OUTLOOK RESEARCH

MOODY'S INVESTORS SERVICE

Paper and Forest Products – Global

2018 Outlook

December 12, 2017

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Global Paper and Forest Products

Outlook stable as growth from wood products and paper packaging offsets commodity paper decline

NEGATIVE ← STABLE → POSITIVE

NEGATIVE

What could change outlook to negative

- If consolidated global operating earnings declined over the next 12-18 months
- Reduced demand or increased input costs that cannot be passed on to customers, or reduced prices as a result of operating capacity in excess of demand for several grades, depressing consolidated operating earnings

STABLE

- Operating earnings to grow 2%-4%
- North American wood product producers will benefit as US housing starts grow 5%
- Commodity paper producers continue to face 5% demand declines as digital alternatives replace paper
- Increasing consolidation will reduce some earnings volatility

POSITIVE

What could change outlook to positive

- If consolidated global operating earnings increased by more than 4% over the next 12-18 months
- Higher product demand and prices (through higher than expected GDP growth or a stronger housing recovery) across several major grades and regions, lifting consolidated operating earnings

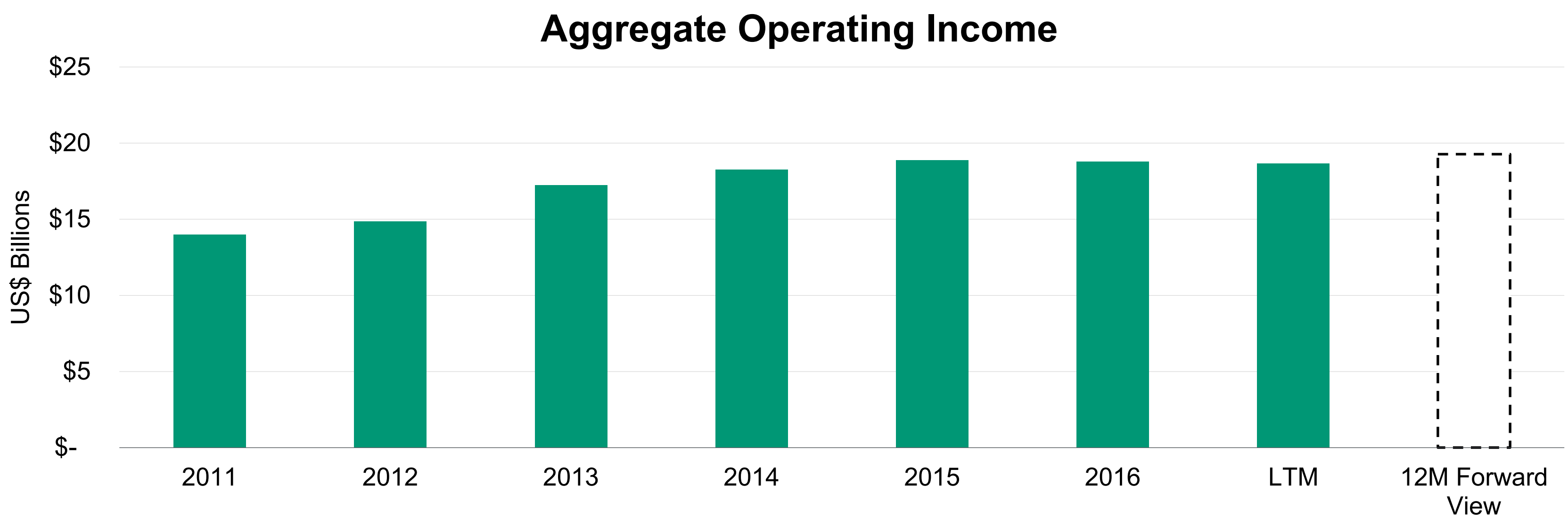
Note: A negative industry outlook indicates our view that fundamental business conditions will worsen. A positive outlook indicates that we expect fundamental business conditions to improve. A stable industry outlook indicates that conditions are not expected to change significantly. Since industry outlooks represent our forward looking view on conditions that factor into ratings, a negative (positive) outlook indicates that negative (positive) rating actions are more likely on average.

Stable global outlook

Consolidated operating income of rated paper and forest products companies will grow 2%-4% in 2018

Historic and projected rolling four-quarter operating income for a segment of the rated global paper & forest products industry

Operating income from 40 of 49 rated paper & forest products companies (US$ billions)



Source: Company financials and Moody's estimates

Subsector outlooks are mixed

Weighted operating earnings will grow about 3%

Outlook Key: NEGATIVE | STABLE | POSITIVE

STABLE	NEGATIVE	POSITIVE	STABLE
Paper Packaging and Tissue	**Printing and Writing Paper**	**Wood Products and Timberland**	**Market Pulp**
Share of consolidated operating income 50%	Share of consolidated operating income 20%	Share of consolidated operating income 10%	Share of consolidated operating income 20%

Paper Packaging and Tissue (STABLE)

- Operating earnings to grow about 3%
- Packaging growth driven by higher prices and increased e-commerce demand
- Increased supply weakens tissue prices

Printing and Writing Paper (NEGATIVE)

- Operating earnings to decline about 4%
- Secular paper consumption will decline about 5% in mature markets
- Partially offset by higher prices

Wood Products and Timberland (POSITIVE)

- Operating earnings to grow about 8%
- US housing starts will increase 6%
- Average prices up, but volatile as the pace of new and restarted capacity differs from demand

Market Pulp (STABLE)

- Operating earnings to grow about 3%
- New capacity will fuel volume growth
- Prices for most grades will weaken in 2018 as capacity growth exceeds demand

Paper Packaging and Tissue

Outlook: Stable

Key credit themes

- Packaging producers will benefit from the flow through of announced price increases. Economic and e-commerce growth will increase demand
- New capacity will pressure North American tissue prices until demand catches up or as older, less efficient machines are shuttered. European tissue prices will increase slightly to offset higher input cost
- North American and European average recycled fiber costs will be flat in 2018 as China’s announced 0.5% contamination limit for recovered fiber imports will lessen imports of recycled fiber
- Beyond 2018, paper packaging prices could be hurt if paper machine conversions to packaging grades exceed demand growth

Paper Packaging and Tissue

Outlook: Stable

» We project modest operating earnings growth for most grades of paper packaging and tissue across North America and Europe

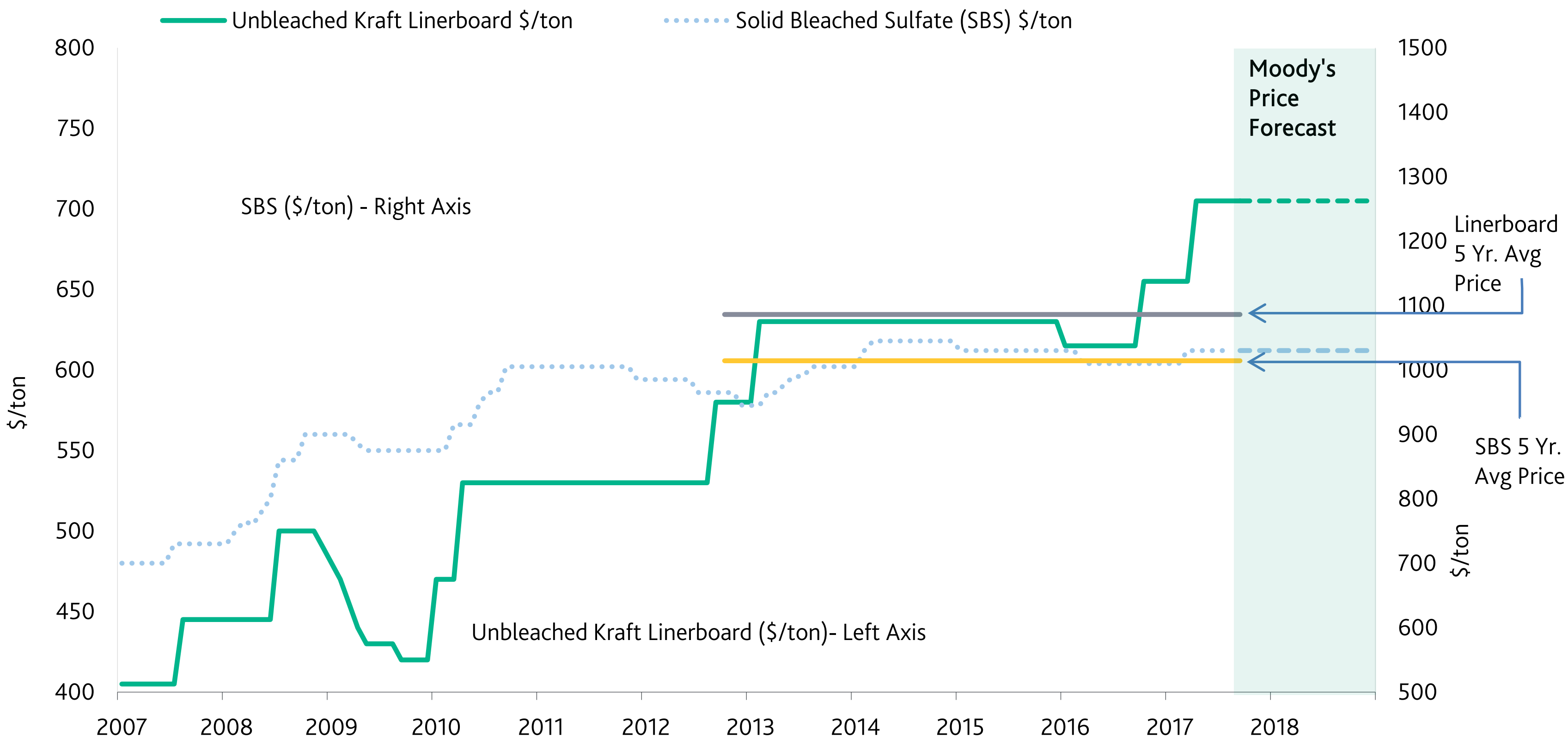
Subsector outlooks and projected trends by region

Region	Sector	Outlook	Demand	Supply	Pricing	Cost
North America	Paper Packaging	▶	↑	↑	↑	↑
	Tissue	▶	↑	↑	↓	↑
Europe	Paper Packaging	▶	↑	↑	→	→
	Tissue	▶	↑	↑	↑	↑

▲ Positive Outlook ▶ Stable Outlook ▼ Negative Outlook ↑ Increasing → Flat ↓ Decreasing

North American Paper Packaging Prices

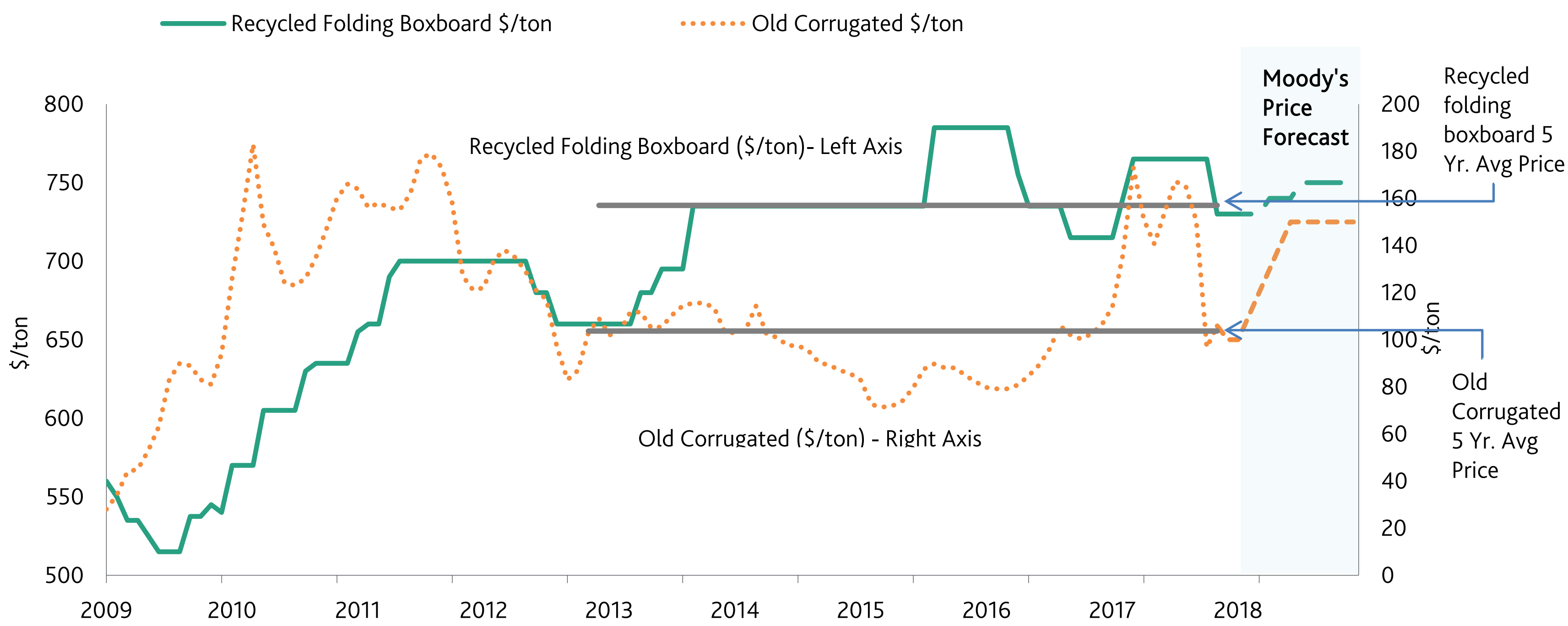
Average virgin containerboard prices will increase slightly; virgin paperboard prices will be flat



Source: RISI and Moody's estimates

North American Paper Packaging Prices

Average recycled boxboard prices will decline slightly; OCC costs will rebound, but average at or below 2017 levels



Source: RISI and Moody's estimates

Containerboard Capacity

Expansion will be in line with demand

» Approximately 1.4 million tons of new North American containerboard capacity (about 3% of all North American capacity) will ramp up in 2018 and 2019, in line with annual 1.5% demand growth

» Western European containerboard producers (especially recycled) will need to rely on a growing export market to balance the approximately 1.1 million tons of new containerboard capacity (about 5% of all Western European capacity) that will start ramping up in 2018

Announced North American and Western European containerboard expansion projects for 2018 and 2019

Company	Location	Capacity (000 Tons)	Grade	Start-up Date
International Paper	Madrid, Spain	450	recycled containerboard	2018
Leipa	Schwedt, Germany	450	recycled containerboard	2018
Pro-Gest	Grezzago, Italy	210	recycled containerboard	2018
Packaging Corporation of America	Wallula, WA, USA	400	virgin containerboard	2018
Bio-Pappel Mckinley	Port Angels, CA, USA	160	recycled containerboard	2019
International Paper	Selma, AL, USA	450	virgin containerboard	2019
Pratt	Wapakoneta, OH, USA	400	recycled containerboard	2019

Source: Company reports and Moody's estimates; only major projects listed

North American Tissue Capacity

Expansion will exceed demand

- Approximately 700,000 tons of new tissue capacity (about 6% of North American capacity) will ramp up over the next two years, versus annual demand growth of about 2%
- Higher-cost capacity will need to be shuttered to balance market

Announced North American tissue expansion projects for 2018 and 2019

Company	Location	Capacity (000 Tons)	Grade	Start-up Date
Sofidel America	Circleville, OH, USA	75	premium	2018
ST Tissue	Franklin, VA, USA	50	premium	2018
Sofidel America	Circleville, OH, USA	75	premium	2018
First Quality Tissue	Anderson, SC, USA	70	TAD	2018
Irving Consumer Products	Fort Edwards, NY, USA	70	TAD	2018
Clearwater Paper	Shelby, NC	70	premium	2019
First Quality Tissue	Lock Haven, PA, USA	70	TAD	2019
First Quality Tissue	Anderson, SC, USA	75	ATMOS	2019
Georgia-Pacific	Palatka, FL, USA	70	TAD	2019
Irving Consumer Products	Macon, GA, USA	80	TAD	2019

Source: Company reports and Moody's estimates; only major projects listed

Paper Packaging and Tissue

Issuers of interest

- **Mondi (Baa1 stable)**
  - Recent upgrade reflects structural improvement in business profile and strong credit metrics. We expect Mondi to operate with an adjusted EBITDA margin around 20% and adjusted debt/EBITDA below 2x (1.4x as of June 2017)
- **International Paper (Baa2 stable)**
  - Adjusted leverage will drop to 3x by 2018 (4x as of June 2017), as the company uses its cash flow to reduce debt, following the integration of Weyerhaeuser's pulp business (December 2016) and the transfer of its underperforming consumer products business to Graphic Packaging (expected to close January 2018)
- **WestRock Company (Baa2 stable)**
  - Adjusted leverage will improve to 2.6x in 2018 (3x as of September 2017), in line with the company's reported leverage target of 2.25x-2.50x. The integration of several acquisitions (most notably the $2.3 billion acquisition of Multi Packaging Solutions Limited, which closed June 2017) will generate cost synergies and further broaden geographic and product diversification

Paper Packaging and Tissue Companies

Recent credit metrics

Company Name	Domicile	Rating	Outlook	Revenues (USD Bn's)	EBITDA Margin	RCF/Adj Debt	Adj Debt/ EBITDA
Georgia-Pacific LLC	USA	A3	Stable	Private Company			
Mondi Plc	Europe	Baa1	Stable	$7.6	20%	44%	1.4x
International Paper Company	USA	Baa2	Stable	$21.9	17%	18%	4.1x
WestRock Company*	USA	Baa2	Stable	$14.4	17%	19%	3.1x
Sonoco Products Company	USA	Baa2	Stable	$4.8	14%	16%	2.9x
Packaging Corporation of America	USA	Baa2	Stable	$6.1	22%	23%	2.4x
Smurfit Kappa Group plc	Europe	Ba1	Stable	$9.1	15%	16%	3.6x
Graphic Packaging International	USA	Ba1	Stable	$4.3	17%	20%	3.5x
Metsa Board Corporation	Europe	Ba1	Stable	$1.9	11%	17%	3.4x
Cascades Inc.	Canada	Ba2	Stable	$3.1	10%	17%	4.2x
Clearwater Paper Corporation	USA	Ba2	Stable	$1.7	12%	22%	3.7x
WEPA Hygieneprodukte GmbH	Europe	Ba3	Stable	$1.1	13%	8%	4.6x
Caraustar Industries, Inc.	USA	B2	Stable	Private Company			
PaperWorks Industries, Inc.	USA	Caa3	Negative	Private Company			

Source: Moody's FM (LTM June 2017)
* LTM September 2017

Printing and Writing Paper

Outlook: Negative

Key credit themes

- » Demand for North American and European printing and writing grades will continue to decrease by approximately 5% per year, as individuals and businesses increasingly turn to digital alternatives
- » Capacity reduction through machine closures or conversions to other grades will likely match or exceed demand declines, leading to flat or slightly higher prices across most grades
- » Overall printing and writing paper operating earnings will decline, as weaker paper demand more than offsets modest price increases across most grades

Printing and Writing Paper

Outlook: Negative

» We project modest operating earning declines for most grades of printing and writing paper across most regions, except Latin America

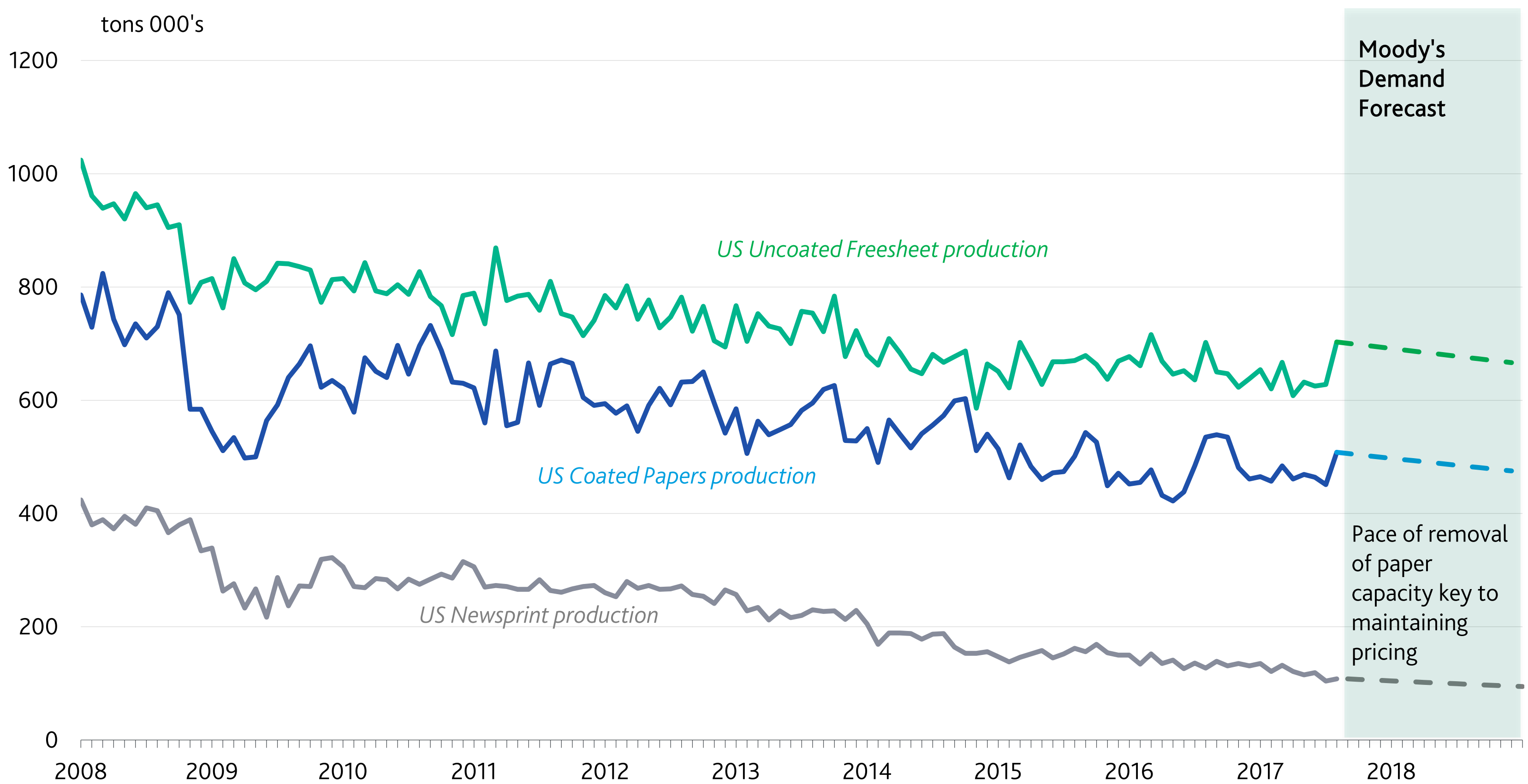
Subsector outlooks and projected trends by region

Region	Sector	Outlook	Demand	Supply	Pricing	Cost
North America	Uncoated Paper	▼	↓	↓	↑	↑
	Coated Paper	▼	↓	↓	↑	↑
	Newsprint	▼	↓	↓	↑	↑
Europe	Uncoated Paper	▼	↓	↓	↓	↑
	Coated Paper	▼	↓	↓	↓	↑
	Newsprint	▼	↓	↓	→	↑
Latin America	Printing and Writing Paper	▶	↓	→	→	→

▲ Positive Outlook ▶ Stable Outlook ▼ Negative Outlook ↑ Increasing → Flat ↓ Decreasing

Printing and Writing Paper Production

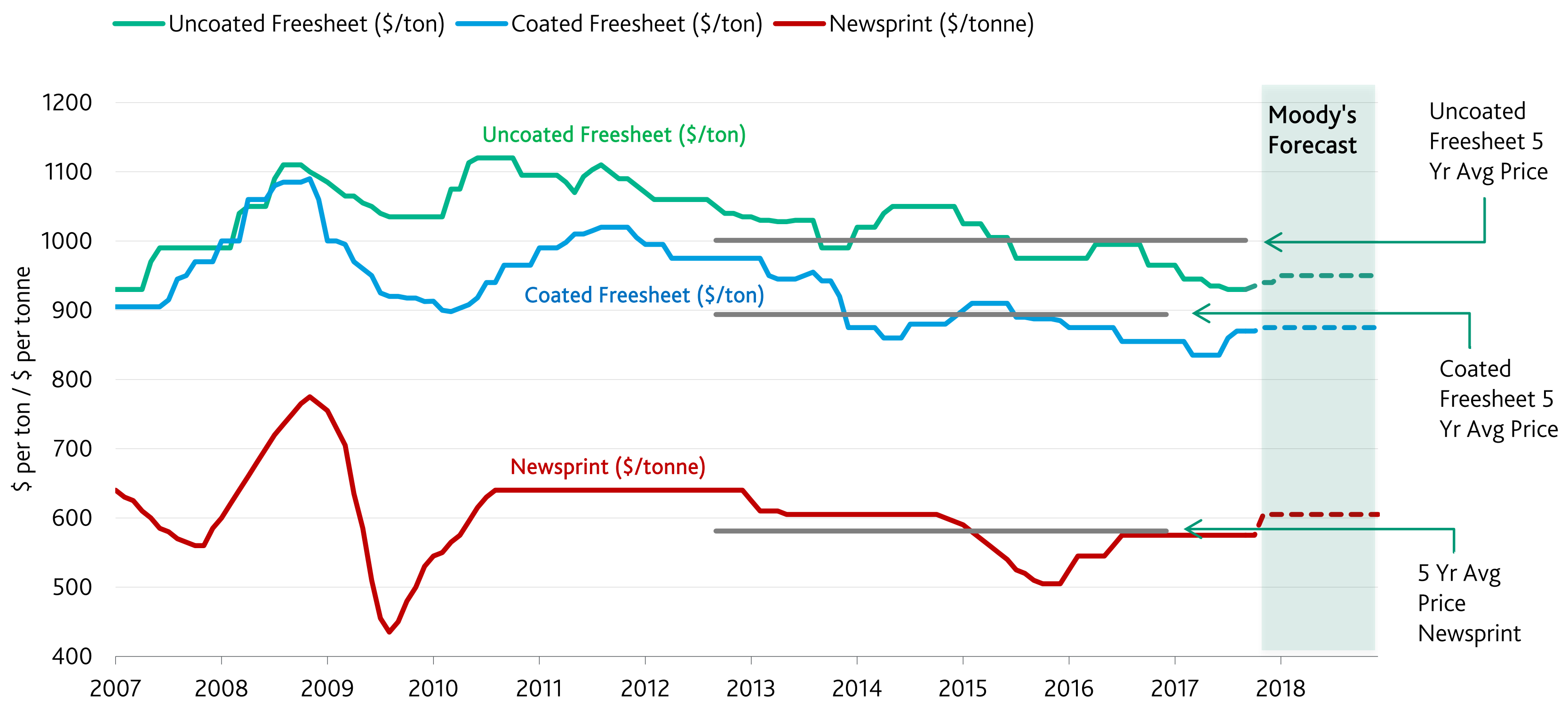
Secular volume declines in mature markets continue



Source: AFPA and Moody's estimates

Printing and Writing Paper Prices

North American paper prices will improve, but remain near or below long-term averages



Source: RISI and Moody's estimates

Printing and Writing Paper

Issuers of interest

» **UPM-Kymmene (Baa2 stable)**

– Recent upgrade reflects UPM's track record of solid operating performance, deleveraging (1.6x as of September 2017), and expectation of continued financial discipline. We expect UPM to generate strong free cash flow and operate with an adjusted EBITDA margin of 17%.

» **Domtar Corporation (Baa3 stable)**

– Leverage will remain below 3x as the company continues to move away from commodity paper towards pulp, personal care and other fiber-based businesses. Absent acquisitions, we expect Domtar's leverage to remain flat (2.4x as of September 2017) in 2018 as EBITDA declines in step with debt reduction

» **Resolute Forest Products (B1 stable)**

– Recent downgrade reflects our view that leverage will remain elevated at around 5.5x in 2018 (from 6.4x in September 2017) with the continued secular decline in paper and slower than anticipated growth in new tissue business. A large unfunded pension plan ($1.1 billion) represents about 4 turns of leverage

Printing and Writing Paper Companies

Recent credit metrics

Company Name	Domicile	Rating	Outlook	Revenues (USD Bn's)	EBITDA Margin	RCF/Adj Debt	Adj Debt/ EBITDA
UPM-Kymmene*	Europe	Baa2	Stable	$11.0	17%	36%	1.6x
Domtar Corporation*	Canada	Baa3	Stable	$5.1	12%	28%	2.4x
P. H. Glatfelter Company	USA	Ba1	Stable	$1.6	9%	12%	3.5x
Stora Enso Oyj	Europe	Ba2	Positive	$10.7	12%	16%	3.9x
Neenah Paper, Inc.	USA	Ba2	Stable	$0.9	16%	31%	1.9x
Sappi Limited	Europe	Ba2	Stable	$5.2	16%	26%	2.6x
The Navigator Company	Europe	Ba2	Stable	$1.8	25%	12%	2.3x
Resolute Forest Products Inc.*	Canada	B1	Stable	$3.5	9%	13%	6.4x
Verso Paper Holdings LLC**	USA	B2	Stable	$2.5	5%	13%	6.0x
Lecta S.A.	Europe	B2	Stable	$1.6	8%	9%	6.7x
Xerium Technologies, Inc.*	USA	B2	Stable	$0.5	21%	6%	6.2x
Norske Skogindustrier ASA	Europe	Caa3	Stable	$1.4	5%	3%	14.7x

Source: Moody's FM (LTM June 2017)
* LTM September 2017
**Projected 2017 Credit Metrics

Wood Products and Timberland

Outlook: Positive

Key credit themes

- » End-market demand for timber, lumber, oriented strand board (OSB) and engineered wood products will improve as US housing starts increase about 6% to about 1.28 million units in 2018
- » Average lumber prices expected to remain strong as higher demand in line with increased production capacity
- » Average OSB prices will be lower in 2018, as the ramp up of new capacity will exceed demand growth
- » US South timber (log) prices will remain flat as excess standing timber from years of harvest deferral easily accommodates higher demand
- » Tight lumber markets will allow countervailing and anti-dumping duties on Canadian lumber to be passed on to consumers

Wood Products and Timberland

Outlook: Positive

» We project overall operating earnings growth of about 8% as North American lumber earnings offset declines in OSB

Subsector outlooks and projected trends by region

Region	Sector	Outlook	Demand	Supply	Pricing	Cost
North America	Lumber	▲	↑	↑	→	↑
	OSB	▼	↑	↑	↓	↑
	Timberlands	►	↑	→	→	→
Europe	Lumber	►	→	→	→	→

▲ Positive Outlook ► Stable Outlook ▼ Negative Outlook ↑ Increasing → Flat ↓ Decreasing

Lumber and OSB Capacity

OSB capacity growth will exceed demand

- Approximately 2.7 million square feet of new OSB capacity (about 11% of North American operating capacity) will ramp up in 2018, exceeding annual demand growth of about 4%
- Lumber capacity growth will be in line with growing demand

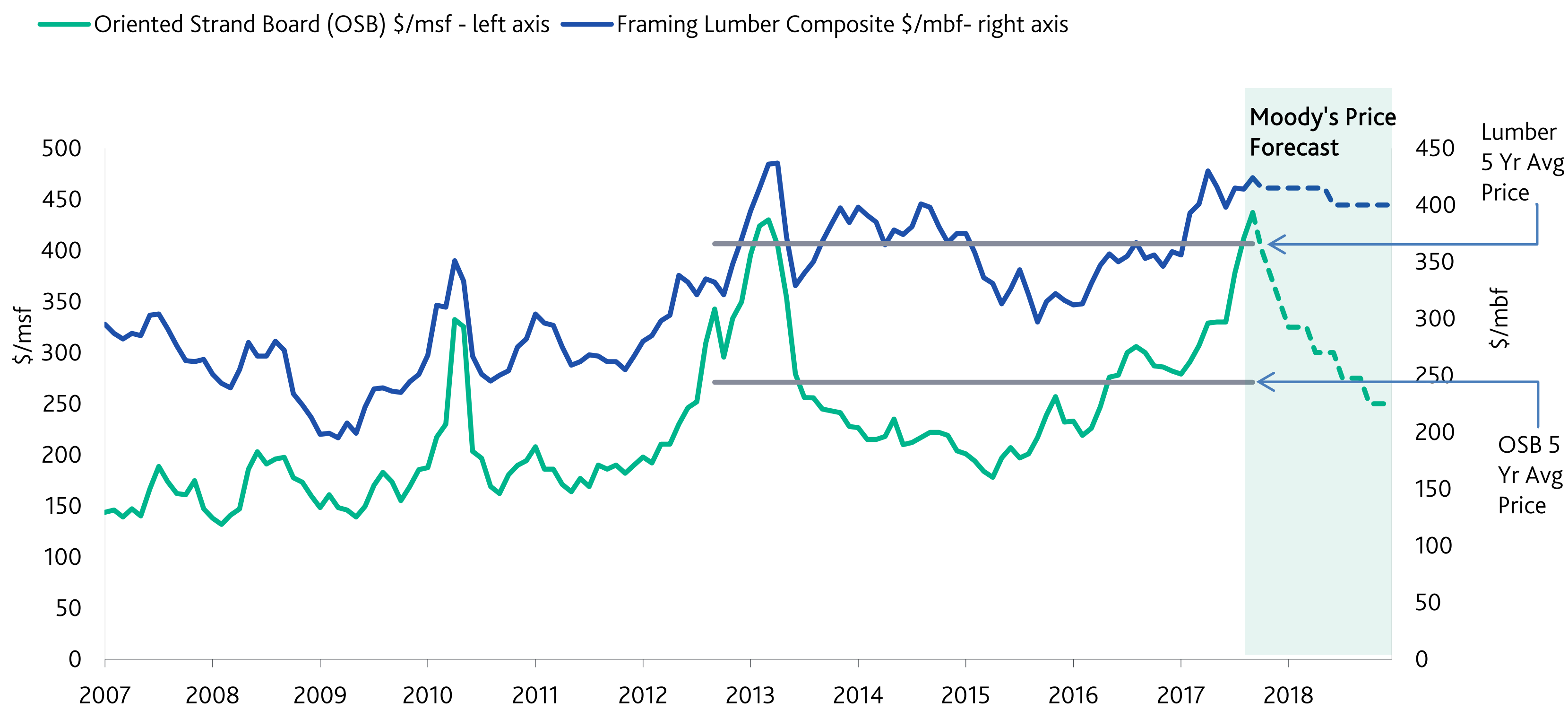
Announced North American OSB expansion projects for 2018

Company	Location	Capacity (000 msf)	Type	Start-up Date
Roy-O-Martin	Corrigan, TX, USA	800	greenfield	late 2017
Tolko	High Prairie, AB, Canada	640	re-start	2018
Forex	Amos, QC, Canada	350	greenfield	2018
Norbord	Huguley, AL, USA	500	re-start	2018
Huber	Spring City, TN, USA	450	re-start	2018

Source: Company reports and Moody's estimates; only major projects listed

Lumber and OSB Prices

North America lumber prices strong as OSB prices decline



Source: Random Lengths and Moody's estimates

Canadian-US Softwood Lumber Dispute

» Clear Winners

– **Potlatch Corporation (Ba1 review for upgrade) and Georgia-Pacific (A3 stable).** Will benefit the most from higher lumber prices and no tariff (100% of lumber production is in the US). Potlatch will also benefit from increased demand for saw logs in the US South, where 60% of Potlatch's timberland is located

– **Weyerhaeuser Company (Baa2 stable).** Most of its lumber production is based in the US (16 of 19 mills) and 56% of timberland is located in the US South

– **Rayonier Inc (Baa3 stable).** 70% of timberlands located in the US South

» Canadian lumber producers also benefit

– **West Fraser (Baa3 stable).** 23.8% final combined duty on lumber sold to the US from Canada (about a third of its lumber capacity) more than offset by higher lumber prices. YTD Western spruce, pine and fir (SPF) prices up 30% from same period last year

– **Resolute Forest Products (B1 stable) and Rayonier A.M. Products (Ba3 stable).** Strong lumber prices will likely offset Resolute's 17.9% and RYAM's 20.8% final duty on lumber sold to the US (about half their lumber capacity). YTD Eastern SPF prices up 25% since last year

Wood Products and Timberland

Issuers of interest

» **Potlatch Corporation (Ba1 review for upgrade)**

– Agreement to merge with Deltic Timber Corporation (unrated), a southern timberland and wood products company, in all-stock deal valued at approximately $1 billion, is credit positive. Benefits include increased scale, diversification, strong timber asset coverage (projected to be maintained over 2x) and pro forma leverage of around 4x

» **West Fraser Timber Company (Baa3 stable)**

– Acquisition of Gilman Companies' six sawmills and a finger-joint mill in the US South broadens West Fraser's industry leading geographic and operational diversification. The acquisition also lessens the potential negative effect of new US-Canada softwood lumber agreement and Western Canada’s pine beetle infestation, while only modestly increasing leverage (0.8x as of September 2017)

» **Norbord Inc (Ba1 stable)**

– Leading OSB market position with low leverage (1x as of June 2017) and increasing stability from expansion of operations in Europe. Constraints include volatility of the North American OSB market and lack of product diversification

Wood Products and Timberland

Recent credit metrics

Company Name	Domicile	Rating	Outlook	Revenues (USD Bn's)	EBITDA Margin	RCF/Adj Debt	Adj Debt/ EBITDA
Weyerhaeuser Company*	USA	Baa2	Stable	$7.0	27%	-2%	3.9x
West Fraser Timber Co. Ltd.*	Canada	Baa3	Stable	$4.8	19%	92%	0.8x
Rayonier Inc.	USA	Baa3	Stable	$0.6	42%	12%	4.2x
Louisiana-Pacific Corporation	USA	Ba1	Stable	$2.5	18%	82%	1.1x
Norbord Inc.*	Canada	Ba1	Stable	$2.1	28%	71%	1.0x
Potlatch Corporation	USA	Ba1	Rating(s) Under Review	$0.6	29%	13%	3.8x
Boise Cascade Company*	USA	Ba2	Stable	$4.3	5%	27%	2.9x
Quintis Limited**	Australia	C	Stable	$0.1	35%	-1%	6.3x

Source: Moody's FM (LTM June 2017)
*LTM September 2017
** LTM December 2016

Market Pulp

Outlook: Stable

Key credit themes

- Recent price increases across most grades from the combination of unexpected supply outages and stronger Chinese demand will likely reverse in 2018, as capacity increases outpace demand growth
- Latin American hardwood pulp producers will continue to enjoy structural cost advantages over North American and Western European producers due to their large efficient mills and short tree-harvesting cycles
- Demand will increase as Chinese environmental regulations will continue to force small and medium-sized Chinese pulp mills to stop production. China's restriction on recycled fiber imports has caused some paper producers to use more virgin fiber (hardwood pulp instead of recycled fiber) in their paper production

Market Pulp

Outlook: Stable

» We project modest operating earnings growth as increased production offsets pricing declines across most grades in most regions

Subsector outlooks and projected trends by region

Region	Sector	Outlook	Demand	Supply	Pricing	Cost
North America	Market Pulp	►	↑	↑	↓	→
Europe	Market Pulp	►	↑	↑	↓	→
Latin America	Market Pulp	►	↑	↑	↓	↓

▲ Positive Outlook ► Stable Outlook ▼ Negative Outlook ↑ Increasing → Flat ↓ Decreasing

Market Pulp Capacity

Expansion will exceed demand

- Approximately 5 million tonnes of hardwood pulp (~15% of global capacity) and 1.8 million tonnes of softwood pulp (~7% of global capacity) will ramp up in 2017 and 2018, versus annual demand growth of about 2%-4%
- Significant existing capacity will need to be idled for market to absorb the expansion

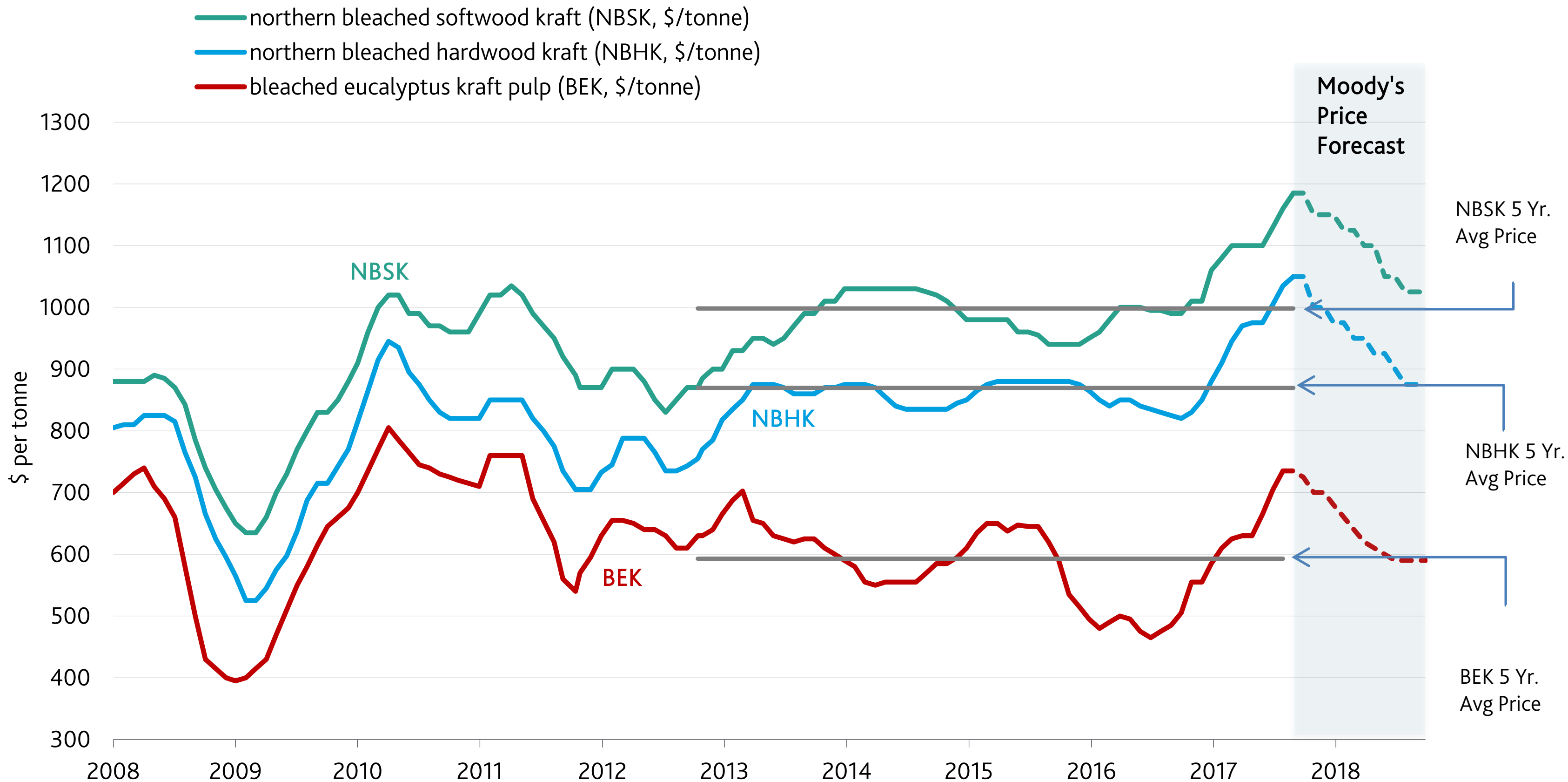
Announced Market Pulp Expansion Projects for 2017 and 2018

Company	Location	Capacity (000 Tonnes)	Grade	Start-up Date
Asia Pulp & Paper (Oki Pulp & Paper)	South Sumatra, Indonesia	2,800	hardwood	2017
Fibria (Tres Lagoas II)	Tres Lagoas, Brazil	1,950	hardwood	2017
Metsa	Äänekoski, Finland	800	mainly softwood	2017
Svetlogorsk	Svietlahorsk, Belarus	400	softwood/dissolving pulp	2018
SCA (Ostrand)	Timra, Sweden	475	softwood	2018
Sun Paper	Savannakhet, Laos	250	hardwood/dissolving pulp	2018
Chenming (Huanggang)	Hubei. China	300	softwood/dissolving pulp	2018

Source: Company reports and Moody’s estimates; only major projects listed

Market Pulp Prices

Pulp prices will likely decline toward 5-year averages as new capacity ramps up



Source: RISI and Moody's estimates

Market Pulp

Issuers of Interest

» **Inversiones CMPC S.A. (Baa3 stable)**

– Extended downtime at a primary pulp mill has delayed deleveraging to 2018. The downtime reduced the company's hardwood pulp production by about 520,000 tons (or 14% of total market pulp capacity) and increased cost by about $200 million in 2017

» **Fibria Celulose S.A. (Ba1 negative)**

– We expect gross leverage (4.6x September 2017) to decline towards its target of 2x-2.5x (net debt/EBITDA) following recent ramp-up of 1.95 million tonne hardwood pulp expansion at Três Lagoas. Fibria is rated one notch above Brazil's sovereign, given the company’s good financial profile and revenue diversification outside of Brazil

» **Rayonier A.M. Products Inc. (Ba3 stable)**

– Ratings confirmed following Tembec acquisition (November 2017), with leverage remaining around 4x over the next two years. Addition of Tembec's specialty cellulose, lumber, high-yield pulp, packaging and newsprint businesses enhances operational flexibility and diversification

Market Pulp

Recent Credit Metrics

Company Name	Domicile	Rating	Outlook	Revenues (USD Bn's)	EBITDA Margin	RCF/Adj Debt	Adj Debt/ EBITDA
Empresas CMPC S.A*.	Chile	Baa3	Stable	$5.1	22%	14%	4.4x
Celulosa Arauco y Constitucion S.A.	Chile	Baa3	Stable	$4.9	22%	18%	3.9x
Fibria Celulose S.A.*	Brazil	Ba1	Negative	$3.2	40%	15%	4.6x
Suzano Papel e Celulose S.A.*	Brazil	Ba1	Negative	$3.1	43%	22%	3.3x
Mercer International Inc.	Canada	Ba3	Stable	$1.0	21%	17%	3.4x
Rayonier A.M. Products Inc.	USA	Ba3	Stable	$0.8	26%	18%	4.3x
ENCE Energia y Celulosa, S.A.	Europe	Ba3	Stable	$0.7	23%	22%	3.5x

Source: Moody's FM (LTM June 2017)
* LTM September 2017