

Indicator 2.c.1

Indicator Name, Target and Goal

Indicator 2.c.1 Indicator of food price anomalies

Target 2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Definition and Rationale

☐ Definition

The indicator of food price anomalies (IFPA) identifies abnormally high or low prices that occur for a food commodity price series over a period of time. The IFPA relies on a weighted compound growth rate (CGR) that accounts for quarterly and yearly price growth.

☐ Concepts

A food commodity price is the market valuation for a given unit of measure (kilogram, tonne, etc.) of a primary agricultural product that can be bought and sold, such as coarse grains or wheat.

A compound growth rate (CGR) is a geometric mean that assumes a random variable grows at a steady rate, compounded over a specific period of time. Because it assumes a steady rate of growth the CGR smooths the effect of volatility of periodic price movements.

☐ Rationale and Interpretation:

Advance warning of impending food crises emerging from abnormal growth in prices in global commodity markets can be critical to mitigating its impact. The food price surges in global markets in 2007-08 and 2011 are examples of this. Because prices summarize information held by a large number of economic agents, including their expectations regarding likely short-term developments in supply and demand, they are ideal to characterize the functioning

of food commodity markets and may help to put in place policies that limit extreme price volatility.

$1 \leq \text{IFPA}_y$	Abnormally High
$0.5 \leq \text{IFPA}_y < 1$	Moderately High
$-0.5 \leq \text{IFPA}_y < 0.5$	Normal
$-1 < \text{IFPA}_y \leq -0.5$	Moderately Low
$\text{IFPA}_y < -1$	Abnormally Low

If the indicator is larger than or equal to 1, values should be closely monitored as they may be the result of a market shock. These shocks may be a result of a drop in supplies due to adverse weather or even policy shocks, such as import or export bans. Demand side shocks may also be responsible.

Data Sources and Collection Method

KSP-POS Market data

Method of Computation and Other Methodological Considerations

○ Computation Method

The compound growth rate (CGR) is a key concept in the calculation of this indicator. A CGR is a geometric mean compounded over a specific period of time. By assuming a steady rate of growth, the CGR smooths the effect of volatility of periodic price movements. The CGR at time t_n from time t_0 is given as follows:

$$CGR_{t_n} = \sqrt[n]{\frac{P_{t_1}}{P_{t_0}} \cdot \frac{P_{t_2}}{P_{t_1}} \cdot \dots \cdot \frac{P_{t_n}}{P_{t_{n-1}}}} - 1 = \left(\frac{P_{t_n}}{P_{t_0}}\right)^{\frac{1}{n}} - 1 \quad \text{Eq 1}$$

where P_{t_n} is the food commodity price at time t in period n . The indicator relies on two compound growth rates, so as to account for seasonal factors in agricultural and food prices. The first is a quarterly growth rate accounting for intra-annual seasonality. The second is a compound annual growth rate, accounting for inter-annual price variations. Both of these compounded rates of growth are calculated as moving averages over their corresponding time period. Following equation 1 above the indicator of food price anomalies can be defined as:

$$IFPA_{y,t}^G = \frac{CGR_{y,t}^G - \overline{CGR_t^G}}{\hat{\sigma}_{CGR_t^G}} \quad \text{Eq 2}$$

Where $IFPA_{y,t}^G$ is the quarterly (annual) $IFPA$ for the compound growth rate G in month t of year y . Where $CGR_{y,t}^G$ is the quarterly (annual) compound growth rate G in month t of year y , $\overline{CGR_t^G}$ is the weighted average of compound growth rate G in month t , $\hat{\sigma}_{CGR_t^G}$ is the weighted standard deviation for month t . Where $\overline{CGR_t^G}$ and $\hat{\sigma}_{CGR_t^G}$ are defined as follows:

$$\overline{CGR_t^G} = \frac{1}{\sum_{y=1}^Y w_y} \sum_{y=1}^Y w_y CGR_{y,t}^G \quad \text{Eq. 3}$$

Where w_y is a declining weight for year y and all other terms previously defined. And:

$$\hat{\sigma}_{CGR_t^G} = \sqrt{\frac{\sum_{y=1}^Y w_y (CGR_{y,t}^G - \overline{CGR_t^G})^2}{\sum_{y=1}^Y w_y (\hat{Y} - 1) / \hat{Y}}} \quad \text{Eq.4}$$

Where $\hat{Y}$ is the total number of years, excluding the current year. Then the $IFPA_{y,t}$, in month t of year y , is given by:

$$IFPA_{y,t} = 0.6 \times IFPA_{y,t}^A + 0.4 \times IFPA_{y,t}^Q \quad \text{Eq.5}$$

Where $IFPA_{y,t}^A$ is the annual value A for the $IFPA$, in month t of year y and $IFPA_{y,t}^Q$ is the quarterly value Q for the $IFPA$, in month t of year y . $IFPA_{y,t}^A$ Then the total value for $IFPA$ in year y is given by:

$$IFPA_y = \frac{1}{12} \sum_{t=0}^t IFPA_{y,t}$$

○ Comments and limitations

It is appropriate to caution the reader that the indicator is just a guide to understanding market dynamics. As such, one cannot rely on it as the sole element to determine whether a food price in a particular market at a given time is abnormally high or low due to the direct effects of local policies. Results must be weighed with other available information on market fundamentals, macroeconomic context and external shocks.

FAO relies on the Food Price Indices as reported in FAOSTAT as

well as on available official domestic food price data that it compiles in the Food Price Monitoring and Analysis (FPMA) tool to calculate the indicator. The FPMA database brings together price series for main food commodities (mainly cereal products) in selected markets in countries around the world. As a result, the indicator estimated by FAO can differ from the indicator estimated at country level, as it may be calculated on prices for a different market or commodity.

Data Disaggregation

By type of commodity

References

N/A

Custodian Ministries of Data

Ministry of Agriculture, Forestry and Fisheries

Custodian Ministries of Related Policies

Ministry of Agriculture, Forestry and Fisheries

International Organizations

Food and Agriculture Organization of the United Nations (FAO)