BIOMASS PRICE VOLATILITY

ANALYSIS OF THE HISTORIC BIOMASS AND ENERGY PRICE VOLATILITY IN THE AUSTRIAN MARKET

Christa Kristöfel

Christoph Strasser, Ulrich Morawetz, Johannes Schmidt, Erwin Schmid

European Biomass Conference 3 – 7 June 2013, Copenhagen
Introduction & Motivation

- The share of bioenergy is projected to increase in the energy demand portfolio

- Developments in the timber and bioenergy market with possible impacts on price volatility:
  - Nationally diverse implementations of European renewable energy policies
  - Increase in biomass trade with large biomass trade flows within Europe and between continents
  - Linkage between fossil fuel prices and bioenergy prices
  - Calamities like windfalls
Objectives

- Compute and empirically analyze historic price volatility of woody biomass
- Analysis of structural changes in price volatility
  - Has commodity (biomass) price volatility changed/increased over time?
- Price volatility of woody biomass is compared to the price volatility of fossil fuels and agricultural commodities
Method

- Detecting structural changes by using the supF-test
- Using Mann-Whitney non-parametric rank-based test to test log-differences
  - Increase in price volatility
  - Compare biomass price volatility and crude oil price volatility
- Compute historic price volatility by
  - GARCH models
  - Moving average of the standard deviation of the monthly log price differences
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Utilization</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log wood (Media B2b)</td>
<td>Sawmill industry</td>
<td>Statistics Austria</td>
</tr>
<tr>
<td>Pulpwood (spruce/fir)</td>
<td>Pulp and paper, panel industry</td>
<td>Statistics Austria</td>
</tr>
<tr>
<td></td>
<td>Energy production</td>
<td></td>
</tr>
<tr>
<td>Firewood (soft)</td>
<td>Energy production</td>
<td>Statistics Austria</td>
</tr>
<tr>
<td>Wood pellets</td>
<td>Energy production</td>
<td>Pro Pellets Austria</td>
</tr>
<tr>
<td>Sawdust</td>
<td>Panel industry</td>
<td>Vienna Stock exchange</td>
</tr>
<tr>
<td></td>
<td>Pellets/ Energy production</td>
<td></td>
</tr>
<tr>
<td>Wood chips without bark</td>
<td>Pulp and paper industry</td>
<td>Vienna Stock exchange</td>
</tr>
<tr>
<td></td>
<td>Pellets/ Energy production</td>
<td></td>
</tr>
<tr>
<td>Wood chips with bark</td>
<td>Panel industry</td>
<td>Vienna Stock exchange</td>
</tr>
<tr>
<td></td>
<td>Energy production</td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td>Food/feed industry</td>
<td>Statistics Austria</td>
</tr>
<tr>
<td></td>
<td>Biogas plants</td>
<td></td>
</tr>
<tr>
<td>Crude oil (Brent)</td>
<td>Energy production</td>
<td>Petroleum Association</td>
</tr>
<tr>
<td>Heating oil</td>
<td>Energy production</td>
<td>Petroleum Association</td>
</tr>
</tbody>
</table>


Price volatility of roundwood

- Price volatility of firewood, log wood and pulpwood <10%

- The volatility of firewood prices even decreased in the last years

- The price volatility of log wood and pulpwood increased significantly in recent years

Figure 1: Volatility of monthly wood prices, measured as conditional standard deviation of log price differences including the structural breaks.
Price volatility of roundwood vs crude oil

Figure 2: Volatility of monthly wood and crude oil prices

Figure 2: Volatility of monthly wood and crude oil prices
Price volatility of wood pellets vs heating oil

Figure 3: Volatility of monthly wood pellets and heating oil prices
Price volatility of sawmill by-products

Figure 4: Volatility of monthly sawmill by-products

- sawdust
- wood chips without bark
- wood chips with bark
Summary

- Structural breaks could be detected in all time series.

- Though price volatility of some roundwood commodities has increased, it is still lower than of agricultural biomass and fossil fuels.

- Sawmill by-products and wood pellet prices are more volatile than roundwood prices.

- Although wood pellet and sawmill by-product prices are more volatile than roundwood prices, they are still less volatile than crude oil and corn prices.
Conclusion

- Households could benefit from the lower volatility of wood fuel prices if they replace old heating oil systems.

- However, private and public investors of large scale plants and wood pellet producers should be aware of the risks of higher price volatility of sawmill by-products.

- Future price volatility of woody biomass may be particularly affected by supply shortages.

- Importance of long-term supply contracts and storage of biomass will increase.
Thank you for your attention!

Christa Kristöfel

BIOENERGY 2020+ GmbH
Gewerbepark Haag 3
3250 Wieselburg-Land
Austria
christa.kristoefel@bioenergy2020.eu
www.bioenergy2020.eu

This research was supported by the IFSP 2 project of the Bioenergy 2020+ GmbH.