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## **EU Food Price Inflation Amid Global Market Turbulences**

**Lukas Kornher, Tomas Baležentis, Fabio Santeramo**

*Selected presentation for the International Agricultural Trade Research Consortium's (IATRC's) 2023 Virtual Summer Symposium: Fields of Discord: Understanding the Intersection of Geopolitics and Agriculture, June 26, 2023.*

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# EU Food price inflation amid global market turbulences

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## This paper

We investigate the dynamics and external drivers of post-2020 food inflation patterns in Europe and quantify the contribution of different components.

### Key results:

- ✓ Food price inflation has been mainly driven by changes in the input price index
- ✓ Energy price inflation has been an important driver
- ✓ Weather variations explain little the changes in real food price inflation in the EU
- ❑ Marked differences are observed across sectors.
- ❑ For F&Vs the international price has driven the most the price inflation.
- ❑ Trade openness has been an important driver for cereals, oilseeds, and sugar

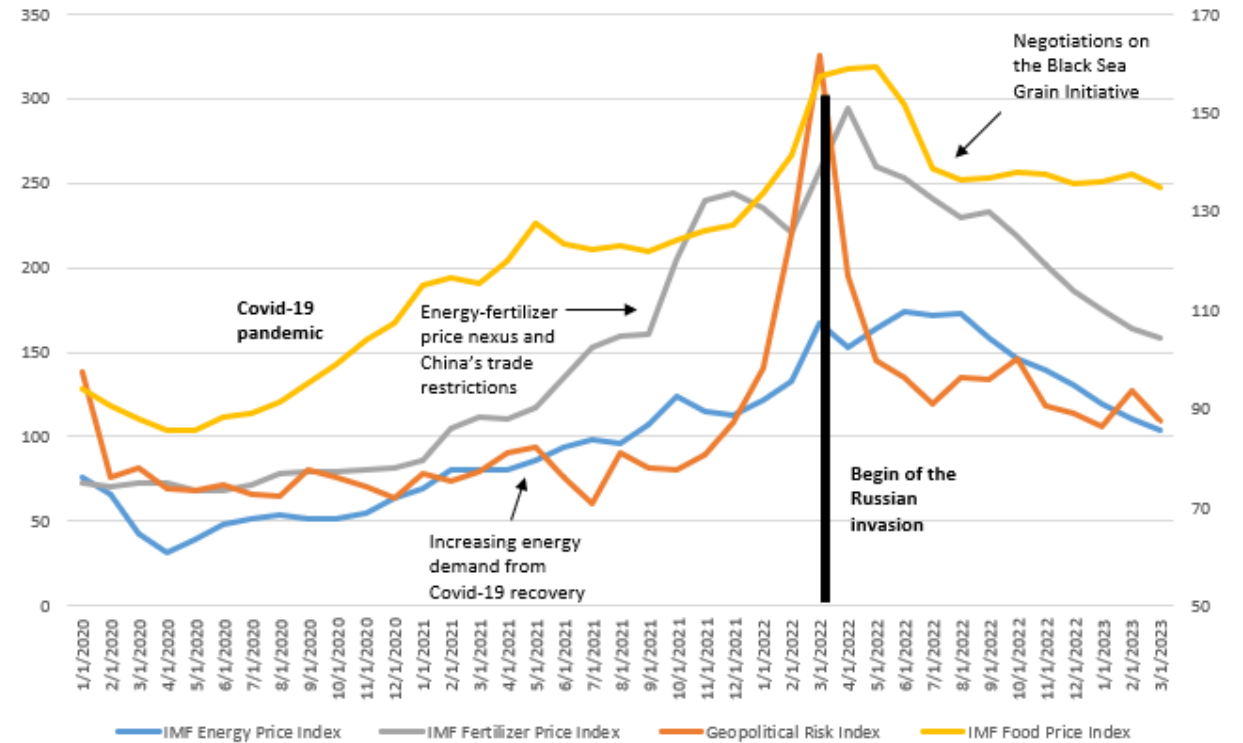
Political events and international market uncertainty are a key driver of food price dynamics, and part of the solution (Santeramo and Dominguez, 2021)

Food markets were already in trouble before Russian invasion of Ukraine (Kornher and von Braun 2022)

The Ukraine-war intensified the crisis

- 12% of calories traded globally (Russia and Ukraine )
- >50 of sunflower oil and cake trade
- 10% in global vegetable oil trade
- 16% in white fish trade (Russia)
- 16% in fertilizer trade (Russia)

## International price development and major political events



Own illustration based on IMF (2023)

Marked differences in food price inflation across EU member states during post-2020 period

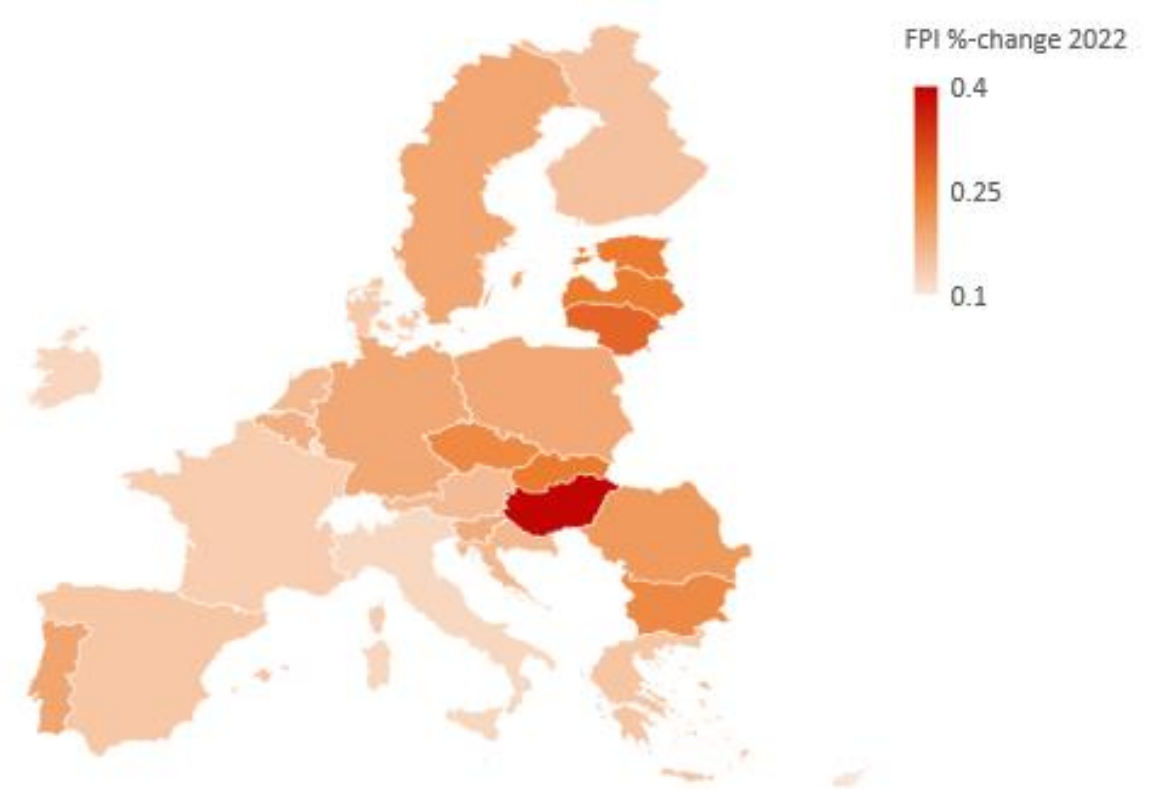
Food price inflation increased with stricter Covid-19 restrictions and case-counts (Akter 2020; Bai et al. 2022)

EU food prices are largely driven by international price movements but the impact varies over time (Peersman 2022)

Significant impact of the Ukraine-war on global food security (e.g. Abay et al. 2023)

Limited evidence on EU food price dynamics and interdependencies with structural factors

% change in FPI across EU countries (Jan2022-Jan2023)



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*FPI is the nominal food price index*

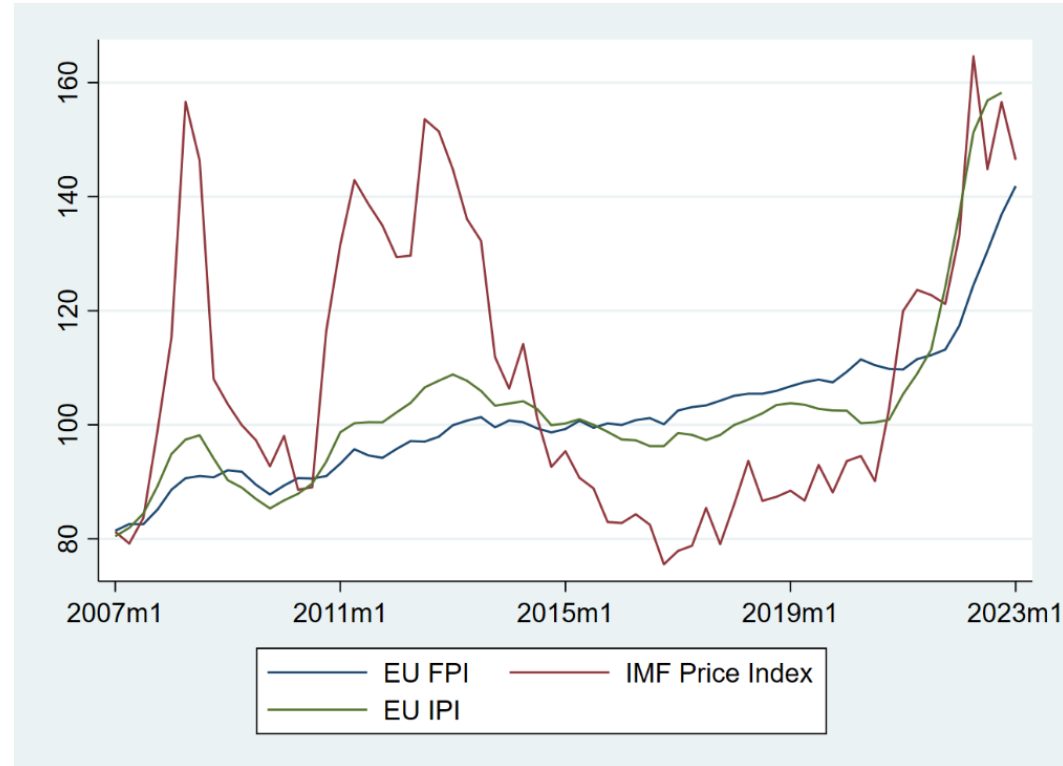
EU prices did not co-move with international prices in 2008 and 2011.

Internal supply and demand drivers remain very relevant for EU food price dynamics:

- Macro-economic dynamics (i.e. money supply)
- Input prices and production costs
- Weather variability

Exposure to international price movements is determined by level of trade integration

## Food price dynamics between 2007-2023



Own illustration based on Eurostat (2023) and IMF (2023)

FPI is the nominal food price index; IPI is the nominal input price index; IMF Price Index is IMF's index for cereals

*Note: EU price indices are unweighted averages across all member states.*

Analytical framework (Law of One Price):  $pW_{it} = pD_{ijt} + \tau_{ijt}$

$$p\hat{D}_{kit} = (1 - \lambda_{kit})pD_{kit} + \lambda_{kit}(pW_{kt} + \tau_{kit}) \quad \text{if } i \text{ is an importing country}$$

$$p\hat{D}_{kit} = (1 - \lambda_{kit})pD_{kit} + \lambda_{kit}pD_{kit}^T \quad \text{if } i \text{ is an exporting country}$$

where  $\lambda_{kit}$  is the international component, i.e. the consumption-weighted share of traded goods in group k.  $pW_{kt}$  is the international price for goods i in t with  $\tau_{kit}$  the transaction cost of trading.

*Hypo. 1: Relevance of the int'l/dom. component depends on the weight of the int'l component*

*Hypo. 2: The larger the int'l comp., the larger the price effects of global market turbulences*



**FPI:**  
Real food price  
of products in  
sector k and  
country i

**IPI:**  
Agricultural input  
price index (IPI)  
in country i

**Openness:**  
Share of total trade in  
sector k and country i  
over the gross value  
added of production of  
country i's in each year

**GDP:**  
quarterly GDP  
of country i

$$\frac{fpi_{kit}}{cpi_{kit}} = \alpha + \delta fpi_{kit-1} + \beta_1 \frac{IPI_{it}}{cpi_{it}} + \beta_2 \frac{IPI_{it}}{cpi_{it}} \times Openness_{kit} + \beta_3 GDP_{it} + \beta_4 Openness_{ijt} + \beta_5 \frac{int\ price_{kt}}{GPI_t} + \beta_6 \tau_t + \beta_7 \frac{int\ price_{kt}}{GPI_t} \times Openness_{ijt} + \beta_8 \tau_t \times Openness_{ijt} + \gamma X' + \mu_{ij} + \varepsilon_{ijt}$$

**Int price:**  
Sector-specific international  
price index divided by the  
global price index of all  
commodities (GPI).

**X:**  
control variables, such as the real  
energy price index of country i,  
the real international energy price  
index, and the monthly average  
stringency of Covid-19 policies

## Drivers of real food price inflation using the Arellano Bond estimator

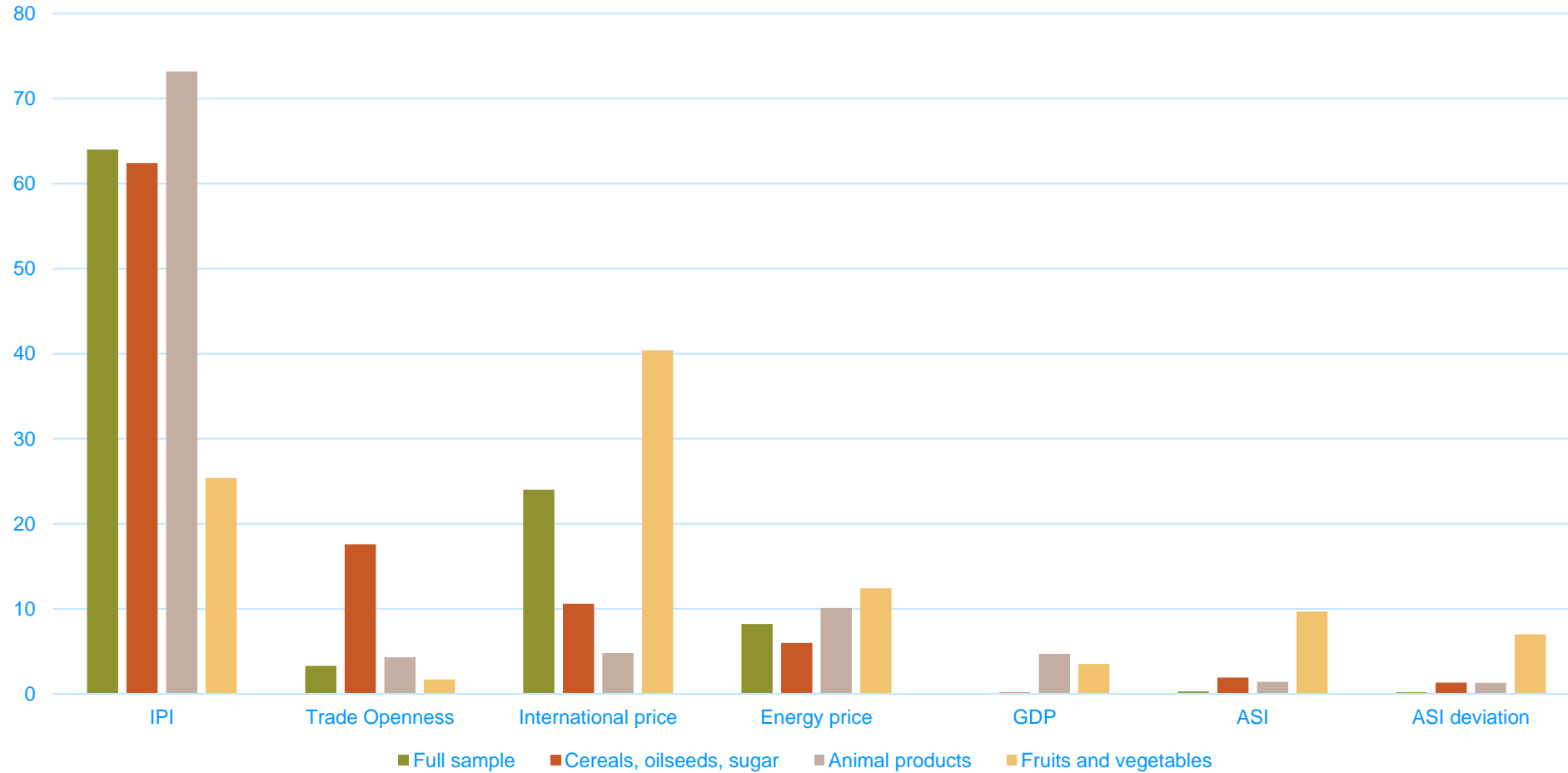
	(1)	(2)	(3)	(4)	(5)	(6)
IPI	0.085*** (3.87)	0.084*** (3.90)	0.305*** (4.29)	0.350*** (4.15)	0.304*** (5.08)	0.337*** (5.49)
Trade openness (log)	0.002 (0.24)	0.004 (0.53)	0.036** (3.06)	0.045*** (3.31)	0.037*** (3.53)	0.038*** (3.57)
IPI × Trade openness (log)			-0.036** (-3.15)	-0.045*** (-3.38)	-0.034*** (-3.61)	-0.036*** (-3.69)
International price	0.033*** (3.75)	0.035*** (4.02)	0.036*** (4.05)	0.034*** (3.66)	0.038*** (6.33)	0.044*** (5.79)
War dummy				0.025*** (6.32)		
GPR					0.030** (2.72)	
Sanction share						0.122 (1.77)
Lagged dependent variable	YES	YES	YES	YES	YES	YES
Weather variables	NO	YES	YES	YES	YES	YES
Additional controls	NO	NO	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Month FE	YES	YES	YES	YES	YES	YES
N	10634	10634	10262	10634	10634	10634

## Drivers of real food price inflation using the Arellano Bond estimator

	(1)	(2)	(3)	(4)	(5)	(6)
IPI	0.085*** (3.87)	0.084*** (3.90)	0.305*** (4.29)	0.350*** (4.15)	0.304*** (5.08)	0.337*** (5.49)
Trade openness (log)	0.002 (0.24)	0.004 (0.53)	0.036** (3.06)	0.045*** (3.31)	0.037*** (3.53)	0.038*** (3.57)
IPI × Trade openness (log)			-0.036** (-3.15)	-0.045*** (-3.38)	-0.034*** (-3.61)	-0.036*** (-3.69)
International price	0.033*** (3.75)	0.035*** (4.02)	0.036*** (4.05)	0.034*** (3.66)	0.038*** (6.33)	0.044*** (5.79)
War dummy				0.025*** (6.32)		
GPR (Geopolitical risk index)					0.030** (2.72)	
Sanction share						0.122 (1.77)
Lagged dependent variable	YES	YES	YES	YES	YES	YES
Weather variables	NO	YES	YES	YES	YES	YES
Additional controls	NO	NO	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	NO	NO
Month FE	YES	YES	YES	YES	YES	YES
N	10634	10634	10262	10634	10634	10634

	(1)	(2)	(3)	(4)
IPI	0.303***	0.231***	0.368***	0.359***
	(4.32)	(3.68)	(5.22)	(6.01)
Trade openness (log)	0.035**	0.027**	0.043***	0.042***
	(2.76)	(2.95)	(4.00)	(4.05)
IPI × Trade openness (log)	-0.035***	-0.026**	-0.041***	-0.038***
	(-3.31)	(-2.90)	(-3.61)	(-4.11)
International price	0.038	0.034***	0.040***	0.049***
	(1.41)	(3.68)	(4.49)	(6.54)
International price × Trade openness (log)	-0.001			
	(-0.13)			
War dummy		0.093**		
		(2.93)		
War dummy × Trade openness (log)		-0.011*		
		(-2.06)		
GPR			0.006	
			(0.09)	
GPR × Trade openness (log)			-0.010	
			(-0.92)	
Sanction share				0.305
				(0.79)
Sanction share × Trade openness (log)				-0.034
				(-0.52)
Year and Month FE	YES	YES	YES	YES
N	10634	10634	10262	10634

## Relative importance of independent variables (net effect) from Shapely Decomposition



- ❑ Food price inflation driven by domestic factors (e.g. IPI)
- ❑ Trade openness mitigation effect on food price inflation
- ❑ More indirect (Geopolitical tension) *vis-a-vis* direct (Sanction share) effects
- ❑ Marked differences are observed across sectors
  - ❖ For F&Vs the international price has driven the most the price inflation
  - ❖ For animal products the effect of ag. prices were strongest
  - ❖ Trade openness has been an important driver for cereals, oilseeds, and sugar

# Comments are welcome

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