ASIA AND PACIFIC COMMISSION ON AGRICULTURAL STATISTICS

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Agenda Item 11

Price Statistics: Collecting producer prices: rational, challenges and proposed solutions

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Outline

1. Agriculture context & users and uses of producer prices
2. Definitions: Producer Prices & Producer Price Indexes
3. Sampling for PPIs: challenges and solutions when small producers are collectively “large”
4. Producer Prices in the value-chain: synergies with market information and market prices
Why collect producer prices? Particularly as agriculture declines as a share of the economy?

- Importance of agriculture for food security; rural employment;
- Impact of food price volatility on political/social stability
- Input to calculating value of production, measuring agriculture GDP, calculating cost of production
- Importance of region’s contribution to global agriculture
Asia & Pacific region’s agriculture share of GDP fell to 8% ...

Source: United Nations Statistics Division and Food and Agriculture Organization
... but region’s share of global Agriculture rose to over 50%

Source: United Nations Statistics Division and Food and Agriculture Organization
Asia & Pacific dominated in global pulse production ...

Global Pulse Production, millions of Tonnes, 1961-2016

Source: Food and Agriculture Organization
... increased its domination in global cereal production ...

Global Cereal Production, millions of Tonnes, 1961-2016

Source: Food and Agriculture Organization
... and grew to dominate in roots’ and tubers’ production ...

Roots & Tubers' Production, millions of Tonnes, 1961-2016

Source: Food and Agriculture Organization
**Users and Uses of Agriculture Producer Prices**

**Government**
- Short-term measure of inflationary trends
- Policy development and monitoring (e.g. food security, minimum price support, value of production, Ag GDP)

**Farmers**
- Inform decisions on what to grow, when and where to sell, overall profitability

**Business Community**
- Forecast market conditions; determine input and food supply contracts; inform lending and insurance decisions

**Researchers / Academics**
- Study policy issues such as food security, price transmission, price volatility

*A globally comparable dataset on agriculture producer prices, absolute levels and price indexes, also enables comparisons between countries of prices, price inflation and price transmission*
**Considerations**

- Best measured *after* a sale/transaction occurs to get *actual* price received.
- Tax & subsidy treatment depends on price concept (producer vs basic price).
- For sales *after the farm gate*, exclude the portion of price on post farm-gate related costs: storage, transportation, wholesale margins, market dues, etc.
WHAT ARE BASIC PRICES VERSUS PRODUCER PRICES?

1. **Basic price** = amount received by producer from a purchaser for a unit of good or service produced as output.
   - includes subsidies and taxes on *production*.
   - excludes taxes on products, other subsidies on production, suppliers’ retail and wholesale margins, and separately invoiced transport and insurance charges.

2. **Producer price** = Basic price - VAT or similar deductible tax, usually invoiced to the purchaser.
   - In agriculture, also known as farm-gate prices, or the price a farmer would receive if he/she sold the commodity at their farm.

**Considerations**
- Practices vary across countries on use of producer vs basic vs other prices
- The producer price may be simpler to collect.
- The price concept used impacts what information should be collected.
Laspeyres index:
• Weight=share of base year value of production
• Production data for to

Paasche index:
• Weight=share of current year value of production
• Annual production data

Fisher index:
• Geometric average of the Laspeyres and Paasche Indices

\[
PPI_t^L = \frac{\sum P_{ti} Q_{oi}}{\sum P_{oi} Q_{oi}}
\]

\[
PPI_t^P = \frac{\sum P_{ti} Q_{ti}}{\sum P_{oi} Q_{ti}}
\]

\[
PPI_t^F = \sqrt{PPI_t^P * PPI_t^L}
\]

Use 3 year weighted average to smooth through volatility in agriculture production
$PPI_L^t = \frac{\sum P_{ti}Q_{oi}}{\sum P_{oi}Q_{oi}}$

$= \sum \left( \frac{P_{oi}Q_{oi}}{\sum P_{oi}Q_{oi}} \right) \left( \frac{P_{ti}}{P_{oi}} \right)$

$= \sum (S_{oi}) \left( \frac{P_{ti}}{P_{oi}} \right)$

**Use of Modified Laspeyres**

- Base period may be a year, while prices are monthly or quarterly (modified Laspeyres)
- Use (3 year) weighted average of base period to smooth through agriculture volatility
1. National PPIs,

2. Sub-national PPIs and/or PPIs for commodity groups

3. Absolute price levels for commodities at national level (requires much larger sample size)

4. May choose to disseminate less frequently than price data is collected; e.g. publish monthly PPIs based on weekly data collection; quarterly or annual PPIs based on monthly data collection.

The above will determine sample size and influence the sampling strategy.
• Determine commodities of interest and level of sub-national aggregation.

**Multi-stage sampling**

1. For each region and commodity, sample representative producers based on a sampling frame.
   • Producers stratified in three groups: Large, medium, small.
   • PPI manuals recommend use of Poisson sampling (sampling proportionate to size)
   • In many areas of production, a small number of large producers account for >60 of value of production; the plurality of small producers account for <10%.
     ➢ “Take all” large producers; “take some” medium producers; “take none” small

2. For each producer, select a typical sample of products sold (usually a judgmental sample determined by the producer), and collect the price received
What if small producers have a significant share of value of production?
  ➤ Must sample small producers

What if small producers sell infrequently? Farmers who own 1 or 2 cows; who only occasionally sell surplus produce, etc.
  ➤ Implies large sample size to find producer engaged in sale
  ➤ Alternative - sample at point of sale: wholesale market, retail market, slaughter house., etc.
  ➤ Requires knowledge of commodity value-chain

- Sampling approach per commodity and region
  - Sample representative markets (instead of small producers)
  - Sample representative traders (purposive or judgemental)
  - Judgemental sample of sales of a commodity (data on price paid by trader, VAT, market dues, transport costs, etc.)
Challenges in collecting and compiling producer prices

- Weighting of commodities and commodity groups; the SUT versus Agriculture Census versus annual survey data
- Standardizing non-standard units of measure (bags of rice; cups of lentil; bunches of bananas)
- Adjusting for quality variations across an agricultural product
- Seasonality (on/off) of agricultural commodities
- Excluding imported products
- Understanding a commodity value chain
Benefits in compiling PPIs using market data

- Enables integration of market information system/market prices and producer price statistics programs
  - Reduce duplication; enhance consistency
  - Introduce statistical robustness into market price data
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Thank you