Are Small Dairy Producers Efficiently Integrated into Markets in Panamá?

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Foto: Guevara, 2012
Content

I. Market structure

II. Vertical Price Transmission

III. Results

IV. Conclusions

V. Policy implications
I. Market Structure

• Market size

Source: Guevara, 2011
I. Market Structure

- Market size
- Product quality

Source: Guevara, 2011
I. Market Structure

• Market size

• Product quality

• Type of producer
I. Market Structure

- Market size
- Product quality
- Type of producers
- Level of market concentration

Source: Guevara, 2011
II. Vertical Price Transmission

- Magnitude
II. Vertical Price Transmission

- Speed

\[ \Delta P \]

\[ t_1 \quad t_2 \quad t_3 \quad t_4 \]

Retailers
Wholesalers
Producers
II. Vertical Price Transmission

- Symmetry

\[ \Delta P \]

\[ t_1 \]
\[ t_2 \]
### III. Results

#### Model Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>$p$</th>
<th>$a_0$</th>
<th>$a_2$</th>
<th>$\delta$</th>
<th>$\gamma$</th>
<th>$\beta_{t-p}$</th>
<th>F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta pp_t = a_0 + a_2 t + \gamma pp_{t-i} + \sum_{i=1}^{p} \beta_i \Delta pp_{t-i} + \varepsilon_t$</td>
<td>2</td>
<td>0.07</td>
<td>0.0002</td>
<td>_</td>
<td>-0.36</td>
<td>-0.45</td>
<td>21.63</td>
</tr>
<tr>
<td>$\Delta wp_t = a_0 + \gamma wp_{t-i} + \sum_{i=1}^{p} \beta_i \Delta wp_{t-i} + \varepsilon_t$</td>
<td>1</td>
<td>0.034</td>
<td>_</td>
<td>_</td>
<td>-0.09</td>
<td>-0.44</td>
<td>5.03</td>
</tr>
<tr>
<td>$\Delta rp_t = a_0 + \delta D_L + \gamma rp_{t-i} + \varepsilon_t$</td>
<td>2</td>
<td>0.08</td>
<td>_</td>
<td>0.03</td>
<td>-0.12</td>
<td>_</td>
<td>5.46</td>
</tr>
</tbody>
</table>
### III. Results

- **Unit Root Test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test</th>
<th>Lags</th>
<th>$H_0: \gamma = 0$</th>
<th>Lags</th>
<th>$H_0: \Delta \gamma = 0$</th>
<th>t-statistics</th>
<th>Critical values at 5% level</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
<td>ADF</td>
<td>8</td>
<td>-3.11</td>
<td>7</td>
<td>-6.98</td>
<td>-3.41</td>
<td></td>
</tr>
<tr>
<td>WP</td>
<td>ADF</td>
<td>2</td>
<td>-2.24</td>
<td>1</td>
<td>-16.44</td>
<td>-2.86</td>
<td></td>
</tr>
<tr>
<td>RP</td>
<td>UR</td>
<td>7</td>
<td>-3.55</td>
<td>-</td>
<td>-</td>
<td>-2.88</td>
<td></td>
</tr>
</tbody>
</table>
## III. Results

- **Cointegration Test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lags</th>
<th>Ro</th>
<th>LR</th>
<th>P-Value</th>
<th>t-statistics critical values at 5% level</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP</td>
<td>9</td>
<td>0</td>
<td>27.75</td>
<td>0.003</td>
<td>20.16</td>
</tr>
<tr>
<td>PP</td>
<td>1</td>
<td>1</td>
<td>1.89</td>
<td>0.794</td>
<td>9.14</td>
</tr>
</tbody>
</table>
### III. Results

- **Granger Causality Test**

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>F-Statistics</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP does not cause WP</td>
<td>3.97</td>
<td>0.02</td>
</tr>
<tr>
<td>WP does not cause PP</td>
<td>2.81</td>
<td>0.06</td>
</tr>
</tbody>
</table>
III. Results

- VECM

\[
\begin{align*}
\Delta WP &= -0.01^* - 0.45^* \Delta WP_{t-1} - 0.09 \Delta PP_{t-1} + 0.09^* [WP_{t-1} - 1.83 PP_{t-1}] \\
\Delta PP &= +0.02^* - 0.02 \Delta WP_{t-1} - 0.15^* \Delta PP_{t-1} + 0.11^* 
\end{align*}
\]
III. Results

• VECM

\[
\Delta WP = -0.01^* - 0.45^* \Delta WP_{t-1} - 0.09 \Delta PP_{t-1} - 0.09^* \]

\[
\Delta PP = +0.02^* - 0.02 \Delta WP_{t-1} - 0.15^* \Delta PP_{t-1} + 0.11^* [WP_{t-1} - 1.83 PP_{t-1}] \]

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III. Results

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\]

\[
\Delta PP = +0.02^* - 0.02 \Delta WP_{t-1} - 0.15^* \Delta PP_{t-1} + 0.11^* \]

• AECM

\[
\Delta WP_t = -0.001 - 0.432^* \Delta WP_{t-1} - 0.056^* \Delta PP_{t-1} - 0.129^* ECT^+ - 0.169 ECT^-
\]
VI. Conclusions

- Price changes at the consumer level are not being efficiently transmitted to other levels of the marketing chain.

- Wholesalers and producers prices are co-integrated in the long-run but not so in the short-term.

- The speed of price transmission is asymmetric, being significantly faster when producers’ prices increase.
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V. Policy Implications

• Efforts to increase small dairy producers' competitiveness should be accompanied with actions to increase the efficiency of the markets in which they operate.
  
  • Improving infrastructure.
  
  • Control over the concentration of market power.
  
  • Reducing transaction costs.
Thank you