SUPPLY / PRICES / ENERGY

The Evolution of European Food Security and Global Agricultural Price Transmission under Geopolitical Shocks: An Econometric Analysis of Ukrainian Supply Dynamics



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From import dependence to a European-market question

The paper broadens the focus from individual importing nations to aggregate EU-27 food prices.

Enough food, of adequate quality, at affordable prices.

AVAILABILITY | QUALITY | AFFORDABILITY

LITERATURE THEMES REVIEWED

Commodity shocks · inflation transmission · resilience of alternative export routes

ANALYTICAL SHIFT

Country-level focus

↓

EU-27

Harmonized Index of Consumer Prices
Food component

Research question: How are export disruptions associated with commodity prices and EU food prices?

Three hypotheses connect supply, war and energy

The empirical framework tests commodity-level relationships and an aggregate European food-price model.

H1

Supply–price relationship

World food prices are inversely related to Ukrainian export volumes.

COMMODITY BENCHMARKS

H2

Wartime structural shift

The export–price link becomes stronger and more elastic during wartime.

PRE-WAR VS. WARTIME

H3

Joint food–energy model

Reduced exports and higher gas costs jointly explain variation in EU food prices.

EU-27 HICP-FOOD

Scope: wheat, corn and sunflower oil — with natural gas as an EU-model control.

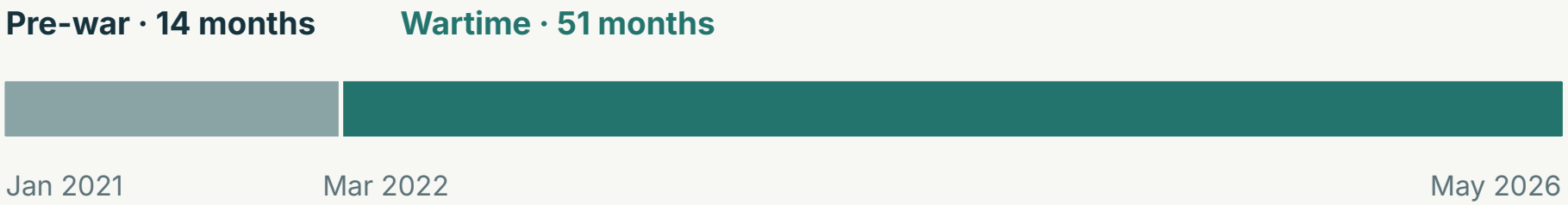
DATA / STUDY WINDOW

65 monthly observations span two analytical regimes

January 2021–May 2026; the manuscript classifies March 2022 onward as the wartime sample.

65

monthly observations



SERIES	MEASURE / SCOPE	SOURCE NAMED IN THE PAPER
Export volumes	Wheat, corn, sunflower oil	UN Comtrade; Ukrainian customs
Global commodity prices	USD per metric ton	World Bank Pink Sheet
European food prices	EU-27 HICP-Food index	Eurostat
Energy factors	Gas imports; TTF prices	Energy-series source not specified

Three modeling steps connect exports to food prices

Single-factor commodity models, a wartime regime split, and a multi-factor EU-27 regression.

1 Non-linear commodity models

Export volumes vs. benchmark prices; reciprocal term (1/X).

2 Pre-war / wartime split

D = 0: Jan 2021–Feb 2022
D = 1: Mar 2022–May 2026

3 Multi-factor European model

Aggregate exports and gas prices are modeled against EU HICP-Food.

EU-27 FOOD-PRICE MODEL

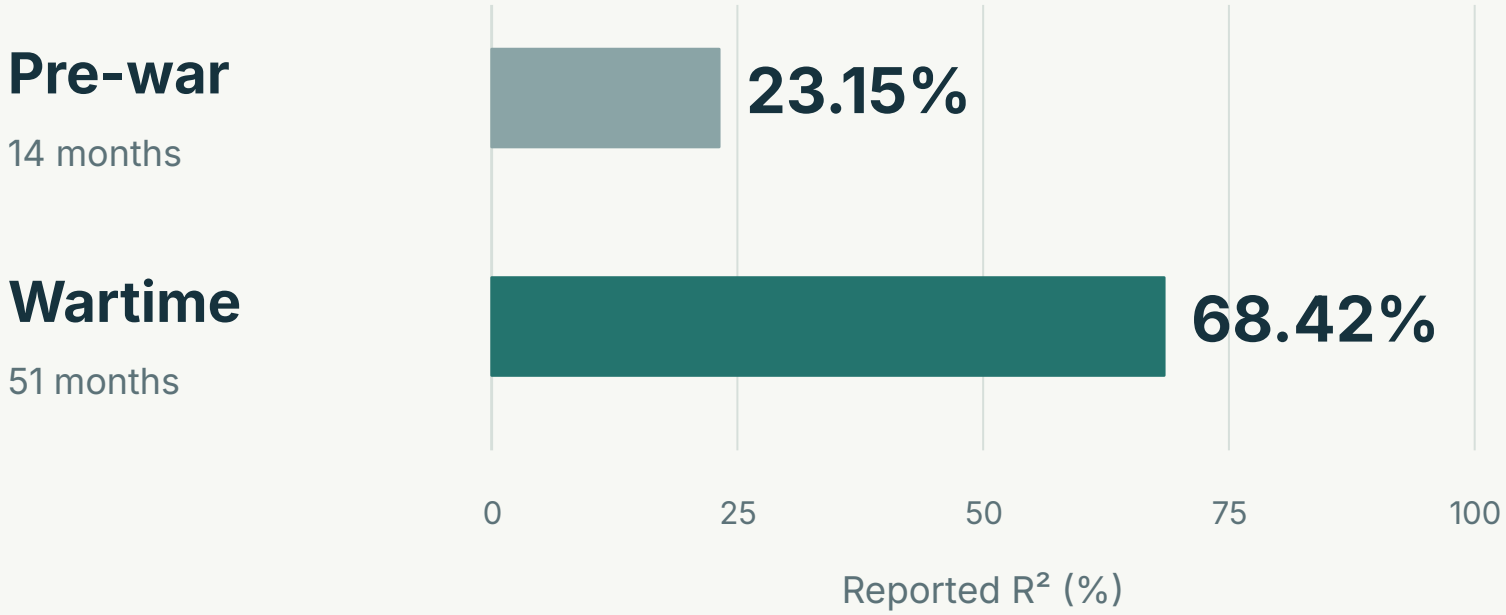
$$\text{HICP-Food} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

X_1 Aggregate Ukrainian agricultural exports
X_2 European natural-gas price index (TTF)

Outcome: a food-price index, not a direct measure of physical food availability.

Reported wheat fit is stronger in the wartime sample

Non-linear relationship between Ukrainian export volumes and wheat benchmark prices.



FULL 65-MONTH MODEL

28.45%

Reported R^2 over the full observation period

Jan 2021–May 2026

The authors interpret the wartime sample as a stronger export–price relationship.

RESULT 02 / CORN

The corn result links grain supply to feed-cost pressure

The manuscript emphasizes corn’s role in animal feed and industrial processing.

WARTIME MODEL

71.2%

reported R^2

F-statistic 38.95
Mar 2022–May 2026

TRANSMISSION CHANNEL DESCRIBED IN THE PAPER

Ukrainian corn exports
Availability of grain inputs

↓

Animal feed & industrial processing
Input-cost channel

↓

European meat & dairy sectors
Cost pressures discussed for 2023–2024

The pathway is the authors’ interpretation; the reported R^2 requires reconciliation with Table 4.

RESULT 03 / SUNFLOWER OIL

The paper reports a pronounced edible-oil response

Reported relationship over January 2021–May 2026.

−10%

Ukrainian sunflower oil export volume

REPORTED ASSOCIATION

+14.5%

European wholesale edible-oil prices

R^2 74.8%

p = 0.0002

A reported model response, not a new forecast.

EU-wide model: export volumes (–), gas prices (+)

Dependent variable: EU-27 HICP-Food index · Wartime sample: 51 months.

Fitted HICP-Food = 105.42 − 0.0084X_1 + 0.1450X_2

PREDICTOR	COEFFICIENT	t-STATISTIC
Intercept	**105.42**	25.40
Ukrainian agricultural exports (X_1)	**−0.0084**	−7.00
European gas-price index (X_2)	**0.1450**	5.80

84.2%

reported adjusted R^2

See caveat on slide 11

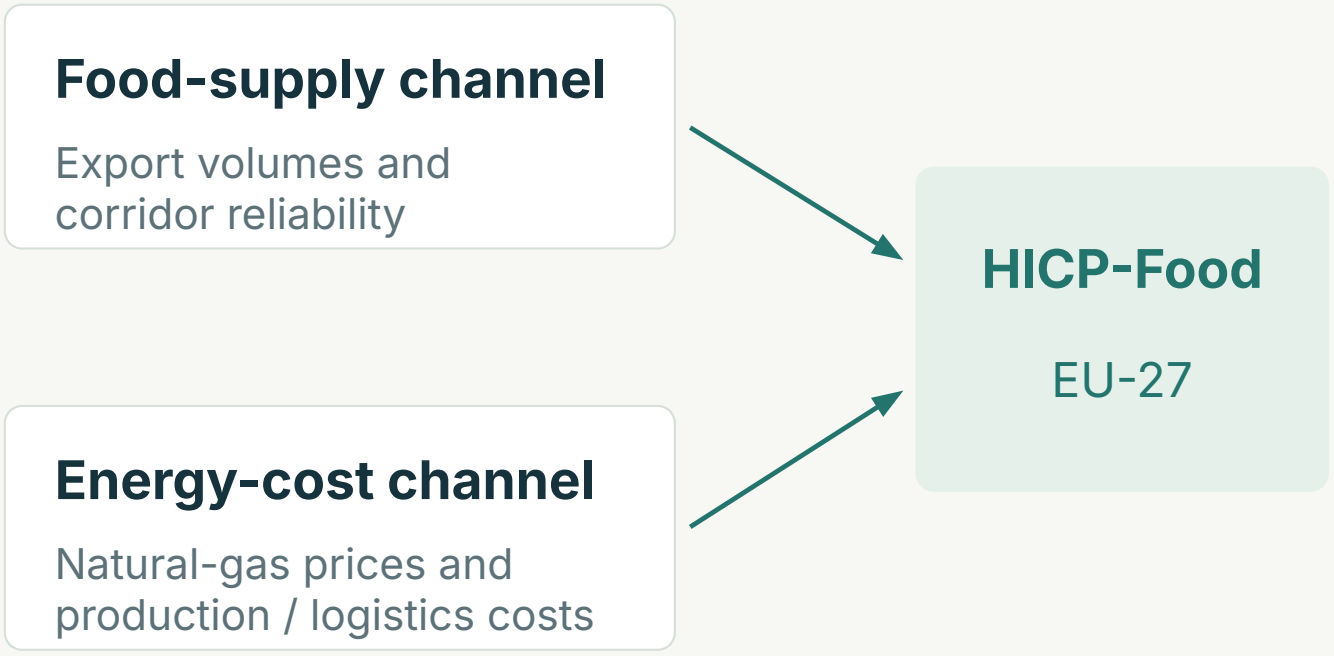
X_1 = aggregate Ukrainian agricultural exports to the EU; X_2 = European TTF gas-price index.

Interpretation note: coefficients are not percentage effects; predictor scaling is not fully specified.

SYNTHESIS / IMPLICATIONS DISCUSSED

The paper frames food and energy as a joint vulnerability

The authors' interpretation links agricultural logistics and energy costs to the EU food-price index.



RESPONSES DISCUSSED BY THE AUTHORS

Long-term logistics integration

Embedding Ukrainian agriculture in European transport frameworks.

Resilient export routes

Reliable Black Sea navigation alongside alternative corridors.

Interpretation requires a statistical consistency check

Arithmetic checks on the manuscript's tables — not an independent re-estimation.

MODEL / FIT MEASURE	REPORTED IN TEXT	IMPLIED BY ANOVA
Wheat · full-sample R^2	28.45%	**≈19.1%**
Corn · wartime R^2	71.2%	**≈44.3%**
EU HICP · adjusted R^2	84.2%	**≈76.5%**

The deck preserves the reported figures; underlying data and code are not supplied to resolve the differences.

Association is not causation

Model fit alone does not establish causal effects or demonstrate higher price elasticity.

Reproducibility is incomplete

Series scaling, diagnostics and detailed model specifications are not fully provided.

The study links EU food-price stability to Ukrainian export flows and energy costs.

01

Wartime shift

The paper reports a stronger export–price relationship during wartime.

02

Food + energy

Both variables are included in the aggregate EU food-price model.

03

European scope

The analysis extends beyond individual importers to the EU-27 market.

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Q&A