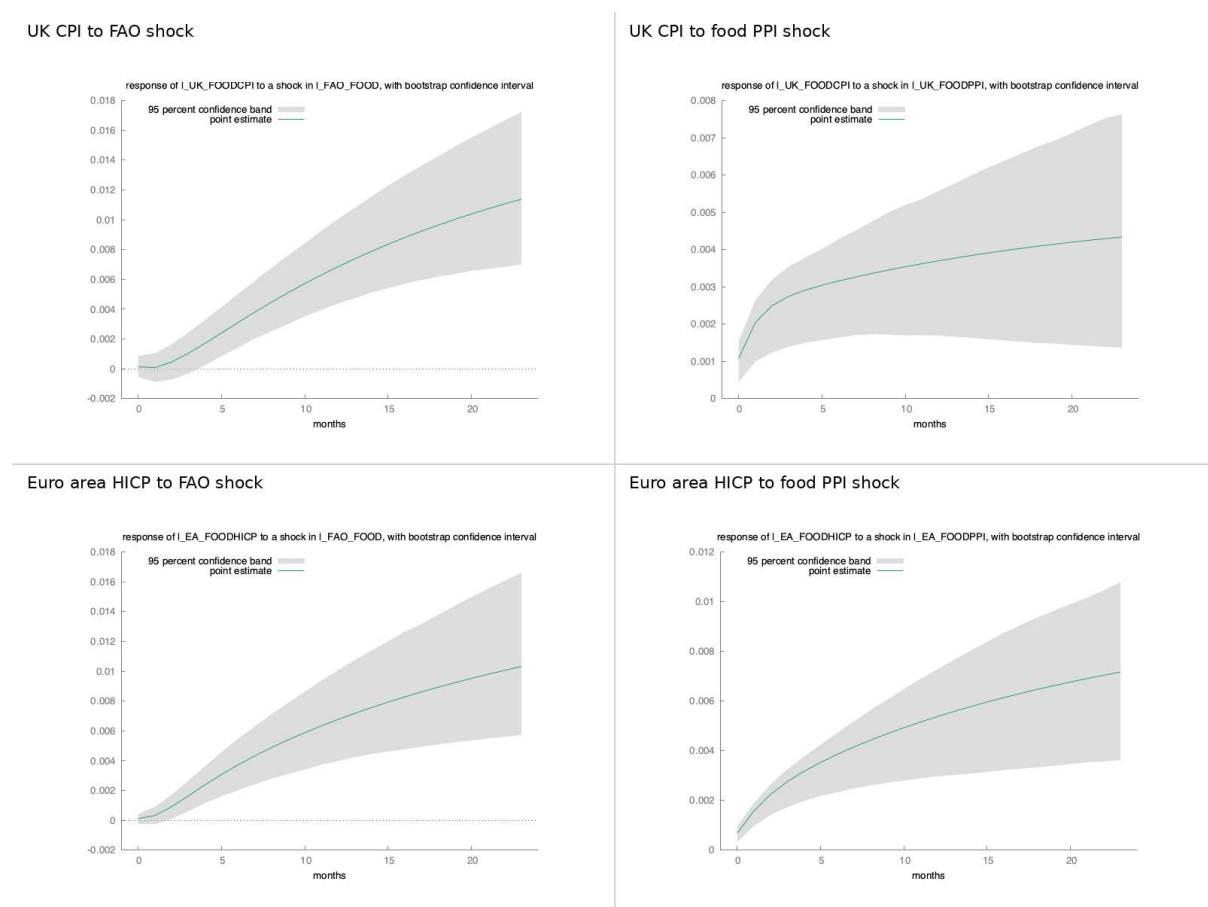
The weak exogeneity tests strengthen the common shock interpretation: the failure to reject the restriction on FAO adjustment supports treating global food prices as external to the domestic food price transmission in the weak exogeneity sense. It does not prove full structural exogeneity because FAO prices can still move with wider international shocks. Also, the UK Brent restriction test matters, as Brent is not a strong short-run HAC driver, but it should not be described as irrelevant to the long-run UK food price transmission.

The diagnostic failures are not a minor technical detail: autocorrelation, ARCH effects and non-normality weaken precise inference from individual VECM coefficients. Therefore, the VECM is read as evidence on long-run relationships and propagation, while HAC regressions provide the cleaner short-run pass-through comparison.

4.4 Dynamic transmission: IRFs, FEVDs and Granger tests

Impulse responses (Figure 4.3) show how logged consumer food price indices respond to shocks in the VECM. They should not be described as one month inflation rate responses, and they are not clean structural causal effects. They depend on the model specification and, under Cholesky ordering, on the ordering assumptions. Their value here is to show persistence and the relative importance of global food and producer price shocks over time.

Figure 4.3: Selected impulse response functions for consumer food prices



Notes: The figures show UK food CPI and euro area food HICP responses to global food price and food producer price shocks over a 24 month horizon.

The IRFs support H1 because global food shocks generate positive, persistent logged price level responses in both economies. Food PPI shocks also raise consumer food price levels in both systems. The medium run picture is not identical to the HAC evidence: the euro area food PPI response remains large over the horizon, even though the UK has the larger immediate HAC coefficient. This is not a contradiction: HAC coefficients measure short-run monthly pass-through, while IRFs describe model based accumulated price level responses.

Table 4.4: Dynamic transmission evidence (FEVD and Granger causality outputs)

Evidence	UK	Euro area	Implication
FEVD: Global food price share at 24 months	47.5%	48.0%	Global food prices explain a similar long-run share in both regions
FEVD: Food producer price share at 24 months	11.8%	28.3%	Producer prices remain important, especially in the euro area variance shares
FEVD: Brent oil share at 24 months	27.1%	0.3%	Oil matters more in the UK decomposition, but direct coefficient evidence is mixed
FEVD: Effective exchange rate share at 24 months	1.8%	10.8%	Exchange rate contribution is larger in the euro area decomposition
Granger: Global food prices → food producer prices	$p < 0.001$	$p < 0.001$	Global food prices predict producer food prices in both regions
Granger: food producer prices → consumer food prices	$p < 0.001$	$p < 0.001$	Producer prices predict consumer food prices in both regions
Granger: Global food prices → consumer food prices	Not significant, $p = 0.931$	Significant, $p = 0.012$	The direct global food price to consumer channel is clearer in the euro area than in the UK

The FEVDs in Table 4.4 separate common shocks from domestic propagation more clearly. At 24 months, FAO food prices explain 47.5% of UK food CPI forecast error variance and 48.0% of euro area food HICP variance, strongly supporting H1. The domestic PPI shares differ: UK food PPI explains 11.8% of UK consumer food variance, while euro area food PPI explains 28.3%. Brent oil explains 27.1% of UK variance but only 0.3% in the euro area FEVD, while the euro area effective exchange rate explains 10.8%. These are forecast variance shares, not pass-through coefficients, so they qualify rather than overturn the HAC result.

The Granger tests are the clearest evidence on indirect transmission: FAO food prices predict food PPI in both economies (UK $F = 14.1$, $p < 0.001$; euro area $F = 20.8$, $p < 0.001$). Food PPI also predicts consumer food prices in both economies (UK $F = 18.0$, $p < 0.001$; euro area $F = 34.5$, $p < 0.001$). Direct FAO to consumer predictive causality differs: the UK fails to reject non-causality ($p = 0.931$), while the euro area rejects it ($F = 4.5$, $p = 0.012$). This is central for H2: the PPI channel is strong in both economies, but the euro area also has a direct global food predictive channel. Table 4.5 summarises the evidence for each hypothesis.

Table 4.5: Hypothesis evidence matrix

Hypothesis	Key evidence	Conclusion
H1: Global food shocks matter in both economies	FAO FEVD shares at 24 months are UK 47.5% and euro area 48.0%. FAO shocks also produce persistent positive logged price level IRFs and FAO predicts food PPI in both regions	Supported - Global shocks are common and important, especially over longer horizons
H2: Global shocks are transmitted mainly through food PPI rather than immediate direct consumer pass-through	Direct FAO terms are insignificant in the HAC models. FAO to PPI and PPI to consumer Granger channels are significant in both economies. Direct FAO to HICP Granger causality is significant in the euro area	Partially supported: strong for the UK, less definitive for the euro area
H3: UK divergence reflects stronger producer to consumer pass-through	The sum of significant HAC PPI coefficients is 0.712 for the UK and 0.465 for the euro area. But the euro area PPI FEVD share is larger at 24 months, 28.3% versus 11.8%	Supported for short-run pass-through, with a medium-run divergence.

4.5 Structural stability and interpretation of the post-2021 shock

The post-2021 surge is central to the paper, but the evidence does not support a strong claim of a clean regional break in January 2021. The Chow tests fail to reject the joint break null in both regions (UK $p = 0.108$; euro area $p = 0.119$). This specific break date is not detected at the 5% level, but this does not prove that the food price transmission system was stable, nor does it rule out other break dates, volatility changes or shifts in individual channels.

The stability diagnostics reinforce that caution: UK CUSUM is stable but UK CUSUMSQ indicates variance instability over part of the sample, while the euro area CUSUM and CUSUMSQ are more stable. Notably, the euro area Chow regression contains an individually significant post-split PPI interaction, even though the joint Chow test fails to reject. Post-2021 restricted VECMs preserve significant food PPI effects in the consumer price equations. The safest reading is that the post-2021 shock amplified transmission through broadly recognisable channels rather than creating a completely new transmission channel.

4.6 Summary of findings

The results provide a nuanced answer to the research question: UK and euro area food inflation were both exposed to shared global food price shocks. The FEVD results show that global food prices explain a similar long horizon share of consumer food price variation in both economies. This means the UK's recent divergence cannot be explained simply by saying that the UK was exposed to different global shocks.

The more compelling explanation is that common shocks were transmitted differently. In the short run, the most robust evidence comes from domestic food producer prices. The UK exhibits a larger cumulative producer to consumer pass-through effect than the euro area, while the Granger and VECM evidence suggests that global food prices feed into producer prices before reaching consumers. Therefore, the UK appears to differ less through direct exposure to global food prices and more through the size and speed of domestic price transmission.

For monetary policy, the implication is that food inflation should not be treated as purely external or domestic. Global commodity shocks generate the initial pressure, but the persistence of food inflation depends on how far those shocks are propagated through producer and consumer prices. For the MPC, this distinction matters because a temporary global shock may require a different policy interpretation from a shock that becomes embedded in domestic pricing behaviour. The results therefore support careful monitoring of food producer prices and producer to consumer pass-through when assessing whether food inflation is likely to fade quickly or remain persistent. In practical terms, food producer prices act as a leading indicator of whether external cost shocks are still driving the domestic inflation process.

Chapter 5: Conclusion and policy implications

5.1 Conclusion

This paper examined whether the recent divergence between UK and euro area food inflation is better explained by shared global shocks or by differences in domestic price transmission. The evidence points to a clear answer: global food shocks matter in both economies, but they were transmitted differently through domestic producer and consumer prices. The UK's divergence is best explained by larger and faster short-run producer to consumer pass-through, not by greater exposure to global shocks.

The empirical results support this conclusion across several stages of the analysis. The VECM evidence showed that food prices, global commodities and producer prices share long-run relationships in both the UK and euro area. However, the clearest comparative evidence came from the HAC short-run model, with food producer prices having a cumulative effect of around 0.71 on UK consumer food inflation, compared with around 0.47 in the euro area. Direct monthly global food price pass-through was not statistically robust once producer prices were included. This supports the idea that global food shocks affect households mainly after passing through domestic producer prices.

The dynamic evidence points in the same direction. FEVD results show that global food prices explain a similar long horizon share of consumer food price variation in both economies, at around 47-48% after 24 months, weakening a UK only exposure explanation. Granger tests show that global food prices predict food producer prices in both regions, and that food producer prices predict consumer food prices. In the UK, the global food to consumer channel is mainly indirect, while the euro area shows somewhat clearer direct global food price effects alongside producer price transmission. The Chow tests did not identify a formal structural break in January 2021, so the post-2021 period is better interpreted as a large shock moving through existing transmission channels rather than as a complete change in the underlying relationship.

5.2 Policy implications

The main policy implication is that food inflation should not be treated as either purely external or purely domestic. Global commodity shocks can create the initial impulse, but their relevance for monetary policy depends on whether they fade quickly or pass through domestic pricing stages in a persistent way. For the MPC, this distinction matters because interest rate policy cannot directly offset global food commodity shocks, but it must respond to the risk that those shocks influence inflation expectations, wage setting and wider inflation persistence. The results suggest that food producer prices are a useful intermediate signal. If producer price pressures remain elevated after global commodity prices ease, this may indicate that external shocks are still being transmitted through the domestic food price chain. In the UK, the larger and faster short-run producer to consumer pass-through means that monitoring food producer prices can help policymakers assess whether food inflation is likely to fade or remain persistent. This does not imply that monetary policy should respond mechanically to food prices, but that food price evidence should be interpreted alongside expectations, wage growth and broader measures of inflation persistence.

The UK-euro area comparison also matters for policy communication. Since global food prices explain a similar long horizon share of consumer food price variation in both economies, describing UK food inflation only as an imported shock risks understating the domestic transmission channel. Equally, describing it only as domestic inflation pressure would overstate the degree of direct monetary policy control. A more balanced communication strategy would distinguish the origin of the shock from the mechanism through which it becomes persistent.

5.3 Limitations and further research

The results should be interpreted with appropriate caution. The VECM framework is useful because it preserves long-run relationships while modelling short-run adjustment, but the diagnostics were not perfect. Residual autocorrelation, ARCH effects and rejected normality mean the VECM results should not be read as precise structural estimates. The HAC robustness models strengthen the short-run evidence, but they do not remove all identification concerns. In particular, the exchange rate may respond to broader macroeconomic conditions, and aggregate food indices may hide important product level differences. The analysis also does not model the monetary policy stance, so differences in the timing of interest rate rises or the scale of asset purchases between the Bank of England and the ECB cannot be ruled out as a contributor to the divergence.

Further research could extend the analysis in three directions. First, product level food categories could be used to examine whether pass-through differs across staples such as cereals, meat and dairy. Second, additional domestic cost measures, including wages, transport costs, agricultural inputs and retail margins, could help separate the stages of the food price chain more clearly. Third, alternative dynamic methods, such as local projections, could test whether the transmission results are robust to different modelling assumptions.

Overall, the paper finds that the UK and euro area shared a broad global food price shock, but the transmission of that shock was not identical. The UK's recent food inflation divergence is best understood as the result of larger and faster domestic pass-through rather than as evidence of a separate global shock. For policy, the implication is clear: monitoring global food prices is necessary but not enough. The persistence of food inflation depends on how these global pressures move through domestic producer prices and into prices paid by households.

Bibliography

- Akaike, H. (1974) 'A new look at the statistical model identification', IEEE Transactions on Automatic Control, 19(6), pp. 716-723.
- Anesti, N., Esady, V. and Naylor, M. (2025) 'Food prices matter most: sensitive household inflation expectations', Bank of England Staff Working Paper No. 1125.
- Baffes, J. and Haniotis, T. (2010) 'Placing the 2006/08 commodity price boom into perspective', World Bank Policy Research Working Paper No. 5371.
- Bank for International Settlements (BIS) (n.d.) Effective exchange rates. Available at: <https://data.bis.org/topics/EER> (Accessed: 10 April 2026).
- Bank of England (2021) Monetary Policy Summary and minutes of the Monetary Policy Committee meeting ending on 15 December 2021. Available at: <https://www.bankofengland.co.uk/monetary-policy-summary-and-minutes/2021/december-2021> (Accessed: 28 September 2026).
- Baumeister, C. and Kilian, L. (2014) 'Do oil price increases cause higher food prices?', Economic Policy, 29(80), pp. 691-747.
- Bobeica, E., Koester, G. and Nickel, C. (2025) 'When groceries bite: the role of food prices for inflation in the euro area', ECB Blog, 25 September.
- Bonciani, D., Masolo, R.M. and Sarpietro, S. (2024) 'How food prices shape inflation expectations and the monetary policy response', Bank of England Staff Working Paper No. 1094.
- Brown, R.L., Durbin, J. and Evans, J.M. (1975) 'Techniques for testing the constancy of regression relationships over time', Journal of the Royal Statistical Society: Series B (Methodological), 37(2), pp. 149-192.
- Burstein, A. and Gopinath, G. (2014) 'International prices and exchange rates', Handbook of International Economics, Chapter 7, Vol. 4, pp. 391-451.
- Campa, J.M., Goldberg, L.S. and Gonzalez-Minguez, J.M. (2005) 'Exchange-rate pass-through to import prices in the euro area', NBER Working Paper No. 11632.
- Chow, G.C. (1960) 'Tests of equality between sets of coefficients in two linear regressions', Econometrica, 28(3), pp. 591-605.
- Davidson, J., Halunga, A., Lloyd, T., McCorriston, S. and Morgan, W. (2016) 'World commodity prices and domestic retail food price inflation: some insights from the UK', Journal of Agricultural Economics, 67(3), pp. 566-583.
- Dickey, D.A. and Fuller, W.A. (1979) 'Distribution of the estimators for autoregressive time series with a unit root', Journal of the American Statistical Association, 74(366), pp. 427-431.
- Doornik, J.A. and Hansen, H. (2008) 'An omnibus test for univariate and multivariate normality', Oxford Bulletin of Economics and Statistics, 70(s1), pp. 927-939.
- Engle, R.F. (1982) 'Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation', Econometrica, 50(4), pp. 987-1007.
- European Central Bank (ECB) (2022) Monetary policy decisions, 21 July 2022. Available at: <https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.mp220721~53e5bdd317.en.html> (Accessed: 28 September 2026).

Eurostat (2023) Eurostat data browser: Harmonised index of consumer prices (HICP) - ECOICOP ver.2 - indices and rates of change, monthly data. Available at: https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_minr/default/table?lang=en

(Accessed: 10 April 2026).

Eurostat (n.d.) Eurostat data browser: Harmonised index of consumer prices (HICP) - ECOICOP ver.2 - indices and rates of change, monthly data. Available at: https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_minr/default/table?lang=en

(Accessed: 10 April 2026).

Eurostat (n.d.) Eurostat data browser: Producer prices in industry, total - monthly data. Available at: https://ec.europa.eu/eurostat/databrowser/view/sts_inpp_m/default/table

(Accessed: 10 April 2026).

Eurostat (n.d.) Eurostat data browser: Unemployment by sex and age - monthly data. Available at: https://ec.europa.eu/eurostat/databrowser/view/une_rt_m/default/table?lang=en

(Accessed: 10 April 2026).

Ferrucci, G., Jimenez-Rodriguez, R. and Onorante, L. (2012) 'Food price pass-through in the euro area: non-linearities and the role of the Common Agricultural Policy', *International Journal of Central Banking*, 8(1), pp. 179-218.

Food and Agriculture Organization of the United Nations (n.d.) FAO Food Price Index. Available at: <https://www.fao.org/worldfoodsituation/foodpricesindex/en/>

(Accessed: 10 April 2026).

Granger, C.W.J. (1969) 'Investigating causal relations by econometric models and cross spectral methods', *Econometrica*, 37(3), pp. 424-438.

Hamilton, J.D. (2003) 'What is an oil shock?', *Journal of Econometrics*, 113(2), pp. 363-398.

Hannan, E.J. and Quinn, B.G. (1979) 'The determination of the order of autoregression', *Journal of the Royal Statistical Society: Series B (Methodological)*, 41(2), pp. 190-195.

Johansen, S. (1988) 'Statistical analysis of cointegration vectors', *Journal of Economic Dynamics and Control*, 12(2-3), pp. 231-254.

Kuik, F., Lis, E.M., Paredes, J. and Rubene, I. (2024) 'What were the drivers of euro area food price inflation over the last two years?', *ECB Economic Bulletin*, Issue 2/2024.

Lloyd, T.A., McCorriston, S., Morgan, C.W. and Rayner, A.J. (2006) 'Food scares, market power and price transmission: the UK BSE crisis', *European Review of Agricultural Economics*, 33(2), pp. 119-147.

Lütkepohl, H. (2005) 'New introduction to multiple time series analysis', Springer, Berlin, Heidelberg, ch. 4, pp. 135-192.

Meyer, J. and von Cramon-Taubadel, S. (2004) 'Asymmetric price transmission: a survey', *Journal of Agricultural Economics*, 55(3), pp. 581-611.

Newey, W.K. and West, K.D. (1987) 'A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix', *Econometrica*, 55(3), pp. 703-708.

Office for National Statistics (ONS) (2023a) Food and energy price inflation, UK: 2023. Available at:

<https://www.ons.gov.uk/economy/inflationandpriceindices/articles/foodandenergypriceinflationuk/2023>

(Accessed: 10 April 2026).

Office for National Statistics (ONS) (2023b) Recent trends in UK food and drink producer and consumer prices: January 2023.

Available at:

<https://www.ons.gov.uk/economy/inflationandpriceindices/articles/recenttrendsinukfoodanddrinkproducerandconsumerprices/january2023>

(Accessed: 10 April 2026).

Office for National Statistics (n.d.) CPI INDEX 01 : FOOD AND NON-ALCOHOLIC BEVERAGES 2015=100. Available at:

<https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/d7bu/mm23>

(Accessed: 10 April 2026).

Office for National Statistics (n.d.) PPI INDEX OUTPUT DOMESTIC GROUP - C101TC109 Food products 2015=100. Available at:

<https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/gb7u/ppi>

(Accessed: 10 April 2026).

Office for National Statistics (n.d.) LFS: Unemployed: UK: All: Aged 16+: 000s: SA: Annual = 4 quarter average. Available at:

<https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/unemployment/timeseries/mgsc/unem>

(Accessed: 10 April 2026).

Schwarz, G. (1978) 'Estimating the dimension of a model', The Annals of Statistics, 6(2), pp. 461-464.

U.S. Energy Information Administration (n.d.) Crude Oil, Europe Brent Spot Price FOB. Available at: https://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm.

(Accessed: 10 April 2026).