Competitiveness of European Containerboard and Corrugated Market
Introduction to Panel Discussion

Ville Henttonen
Senior Product Manager, Mill Intelligence
Agenda

• Key cost drivers
• Machine conversions
• Risk matrix
• Integration strategies
• Corrugator asset quality
Key cost drivers have varying volatility

Typical risk scenarios focus on those that fluctuate the most and make the biggest difference:

- Recovered paper prices are typically more volatile than wood prices, meaning that fiber costs for kraftliner are more stable than for fully recycled containerboard.
- All products using significant amounts of market pulps have recently been under massive cost pressure.
- Average electricity and natural gas prices have followed similar shape pattern, but recently gas prices have remained lower and more stable.
Energy prices can be especially volatile

DIFFERENT FUELS CAN HAVE VERY DIFFERENT COSTS DUE TO BOTH MARKET AND POLICY REASONS

- Regional variations may be substantial
- In most European countries natural gas is cheaper than fuel oil
- Hedging allows large users to manage their energy costs while reducing the potential impact of volatile prices
- Coal is still the lowest cost option in many regions with easy access to either shipped or local supply
- Many countries are likely to phase out coal use and enforce it with increasing taxes and duties

Industrial consumer prices in heat production in Finland (EUR / MWh)
Fiber is a key cost driver, but not the only one

**FIBER’S SHARE OF THE TOTAL CASH COST CAN VARY A LOT**

- Energy strategy can also make winners and losers, as energy prices may have significant differences and volatility
- Labor costs may vary a lot between mills but are typically quite stable
- Chemical usage is relatively consistent in comparable containerboard products

---

*Undelivered cash cost (EUR/MT) - 2018Q3 - UB recycled containerboard*

- *Machine by product - EU28*

---

2019 | Fastmarkets RISI | European Conference / Packaging Seminar, March 11, 2019
Source: Fastmarkets RISI
Machine conversion competitiveness may vary

MACHINES CONVERTED FROM GRAPHIC PAPERS CAN HAVE SIGNIFICANTLY DIFFERENT CASH COST COMPETITIVENESS

- Successful conversions depend on several factors: rebuild concept, asset quality, fiber sourcing, cost position, product quality, sales and marketing, etc.
- The most successful European graphic paper machine conversions have been able to reach the second quartile on the regional containerboard cost curve.
- Typically converted machines are not the widest, biggest or most modern, but still slightly ahead of the average producer.
Risk matrix: Company risk is combined with machine risk

**COMPARISON OF COMPANY AND MACHINE RISK TO THE REGIONAL INDUSTRY AVERAGE MAY REVEAL POTENTIAL INDUSTRY ACTIONS**

- Company risk identifies those companies which are most likely to do forced or planned closures, or divest their competitive assets
- Machine risk identifies those machines inside the high-risk companies which are most likely to be closed or divested
- Machines with high company and machine risk are most likely to face forced closure in difficult market conditions
- Case study: Western and Central European containerboard market (2017)
Local competition may increase risks

Other nearby producers of competing products and especially key raw material demand are potential risks

Recycled containerboard and corrugating plants are most often located near high population density areas

- Containerboard mills (green) are typically slightly outside the city area, but still near recovered paper sources
- Corrugating plants (red) are built to proximity of the clients, often in big cities
Transportation of corrugated board sheets is expensive compared to containerboard rolls.

ECONOMICAL DELIVERY DISTANCE IS QUITE LIMITED

COSTS ARE THE MAIN DRIVER FOR LIGHTER WEIGHTS

Typical road transportation cost estimates in Europe

Average basis weight of corrugated board in Europe

Source: Fastmarkets RISI, Fefco
Comparison of corrugated board cost and price indexes

**CORRUGATED BOARD OUTPUT PRICE INDEX SHOWS ONLY MODEST GROWTH COMPARED TO THE COST ESTIMATES**

- Containerboard is the key cost driver of corrugating
- High containerboard prices have increased the corrugating costs
- Corrugated board producers may have faced difficulties in transferring the full effect of the recent cost increases to their prices

![Graph showing comparison of average German corrugated board production cost and output price index.](image)

* Eurostat: Manufacture of corrugated paper and paperboard and of containers, domestic output price index (PPI)
Integrated vs. independent corrugating plant

MANUFACTURING CORRUGATED BOARD WITH TWO INTEGRATION STRATEGIES

- Integrated = Containerboard net price at corporate level equals manufacturing cost + delivery to “natural market” thus own corrugator
- Integrated corrugators are exposed to immediate price changes in necessary containerboard raw materials
- Independent corrugators usually experience a slight delay in raw material cost changes (containerboard prices)

Cash costs of recycled corrugated board sheets in Germany
Recycled-fiber-based 500 gm C-flute single wall, euros per thousand square meters
Estimates for the identified assets operating in the fourth quarter of 2018
Cost variation between corrugators

THE MANUFACTURING COST DIFFERENCE BETWEEN THE LOW-COST AND THE HIGH-COST CORRUGATORS CAN BE WIDE

- The cost difference is mainly due to operational efficiency; especially labor productivity is a significant factor
- Despite the wide gap, the vast majority of capacity operates near the average cost level
- The cost difference has been quite consistent, but it typically widens when the key input prices increase
- All raw materials are assumed being purchased at estimated market prices of each country

Cash costs of recycled corrugated board sheets in Western Central Europe
Recycled-fiber-based 500 gsm C-flute single wall, euros per thousand square meters
Estimates for the identified assets operating in the fourth quarter of 2018

* Austria, Germany and Switzerland
Regional variation in European corrugator asset quality is both substantial and worth understanding.

**CORRUGATOR CAPACITY DISTRIBUTION IS WIDE**

**THE 2.5 M CORRUGATOR WIDTH IS DOMINATING**
Take away

Fiber and energy are the key cost drivers
- Especially volatile recovered paper costs for recycled mills
- Gas and electricity are the most important energy cost drivers

Machine conversions can give varying results
- Conversion does not necessarily improve competitiveness
- Also packaging markets have their complexities and issues

Two-dimensional risk analysis
- Both company risk and machine risk are worth analyzing
- Fiber and energy price scenarios can predict profit volatility

Integration strategy is an important factor in the containerboard business
- Integrated corrugating may safeguard otherwise high-risk units
- Price fluctuations have a bigger effect on independent corrugators
- Transportation, operational and labor efficiency are also important
Further reading

European Corrugators: A Comprehensive View
https://www.risiinfo.com/product/european-corrugator-study/

European Containerboard Risk of Closure Study

European Containerboard Machine Conversion Study

Analytical Cornerstone Cost Benchmarking Tool
https://www.risiinfo.com/product/analytical-cornerstone-4-0-cost-benchmarking-tool/

Asset Database

Index Builder
https://www.risiinfo.com/product/index-builder/
Thank you for your attention

Ville Henttonen, Senior Product Manager, Mill Intelligence
ville.henttonen@fastmarkets.com

Fastmarkets RISI