Philippine Statistical Research and Training Institute

Indicator of Food Price Anomalies for the Philippines

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ABSTRACT

Target 2.c of the Sustainable Development Goals aims to 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. This target covers Indicator 2.c.1 – the Indicator of Food Price Anomalies (IFPA) which identifies market prices that are abnormally high that can assist the government in taking necessary actions to maintain stable food prices. This paper focuses on generating the Indicator 2.c.1 for the Philippines through localizing the official United Nations Food and Agriculture Organization's (UNFAO) official methodology by examining different computations for the weighted average of the quarterly/annual compound growth rate using averages and moving averages. Using data on food indices and prices from the Philippine Statistics Authority (PSA), the IFPA was computed aggregately and per commodity and location. This study calculated a total of 266 IFPAs which includes indicators for food, rice, corn, meat, fish and seafood, fruit, and vegetables, both nationally and regionally. Results showed that computation for the IFPA becomes sensitive when the number of periods for the rolling mean and standard deviations decreases, and becomes relatively desensitized when the number of periods increases. Overall, the study showed that IFPA produces evident signals for historically high inflation periods which can prove to be useful in the government's monitoring of the food market.

1. Background

The Sustainable Development Goals (SDG) were adopted by the United Nations (UN) in 2015 as a replacement to the Millennium Development Goals (MGD). From the eight goals outlined in the MDG, the number of goals in the SDG was increased to 17, revolving around the ultimate task to "leave no one behind" (UN, 2021). Each SDG has a corresponding set of targets, and each target has its own set of indicators to monitor the progress of UN member states and evaluate whether the target has been reached by 2030. The indicators are classified into three tiers depending on the degree of their availability at the global level.

The Philippines, being a UN member state, adopted the SDGs and localized the indicators as spearheaded by the Philippine Statistics Authority (PSA). The Inter Agency and Experts Group on SDGs (IAEG-SDG) classified the indicators into tiers depending on the availability of an established methodology and frequency of data collection as follows:

- Tier 1 – indicators with established methodology, regularly collected
- Tier 2 – indicators with established methodology, data not regularly collected
- Tier 3 – indicators with no established methodology, methodologies are being developed/tested

The Philippine Statistical Research and Training Institute (PSRTI) exercises its mandate to contribute to the Philippine Statistical System by developing methodologies and producing Tier 3 SDG indicators. For this study, we focus on Indicator 2.c.1, in the SDG taxonomy:

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

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

INDICATOR 2.c.1: Indicator of food price anomalies

High volatility in food prices poses risks to both consumers and producers. On the consumer side, high price volatility induces uncertainties regarding the amount of food that can be bought given a fixed budget, especially during increasing prices. A sudden upward change in the price of food implies lower purchasing power of the currency resulting in a reduced quantity of food that can be bought. A higher price implies increased in income for the suppliers of food commodities, but a sustained and fast inflation would lead to lower income for the producers and sellers of food. The problem exacerbates when there is limited food supply as prices cannot be lowered substantially. This would result in further inflationary pressures that may last for an extended period until supplies meet the demand.

While a sudden price reduction is beneficial to the consumers, it could be detrimental to the sellers and producers of food. A sudden increase in the supply of food could initiate price reduction. However, food consumption by the households is somewhat fixed at a certain threshold, such that households would not buy food more than they need, and savings due to the lower food prices can be used to purchase non-food commodities. This translates into lower income for the sellers and producers of food. Moreover, a glut of food supplies implies a higher risk of spoilage on most food commodities with a limited shelf life, which doubles the burden to the sellers and

producers of commodities. The reduced income of food producers may eventually lead to lower reinvestments for food production and reduced supply, which will result in relatively higher prices.

A sudden price increase on a commodity may also affect other commodities. Suppose that there is a sudden price increase of pork. Consumers would look into other goods as substitutes; that is, people would buy more chicken or fish as a replacement for pork. As the demand for substitute goods increases, so as their prices until supply is sufficient for the demand. This emphasizes the importance of not only monitoring the prices of few commodities but the whole class of commodities. Moreover, food price volatilities must be monitored, not only at the national but also at the subnational level, such as at the regional or provincial level. Certain areas are predominantly producers of a food commodity, while some regions do not produce but are only consumers of food, such as the National Capital Region. Price volatilities in the producing region may be transmitted to the consumer regions.

The market will eventually find the equilibrium price given the demand and supply for food, and the path to price equilibrium may be a volatile one. In this case, damage to either the consumer or producer may occur. The role of the government is to minimize price volatilities as the market recalibrates. In the case of a sudden price increase due to reduced supply, government policies aimed towards increasing the supply of food without reducing the welfare of the producers are imperative. And in the case of a sudden supply glut, excess supply needs to be siphoned off the local market and exported to other countries before spoilage. The Rice Tariffication Law (Republic Act 11203) is an example of a market-driven price determination mechanism by the government with the aim for price stability and ample food supply.

SDG Indicator 2.c.1 is essential for government monitoring. This is highly relevant for the Philippines as local prices are highly dependent on demand and supply shocks, either due to calamities, importation, and other internal shocks. Maintaining a stable food price reduces the occurrence of negative shocks to both consumers and producers of food. A stable food price provides a layer of security, especially to households in subsistence poverty. Maintaining a stable price of food may eventually alleviate poverty by making conditional cash transfers more effective in meeting the daily needs of poor households. Moreover, the government can intervene in the market given early signs of potential market volatility.

The main objective of the study is to generate SDG Indicator 2.c.1 for the Philippines. This study will localize the official Food and Agriculture Organization (UNFAO) of the United Nations methodology for Indicator 2.c.1, which is called the indicator of food price anomalies (IFPA). Food indices and prices from the PSA will be used to produce the IFPA. Lastly, an assessment will be applied to the localized methodology, discussing its limitations, data regularity, and potentiality for process automation.

2. Review of IFPA Estimation Methodology

2.1 FAO IFPA

The UNFAO is the custodian and data reporting organization of the IFPA. The official definition and methodology of the IFPA calculation is reported in a UN Statistical Division (UNSD, 2021) document. The official definition is:

The indicator of food price anomalies (IFPA) identifies market prices that are abnormally high. The IFPA relies on a weighted compound growth rate that accounts for both within year and across year price growth. The indicator directly evaluates growth in prices over a particular month over many years, taking into account seasonality in agricultural markets and inflation, allowing to answer the question of whether or not a change in price is abnormal for any particular period (UNSD, 2021).

The IFPA is a standardized series using historical data and is interpreted by comparing it with thresholds based on the standard deviation of a certain period of time. The thresholds with respect to the standard deviations are given by the following:

$$\begin{aligned} -0.5 \leq IFPA_y < 0.5 \quad & Normal \\ 0.5 \leq IFPA_y < 1 \quad & Moderately\ High \\ IFPA_y \geq 1 \quad & Abnormally\ High \end{aligned}$$

where y indicates the year. An IFPA greater than or equal to -0.5 to less than 0.5 is considered a normal price movement for the commodity. An IFPA greater than or equal to 0.5 to less than 1 is moderately high, while an IFPA greater than or equal to 1 is abnormally high. FAO suggests that an abnormally high IFPA greater than or equal to 1 is a signal for a significant market event (UNSD, 2021).

2.1.1 Commodity Price Movements

As defined, the IFPA relies on the weighted compound growth rate accounting for both within year and across year price growth. FAO used the compound growth rate (CGR) formula to get the percent change between two periods. The CGR is a geometric mean that assumes that the commodity price grows at a steady rate across time. The CGR formula is given by:

$$CGR_t = \left(\frac{P_{t_B}}{P_{t_A}}\right)^{\frac{1}{t_B - t_A}} - 1 \quad \textbf{(1)}$$

where P denotes the price of the commodity from period t_A to t_B. To account for the within year growth rates, the quarterly CGR (CQGR) is calculated. This depends on the frequency of available price series. The annual CGR (CAGR) accounts for the across-year price movement. UNSD (2021) recommends using real prices to factor out the effects of inflation. However, UNSD (2021) noted that if the weight of a certain commodity to the consumer price index (CPI) is high, then anomalous price movement would reflect in the CPI, and would induce a downward bias in the commodity price in real terms. Therefore, it is also acceptable to use nominal prices or a non-food CPI for deflation.

2.1.2 IFPA Formula

The quarterly IFPA (QIFPA) and annual IFPA (AIFPA) is the standardized CQGR or CAGR, respectively, as defined:

$$XIFPA_{yt} = \left(\frac{CXGR_{yt} - \overline{W\_CXGR_t}}{\hat{\sigma}_{W\_CXGR_t}}\right) \quad \textbf{(2)}$$

where

- $CXGR_{yt}$ is either the quarterly or annual compound growth rate in month t for year y;
- $\overline{W\_CXGR_t}$ is the weighted average of either the quarterly or annual CGR for month t across years y;
- $\hat{o}_{W\_CXGR_t}$ is the weighted standard deviation of either the quarterly or annual compound growth rate for month t over the years y; and
- $XIFPA_{yt}$ is either the quarterly or annual IFPA.

The IFPA for a particular year y in month t is the weighted sum of the quarterly and annual IFPA at month t. The formula is given as follows:

$$IFPA_{yt} = \gamma QIFPA_{yt} + (1-\gamma)AIFPA_{yt} \quad \textbf{(3)}$$

where γ is assumed to be 0.4. In general, the IFPA of FAO is high if the CGR of prices is substantially greater than from its historical mean. Moreover, the use of the CGR implies that the IFPA is a measure of an upward price volatility, which could be directly linked to demand or supply shocks and does not necessarily imply the presence of market manipulation or collusion. Since the IFPA is standardized as shown in Equation 2, the indicator yields an abnormally high price signal if the CGR is greater than one standard deviation from the mean.

2.2 Country Experience on IFPA Estimation

ASEAN countries tend to prioritize other SDG indicators that are in Tier 2 and rely on the FAO IFPA estimates. This is evidenced by the fact that SDG Indicator 2.c.1 is not mentioned in most of the ASEAN national statistics offices' websites. Only Malaysia has indicated in their website that Indicator 2.c.1 is partially available and needs further development, as seen in Table 1.

Table 1. Availability of SDG Indicator 2.c.1 from ASEAN Member Countries

ASEAN Member Country	National Statistics Office	Availability	Website
1. Brunei Darussalam	Department of Economic Planning and Statistics	Not Available	http://www.deps.gov.bn
2. Cambodia	National Institute of Statistics	Not Available	https://www.nis.gov.kh
3. Indonesia	BPS – Statistics Indonesia	Not Available	https://www.bps.go.id/publication/2019/12/25/7ac89aed4ab8a22260d63ceb/indikator-tujuan-pembangunan-berkelanjutan--tpb--indonesia-2019.html
4. Lao PDR	Lao Statistics Bureau	Not Available	https://laosis.lsb.gov.la/main.do
5. Malaysia	Department of Statistics	Partially Available; Need Further Development	https://www.dosm.gov.my/v1/uploads/files/4_Portal%20Content/2_%20Statistics/SDG/indicator/Goal-2.pdf

ASEAN Member Country	National Statistics Office	Availability	Website
6. Myanmar	Central Statistical Organization	Not Available	https://www.csostat.gov.mm/PolicyAndStrategy/SDGs
7. Philippines	Philippines Statistics Authority	Not Available	https://psa.gov.ph/sdg/Philippines/baselinedata/2%20Zero%20Hunger
8. Singapore	Department of Statistics	Not Available	https://www.singstat.gov.sg/find-data/sdg/goal-2
9. Thailand	National Statistics Office	Not Available	http://web.nso.go.th
10. Viet Nam	General Statistics Office	Not Available	https://www.gso.gov.vn/en/other-news/2019/11/overview-of-the-set-of-sustainable-development-statistical-indicators-of-vietnam/

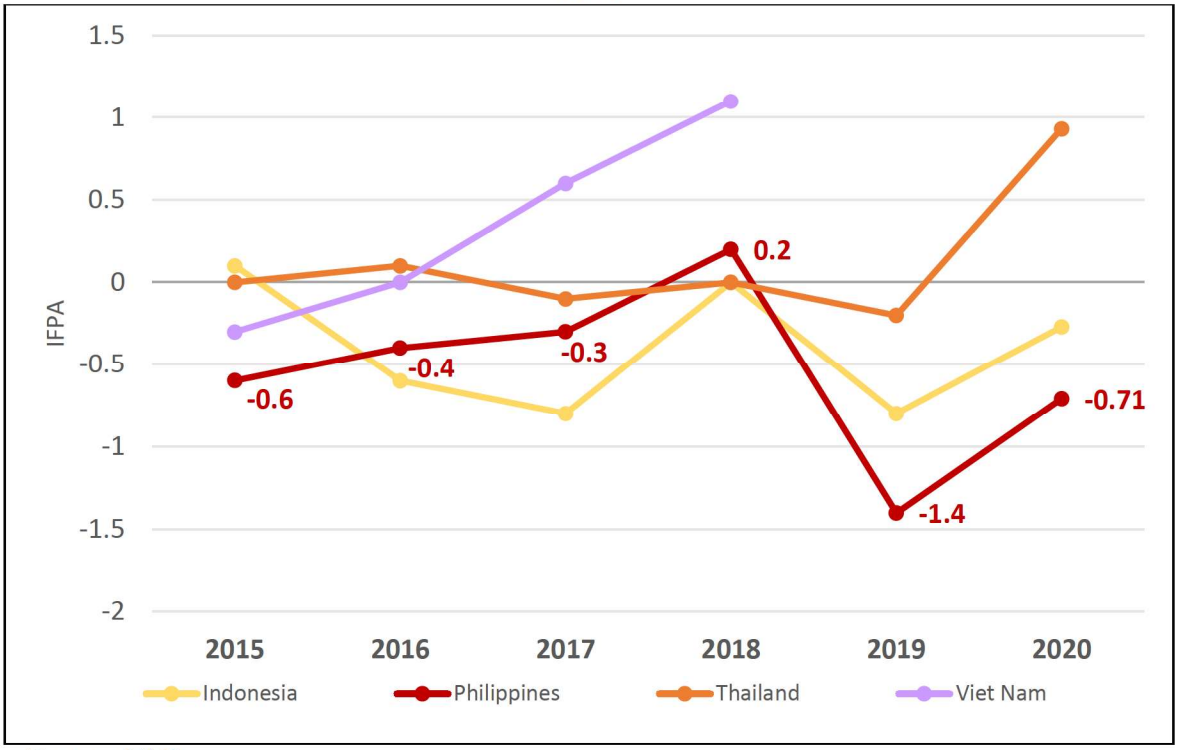
The FAO compiled food commodity prices from the member countries. Table 2 shows the available IFPA indicators calculated by FAO from ASEAN member countries. More commodity prices are available from the FAO website, but IFPAs were calculated only for select commodities such as rice, wheat, and maize (corn). These three commodities are the staple food of the ASEAN countries. Three countries Brunei Darussalam, Malaysia, and Singapore, do not have food price series submitted to FAO. Moreover, the Philippines only has two commodities with FAO IFPA indictor, which are rice and corn. Figure 1 shows the annual IFPA for rice of the Philippines and select ASEAN countries. Based on the IFPA cutoffs, all periods indicate Normal IFPA values except for 2019, which has no classification. Vietnam and Thailand experienced Moderately High rice IFPA in 2017 and 2020, respectively; Vietnam had an Abnormally High rice IFPA in 2018.

Table 2. FAO IFPA Indicator for the ASEAN Member Countries

ASEAN Member Country	Available IFPA Indicator from FAO
1. Brunei Darussalam	None
2. Cambodia	RICE - Phnom Penh, Rice (mix), Wholesale price
3. Indonesia	WHEAT - National average, Wheat (flour), Retail price RICE - National average, Rice, Retail price
4. Lao PDR	RICE - Vientiane Capital, Rice (Glutinous, first quality), Retail price
5. Malaysia	None
6. Myanmar	RICE - Yangon, Rice (Emata, Medium), Retail
7. Philippines	RICE - National average, Rice (well milled), Retail price MAIZE - National average, Maize (yellow), Retail price
8. Singapore	None
9. Thailand	RICE - Bangkok, Rice (5% broken), Wholesale price MAIZE - Bangkok, Maize (feed), Wholesale price
10. Viet Nam	RICE - An Giang, Rice (20% broken), Wholesale price

Source: Author's compilation from FAO

Figure 1. Annual FAO Rice IFPA of the Philippines and Select ASEAN Countries; 2015-2020



Source: FAO

3. Methodology

The methodology for the Philippine IFPA closely followed the FAO (UNSD, 2021) methodology. Given a monthly food price series P_t $(t = 1, \dots T)$, quarterly and annual CGRs are calculated using Equation (1). Quarterly and annual IFPAs are calculated using Equation (2). Final IFPA are calculated using Equation (3). However, the components of Equation 2, such as $\overline{W\_CXGR_t}$ and $\hat{\sigma}_{W\_CXGR_t}$ need additional definitions to be operationalized.

3.1. Localizing the IFPA Thresholds

As discussed in the background of this paper, sudden price changes would either affect the consumers and producers of food. The Philippines is heavily a consumer country and produces a large volume of agricultural output. Therefore, extreme price movement regardless of the direction must be detected by the IFPA. As the purpose of the IFPA in the Philippines is to protect the consumers and producers of food, the IFPA thresholds are revised to include negative IFPA values:

for $CAGR_t \geq 0$

$$\begin{array}{cc} IFPA_y \geq 1 & Abnormally\ High \\ 0.5 \leq IFPA_y < 1 & Moderately\ High \\ 0 \leq IFPA_y < 0.5 & Normal \end{array}$$

and for $CAGR_t < 0$:

$$-1 \leq IFPA_y < 0 \quad Moderately\ Low$$
$$IFPA_y \leq -1 \quad Abnormally\ Low$$

The revised thresholds detect both extreme upward or downward price changes.

3.2. Operationalizing $\overline{W\_CXGR_t}$ and $\hat{\sigma}_{W\_CXGR_t}$

Several options in operationalizing the calculation of the two statistics are available. The first option is to calculate the weighted mean and standard deviation across the whole sample; if the available time points are $t \in \{1,\ldots,T\}$, then the weighted mean and standard deviation are calculated over all T observations. The advantage of this is a larger sample that gives more precision to the estimated parameters. However, a disadvantage is the existence of drastic changes in the market leading to structural changes in the mean and standard deviation, thus making them time-varying. These structural changes are due to either import policies, price shocks in our trading partners, and other systemic shocks.

The other option is to account for the possible structural changes in the price processes, taking into account the time-varying nature of the parameters. Calculating the moving averages of the weighted mean and standard deviation captures the local structural changes. This approach is also advantageous when it comes to updating the series. Additional observations may alter the overall estimated mean and standard deviation of the historical data, which requires updating the IFPAs. This contrasts with the use of moving averages, wherein no changes are required to the IFPAs as long as there are no revisions to the historical prices.

The values for $\overline{W\_CXGR_t}$ and $\hat{\sigma}_{W\_CXGR_t}$ will be the weighted moving average and standard deviation of $CXGR_t$. The formula for $\overline{W\_CXGR_t}$ for a monthly price series is given by:

$$\overline{W\_CXGR_t} = \frac{1}{s}\sum_{i=1}^{s}\frac{1}{w_i}CXGR_{t-i} \quad \textbf{(4)}$$

where $\sum_{i=0}^{s-1} w_i = s$, while the formula for $\hat{\sigma}_{W\_CXGR_t}$ is:

$$\hat{\sigma}_{W\_CXGR_t} = \frac{1}{s-1}\left[\sum_{i=1}^{s}\frac{1}{w_i}(CXGR_{t-i} - \overline{W\_CXGR_{t-i}})^2\right]^{1/2} \quad \textbf{(5)}$$

where $s = \{12,24,36\}$. Thus, there will be four historical benchmark horizon to be evaluated: (i) rolling one year, (ii) rolling two years, (iii) rolling three years, and (iv) whole time horizon. To use formulas (4) and (5), the weight w_i must be defined. Decaying weights can be used; however, FAO methodology did not provide details on the weighing mechanism. For the output of this study, equal weights are applied.

3.3. Data

The calculation of the IFPA is done using monthly food price indices by the PSA with base year 2012 (PSA OpenStats, 2021); these are subcomponents of the CPI. The data spans from 2012-M1 to 2021-M3. The available price indices are as follows:

1. Food
2. Rice
3. Corn
4. Meat
5. Fish and Seafood
6. Fruit
7. Vegetables

The IFPA is calculated for the Philippines, National Capital Region (NCR), areas outside NCR (AONCR), and other regions. The total number of food price index series is 133. In addition, IFPA for the lower 30% of the population is also calculated from the lower 30% food CPI components, resulting in an additional 133 price indices. This type of CPI represents the food price index faced by the lower-income class households. Overall, the total number of IFPAs that are calculated is 266.

3.4. Assessment

Upon calculation of the IFPAs, periods of abnormal price movements are tagged. The proportion of IFPA signals are assessed. A high proportion of abnormally high signals may indicate that the indicator is too sensitive and is prone to give false signals. If the proportion of abnormally high signals is low, then the indicator is too strict and may miss potential periods of food inflation. Moreover, the calculated IFPAs are compared with Google Trends data on select related keywords for the Philippines. Google Trends provides indices of keyword search volume from a geographic location. An increase in searches using keywords related to a particular food commodity implies interest in the topic. The kewords used are: shortage, crisis, and prices.

4. Results

4.1. IPFA Signals

The results for the Philippines are presented in Figures 2 to 8; please refer to the Supplementary File for the regional IFPAs. The black line is the year-on-year growth rate of the index, while the color of the bar represents the IFPA signal categories: gray if normal, pink if moderate, and red if abnormal. Panel (a) of the figures gives the IFPA using the 12-month rolling mean and standard deviations in equations 4 and 5, panel (b) is for the 24-month rolling mean and standard deviation, panel (c) for the 36-months, and panel (d) is the IFPA result using all observations in the sample for the mean and standard deviation in equation 2. The IFPA using the rolling mean and standard deviation will use lag values and, therefore, will produce missing values at the start of the series.

Generally, as more time points are included in the rolling means and standard deviations, the less moderate and abnormal signals are observed, and the IFPA using all observations for the mean and standard deviation gives the lowest proportion of non-normal signals. This is observed in Table 3. This is because a 12-month rolling mean only looks at the more recent periods and uses these as the benchmark. Therefore, if there are no shocks in the past 12 months, then a slight price increase in the current period is treated as an outlier. This contrasts with the rolling 36-months IFPA, which uses three years of past price movements as its benchmark. Therefore, distant shocks in the last three years are still included in the rolling mean, which makes a current shock similar in magnitude to past shocks seem normal. This makes the rolling 12-month IFPA a

sensitive price indicator and a rolling 36-month IFPA a relatively sensitized indicator. Only the 12-month IFPA for rice indicated moderate and abnormally low-price movement, albeit during the recovery phase.

The sensitivity of the different IFPAs can be observed in Figure 2 from periods around 2016-M6 to 2017-M3. The 12-month and 24-month IFPA signal at least a moderately high food price movement, while the 36-month IFPA registers normal price activity. This is because the recent 12-24 months were relatively food inflation periods, and a sudden slight increase of prices by only less than 2% year-on-year was deemed abnormal. The 36-months and all observations IFPAs did not register any signals for the period.

Table 3. Proportion of Abnormally High Periods, Philippines

Commodity Group	Rolling 12 Months	Rolling 24 Months	Rolling 36 Months	All Observations
Food	28.4%	25.0%	23.4%	12.1%
Rice	21.6%	15.8%	15.6%	16.2%
Corn	22.7%	18.4%	18.8%	10.1%
Meat	34.1%	25.0%	29.7%	5.1%
Fish and Seafood	19.3%	26.3%	23.4%	14.1%
Fruit	18.2%	15.8%	14.1%	15.2%
Vegetables	15.9%	17.1%	18.8%	12.1%

Figure 2. Food Inflation and IFPA Signals, Philippines

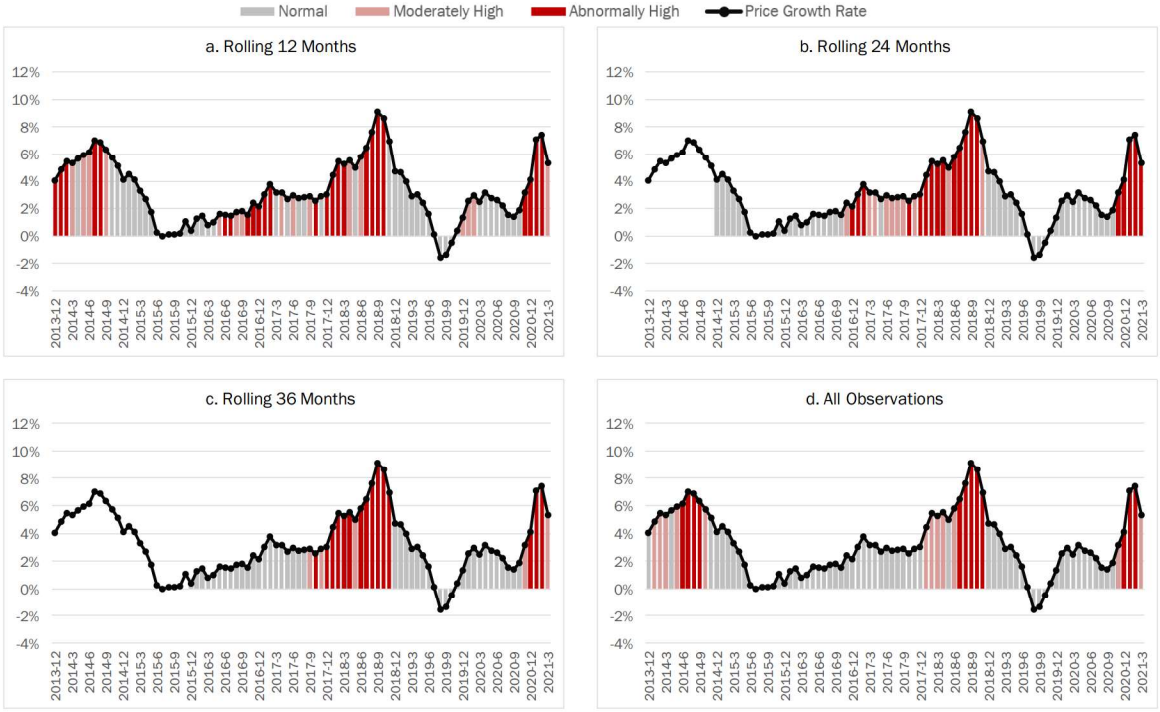


Figure 3. Rice Inflation and IFPA Signals, Philippines

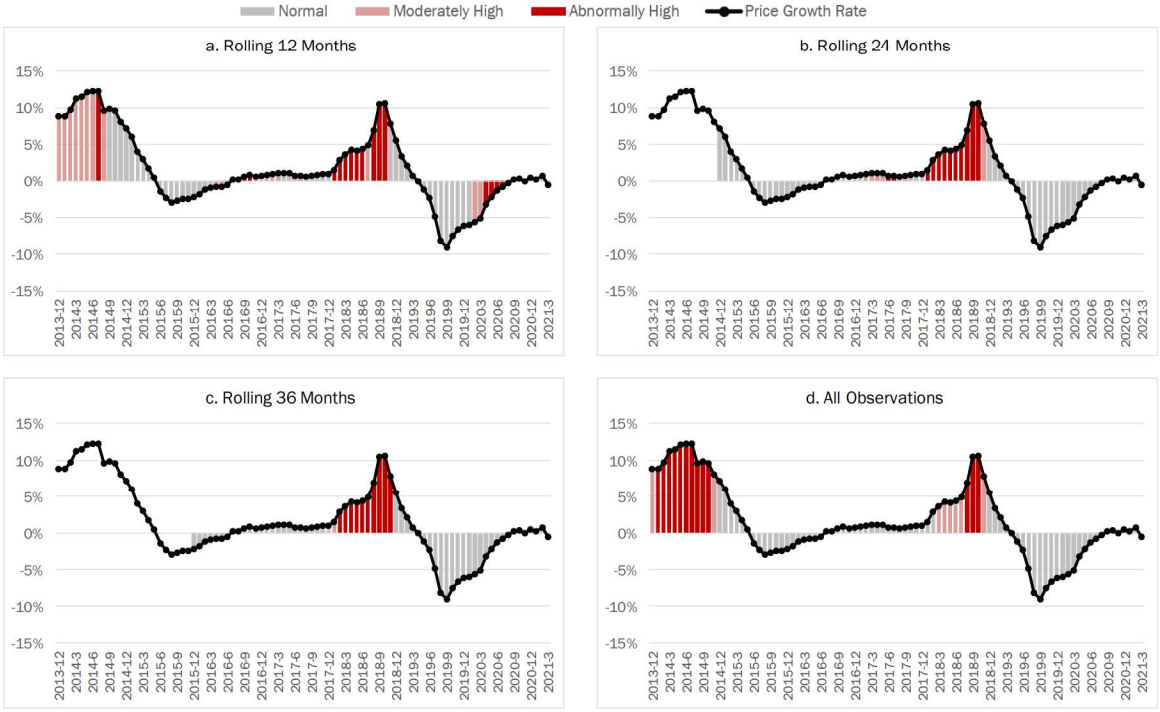
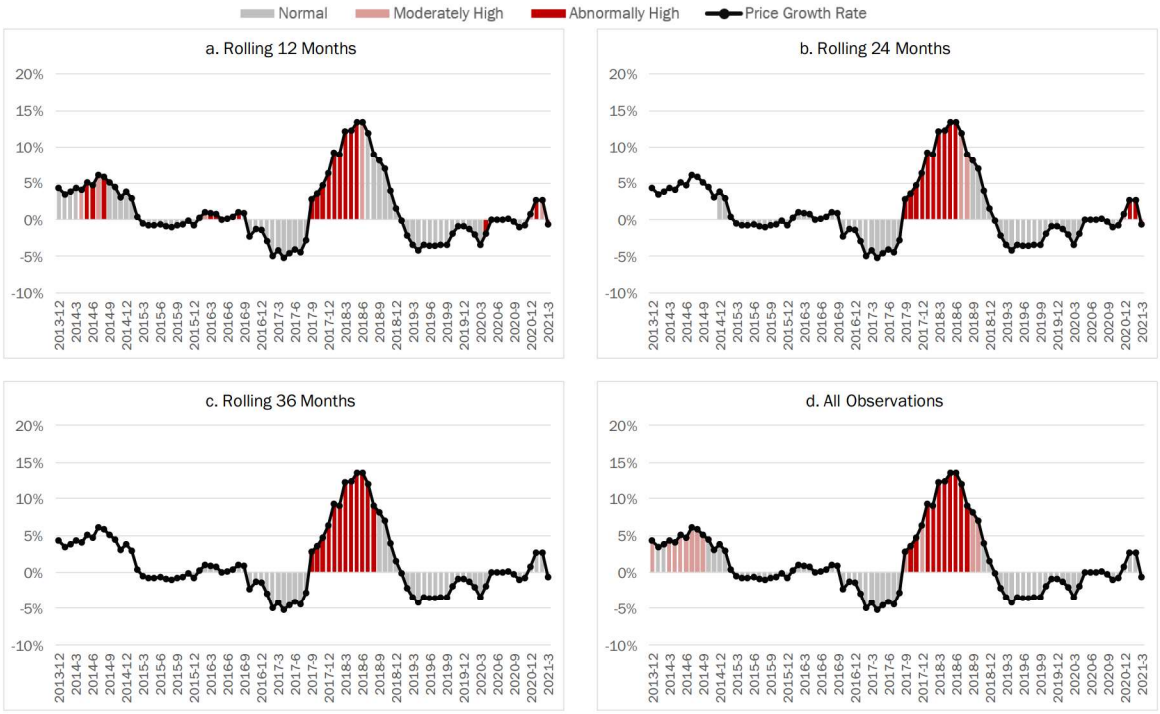


Figure 4. Corn Inflation and IFPA Signals, Philippines



While a sensitive indicator may provide more false-positive signals, a highly insensitive indicator may fail to give an alarm during a price surge. This can be observed in Figure 5.d for periods 2017-5 to 2018-9, where the rolling 36-month IFPA gives an abnormally high price movement for around 5% meat price inflation. This is because the whole sample includes an extreme inflation phase from the last quarter of 2020 to the third quarter of 2021. The IFPA using all observations, set this high inflation period reaching as high as 20% year-on-year as abnormal, making all other periods seemed normal. This is also observed in Table 3, where the proportion of abnormally high periods for meat using all observations IFPA is only around 5% compared to the other commodities hovering around 10-16%.

Figure 5. Meat Inflation and IFPA Signals, Philippines

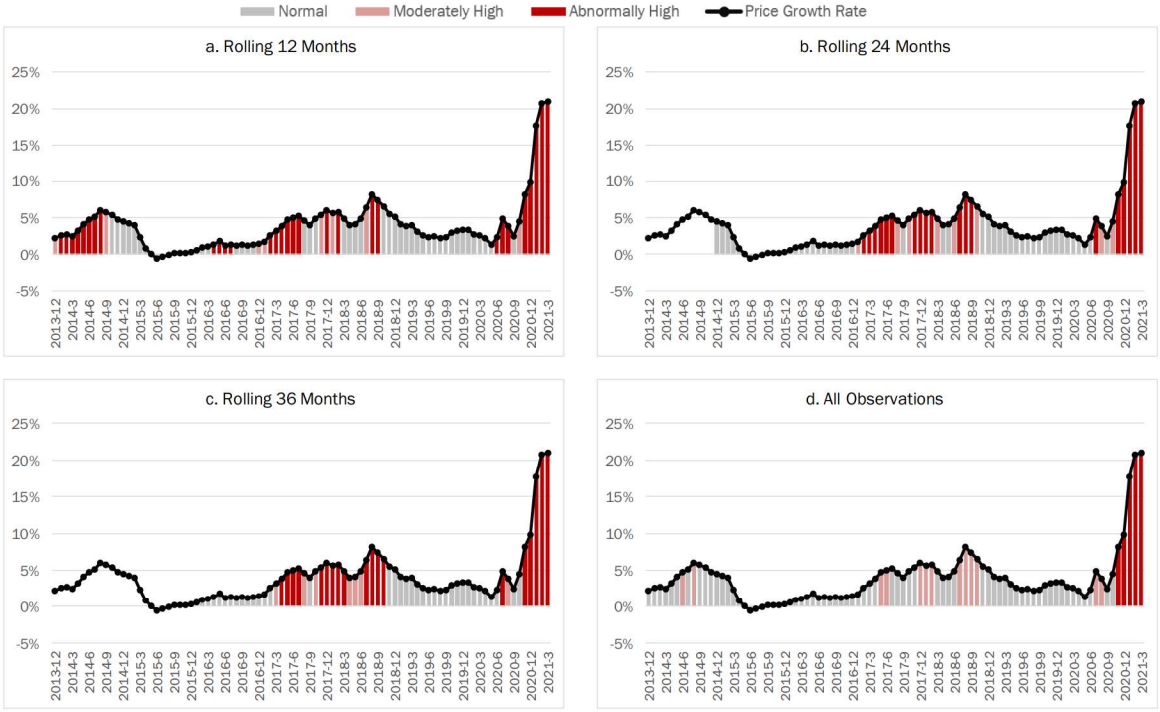


Figure 6. Fish and Seafood Inflation and IFPA Signals, Philippines

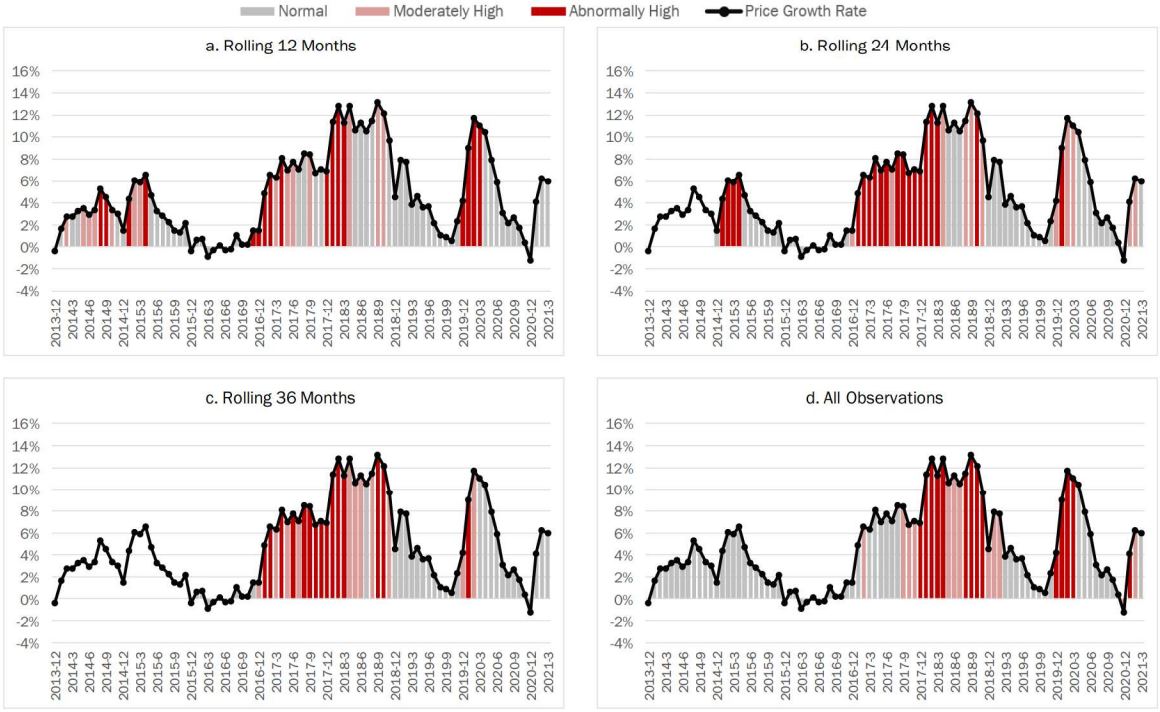


Figure 7. Fruit Inflation and IFPA Signals, Philippines

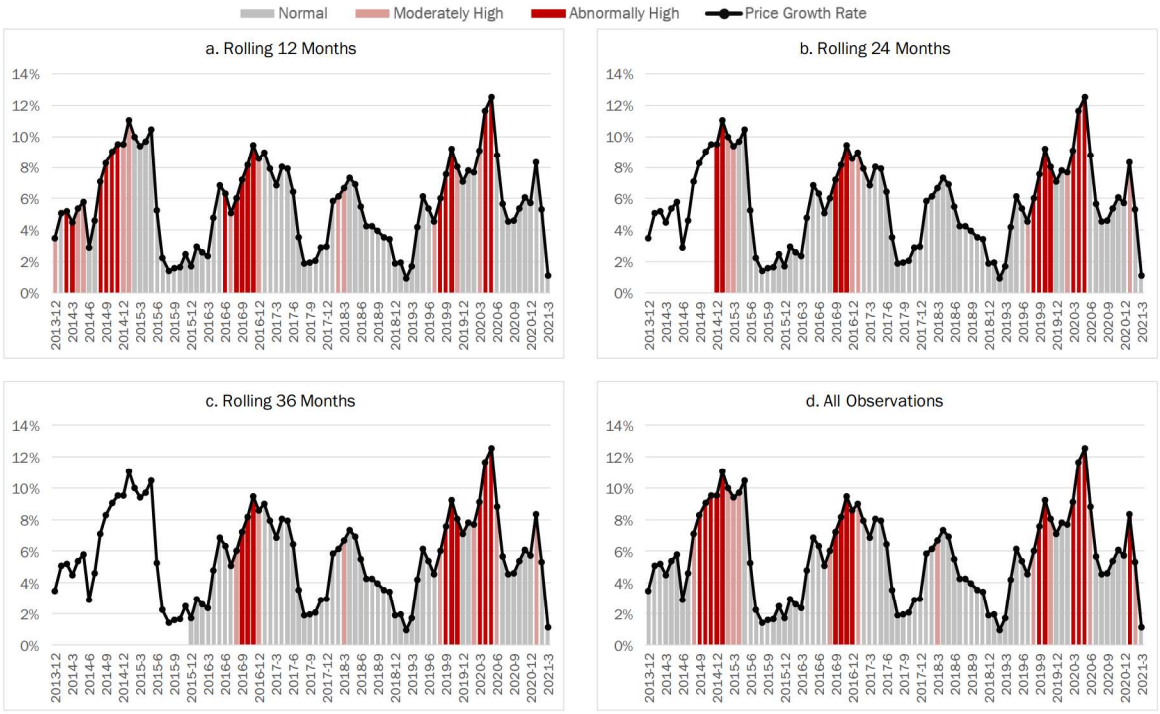
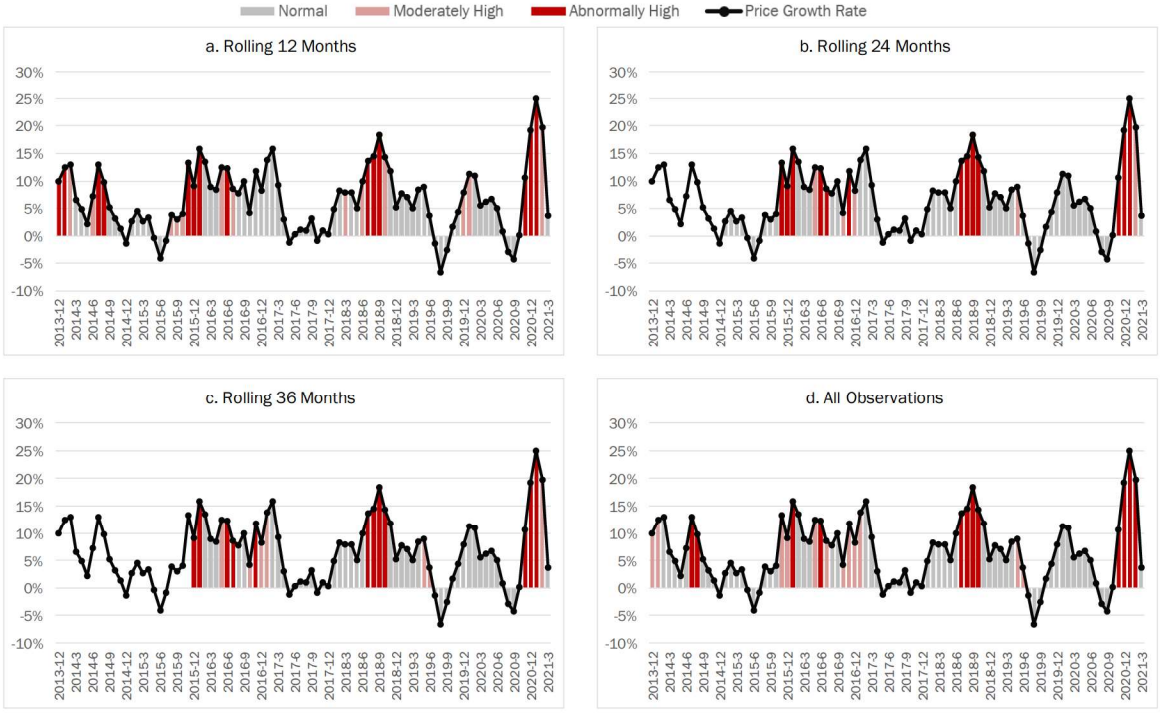


Figure 8. Vegetable Inflation and IFPA Signals, Philippines



4.2. IFPA and Google Trend Search Results

The rolling 36-month IFPA signals for the Philippines are superimposed with Google trend indices. The downloaded data have a monthly frequency following the same time periods as the calculated IFPA. The actual values of the Google trends are relative to the time frame being analyzed and the keywords being compared and thus have no direct interpretation, aside from its relative magnitude. A period with high Google Trend index implies numerous searches of searches have used the keyword. This study limits the analysis to three keywords: (i) shortage, (ii) crisis, and (iii) prices. These terms were appended to the commodity group; e.g., for meat: meat shortage, meat crisis, and meat prices.

All keywords are available for food and rice. Only shortage and prices are available for meat, only prices are available for corn, fish and seafood, and fruit, and no available Google Trend indices for vegetables. A missing Google Trend index means that the exact keyword was not searched for the period. Figures 9 to 14 compares the Rolling 36-Month IFPA signal with Google Trend indices. The height of the bars represents the year-on-year inflation rate of the commodity on the left-axis (positive inflation only), and the color of the bar represents the IFPA signal category. The black line represents the Google Trend index with vertical location representing high interest; the level of the index has no absolute interpretation.

In Figure 9, we see that IFPA signals abnormally high food prices from 2017-9 to 2018-11, with inflation hovering around 5-7%. Panel a and b shows that a peak interest around 2018-10 around the peak inflation of more than 9%. In this instance, IFPA provided signals even before the public became interested in the food shortage and crisis keywords. There was also a spike in Google Trend in the last quarter of 2020 to the first quarter of 2021, along with an increase in food prices during the period. All other periods where the Google Trend indices are high are low inflation periods.

Figure 10 shows elevated rice prices in 2018. Interest in the rice price keyword has also spiked during the same period. Interest for rice shortage and crisis was at the highest during the peak year-on-year inflation of more than 10%. This contrasts with a normal annual IFPA as reported by FAO in Figure 2. Figure 11 shows an increase in corn price search keyword in the third quarter of 2017, the start of the high inflation period for corn lasting for more than one year. Figure 12 shows that searches for meat shortage spiked by the end of 2021 coincide with a high inflation period. This is because of the African Swine Flu epidemic that resulted in limited pork supply during the period. Figure 13 shows the Google Trend result for fish; no searches were made for the seafood commodity. There was a spike in the fish price keyword at the start of a high inflation period for the fish and seafood commodity in the first quarter of 2017. Fruit price keyword also experienced a spike in interest around abnormally high IFPA signals.

Figure 9. Food 36-Month IFPA Signals and Google Trend Index, Philippines

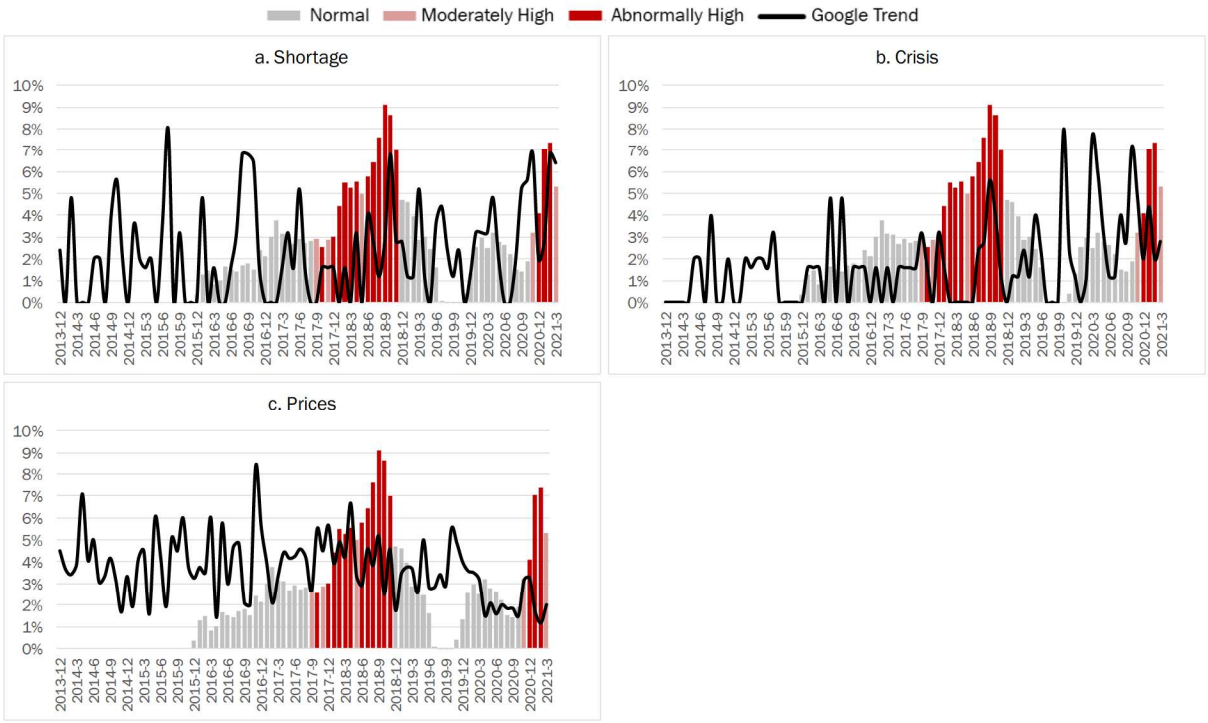


Figure 10. Rice 36-Month IFPA Signals and Google Trend Index, Philippines

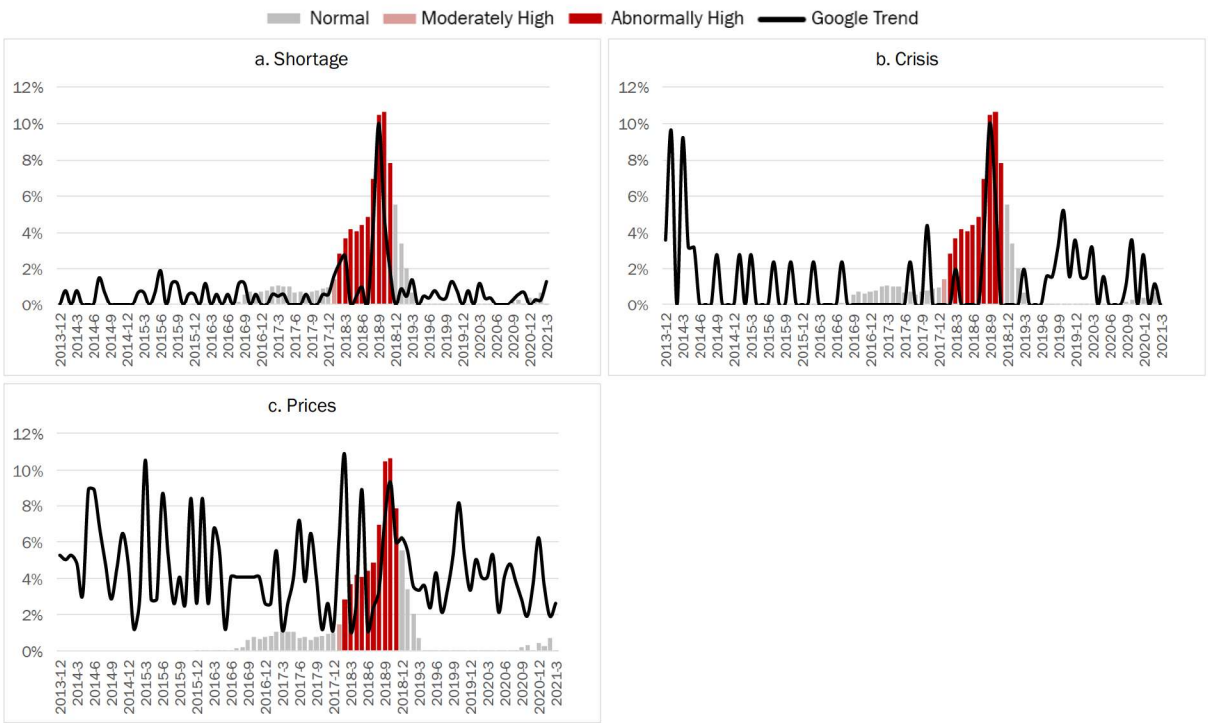


Figure 11. Corn 36-Month IFPA Signals and Google Trend Index, Philippines

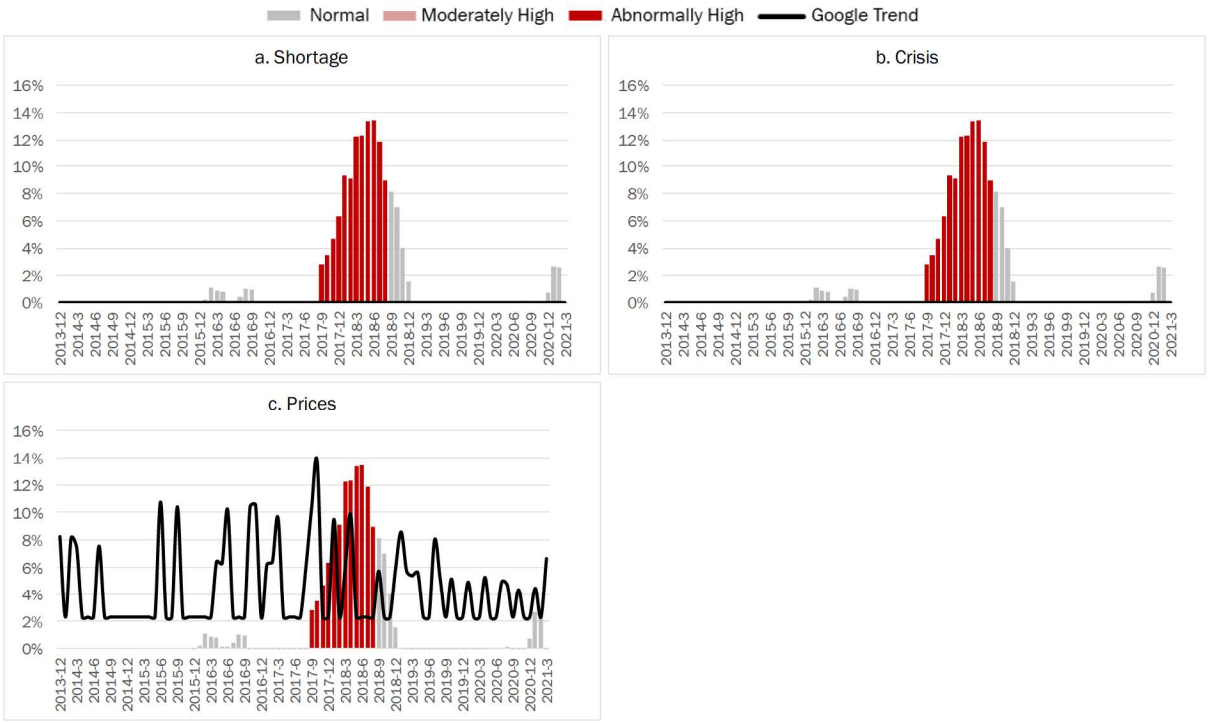


Figure 12. Meat 36-Month IFPA Signals and Google Trend Index, Philippines

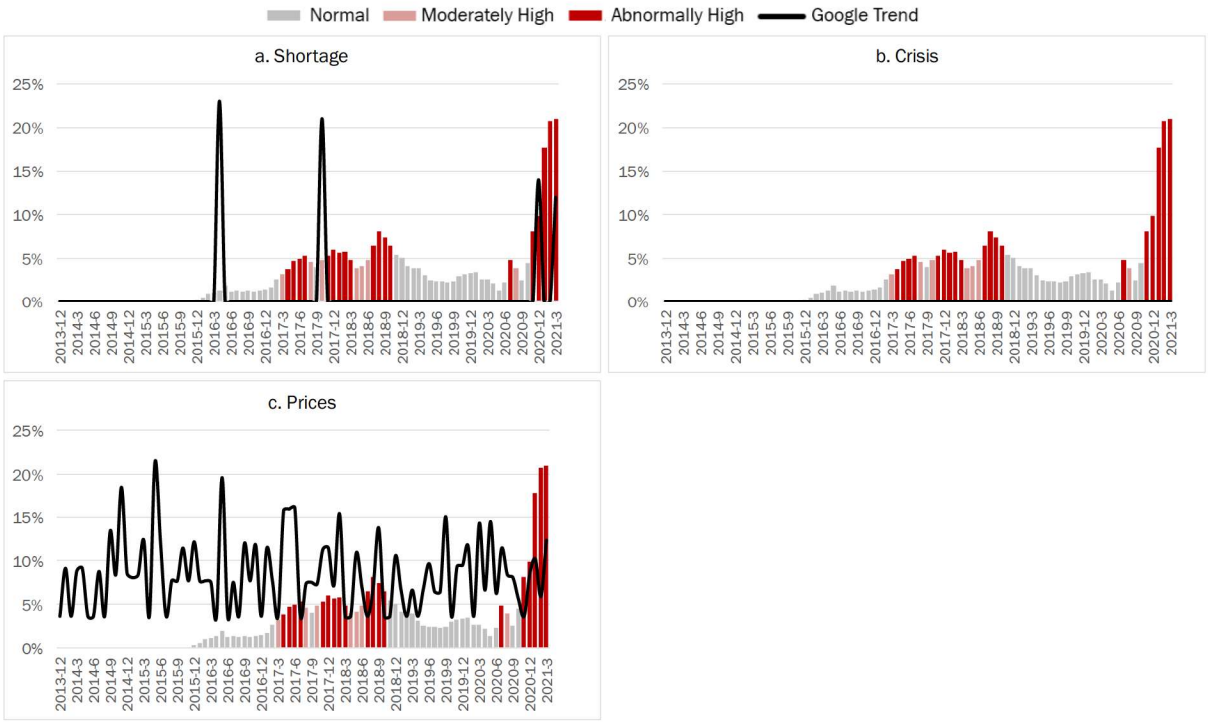


Figure 13. Fish and Seafood 36-Month IFPA Signals and Google Trend Index, Philippines

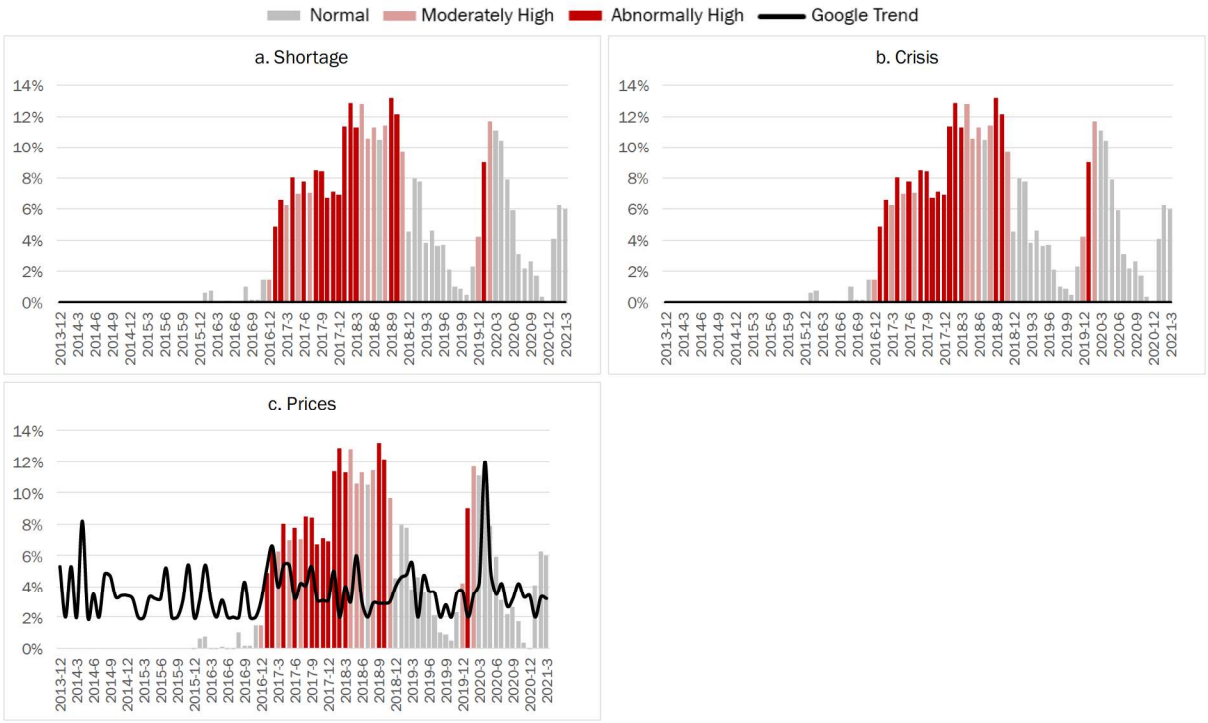
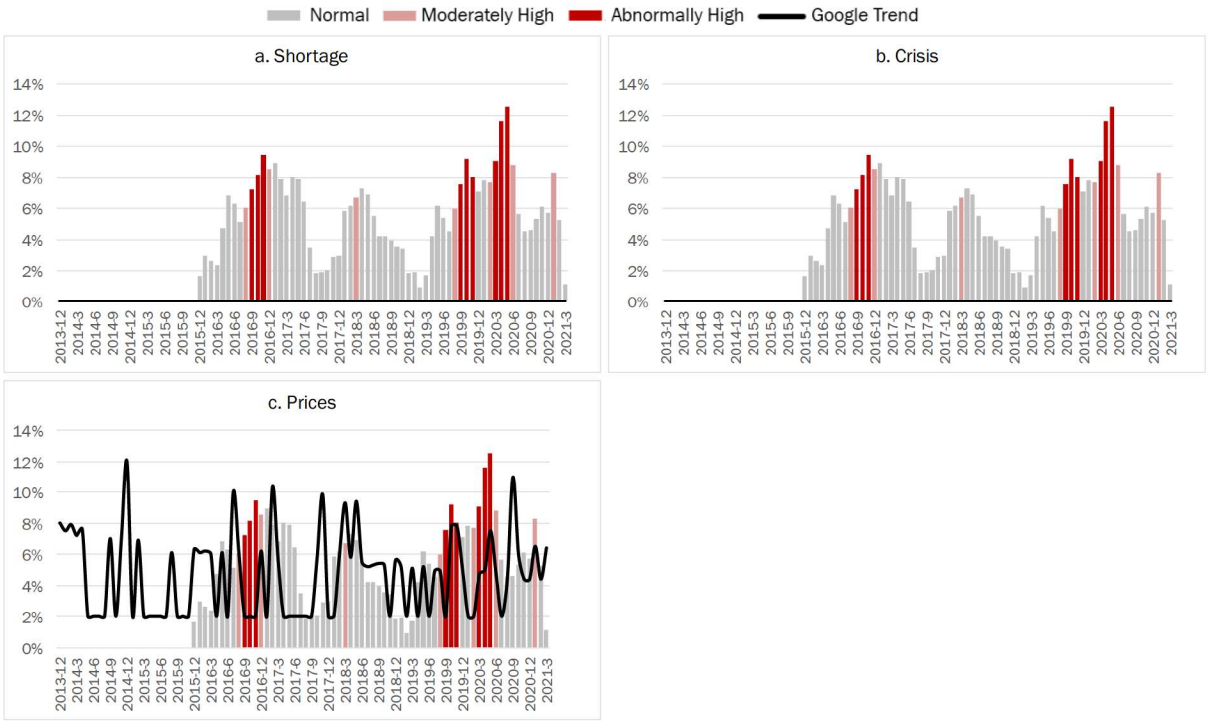


Figure 14. Fruit 36-Month IFPA Signals and Google Trend Index, Philippines



5. Conclusion

The study localizes the IFPA methodology of FAO and UN STATS for the Philippines and contributes to the SDG indicators of the country. It was observed that the IFPA becomes sensitive when the number of periods for the rolling mean and standard deviations decreases, and becomes relatively desensitized when the number of periods increases. It is recommended to use the rolling 36-month IFPA to maintain a balanced indicator that yields a small number of moderate and abnormal periods while still detecting practically sizable price anomalies. While the assessment of the IFPA was done descriptively by comparing it to interest in keyword searches using Google Trends, the study recommends expanding the list of keywords that includes the sub-commodities.

The series used in the IFPA calculation are CPI base 2012 for food and its components. The IFPA is recommended to be recalculated using the CPI base 2018 once the series for food and its components are available from the PSA OpenStats database. Moreover, the methodology can also be applied to farmgate, wholesale and retail prices of food. This may help in identifying prospective price anomalies by analyzing farmgate to retail price dynamics. Area disaggregated IFPAs can also be calculated at the provincial level, depending on the availability of price data points.

6. References

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