Developing monthly agricultural export price indexes

Kirk Zammit, Chris Boult, Shiji Zhao & Liangyue Cao
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Outline

- Why ABARES developed this price index
- What are the main features of this price index?
- How did we construct the index?
- Results
Agriculture is highly export oriented

Average values, 2012-13 to 2014-15

- Wheat: $7.4b, 78% domestic consumption, 24% export
- Sugar: $1.2b, 96% domestic consumption, 4% export
- Cotton lint: $1.5b, 98% domestic consumption, 2% export
- Beef: $8.3b, 70% domestic consumption, 30% export
- Wool: $2.6b, 98% domestic consumption, 2% export
- Dairy products: $4.4b, 41% domestic consumption, 59% export

Total agricultural production: $48b, 66% domestic consumption, 34% export
Existing indexes do not meet our needs

<table>
<thead>
<tr>
<th></th>
<th>ABS IPD</th>
<th>ABS EPI</th>
<th>RBA ICP</th>
<th>ABARES unit returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Index</strong></td>
<td>Current weighted Paasche</td>
<td>Annually weighted chained Laspeyres</td>
<td>Annually weighted chained Laspeyres</td>
<td>Annually weighted chained Fisher</td>
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<tr>
<td><strong>Weights</strong></td>
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<td>Average of the most recent two years</td>
<td>Average of the most recent two years</td>
<td>Annual average</td>
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<tr>
<td><strong>Price data source</strong></td>
<td>Average export unit values (AUV)</td>
<td>Survey and limited use of AUVs</td>
<td>Indicator prices</td>
<td>AUVs</td>
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<tr>
<td><strong>Coverage</strong></td>
<td>100%</td>
<td>100%</td>
<td>~65%</td>
<td>~75%</td>
</tr>
<tr>
<td><strong>Subindexes</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>Quarter</td>
<td>Quarter</td>
<td>Month</td>
<td>Annual</td>
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<tr>
<td><strong>Classification</strong></td>
<td>BOP</td>
<td>ANZSIC, BOP AHECC</td>
<td>Top eight exports by value</td>
<td>ABARES</td>
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</tbody>
</table>
Outline

• Why ABARES developed this price index

• **What are the main features of this price index?**

• How did we construct the index?

• Results
Source data – average export unit values (AUV)

- Suited for agricultural products (homogeneous)
- Measure of prices received
- Comprehensive coverage
- Readily available
Monthly index

• Agricultural prices are volatile

• Useful for analysis

• Can be aggregated
Outline

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We chose the Fisher index

Agricultural export price indexes

Paasche
Fisher
Laspeyres
The Fisher index controls for substitution bias
Positive relationship between price and quantity is more prevalent in ‘Livestock & livestock products’

Paasche - Laspeyres spread

- Livestock & livestock products
- Crops

ppt
Jul-90 Jul-93 Jul-96 Jul-99 Jul-02 Jul-05 Jul-08 Jul-11 Jul-14 Jul-17
The Fisher index has desirable axiomatic properties

• Factor reversal

• Approximately consistent in aggregation
Controlling divergence between the Laspeyres and Paasche Indexes

Paasche - Laspeyres spread

Chained
Unchained

ppt
Jul-02 Jul-05 Jul-08 Jul-11 Jul-14 Jul-17
Fisher test of transitivity

THE MAKING
OF INDEX NUMBERS
A Study of Their
Varieties, Tests, and Reliability

BY
IRVING FISHER
PROFESSOR OF POLITICAL ECONOMY, YALE UNIVERSITY

THIRD EDITION, REVISED

BOSTON AND NEW YORK
HOUGHTON MIFFLIN COMPANY
1927

Index
1913 1914 1915 1916 1917 1918

- Fisher Direct Index
- Fisher Chained Index
But how frequently should we chain?
Construction of weights

Livestock

Crops

Production possibility frontier

L1

L2

C2

C1

X1

X2

Indifference curve

A

B

B1

B2

X1

X2
Construction of weights

Laspeyres

Paasche

June 2016

June 2017

Dec 2017

June 2018
Outline

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Monthly agricultural export price indexes

- Livestock & livestock products
- All Agriculture
- Crops
Monthly agricultural export price indexes

Index

Jul-90 Jul-93 Jul-96 Jul-99 Jul-02 Jul-05 Jul-08 Jul-11 Jul-14 Jul-17

USD
AUD
Subindexes – crops

Index
Jun-02  Jun-05  Jun-08  Jun-11  Jun-14  Jun-17

Pulses
Oilseeds
Grains
Industrial crops
Subindexes – livestock and livestock products
We would really appreciate your feedback on:

1. Chaining method
2. Construction of weights
3. Use of average unit values

Thank you
Indicator prices

• Available monthly

BUT:

• Difficult to build a comprehensive index

• Some indicator prices are approximate measures

• Each indicator price is measured differently

• Do not reflect the actual return to Australia
Cotton prices
Survey prices

• Gold standard

BUT:

• No access/very expensive

• Only available on a quarterly basis
Index formulas

Laspeyres Index: \[ L_t = \frac{\sum_i p_{it}q_{i0}}{\sum_i p_{i0}q_{i0}} = \frac{\sum_i v_{i0}(p_{it}/p_{i0})}{\sum_i v_{i0}} = \sum_i w_{i0}(p_{i1}/p_{i0}) \]

Paasche Index \[ P_t = \frac{\sum_i p_{it}q_{it}}{\sum_i p_{i0}q_{it}} = \frac{\sum_i v_{it}(p_{it}/p_{i0})}{\sum_i v_{it}} = \left\{ \sum_i w_{i1}(p_{i0}/p_{i1}) \right\}^{-1} \]

Fisher Index \[ F_t = (L_tP_t)^{1/2} \]