

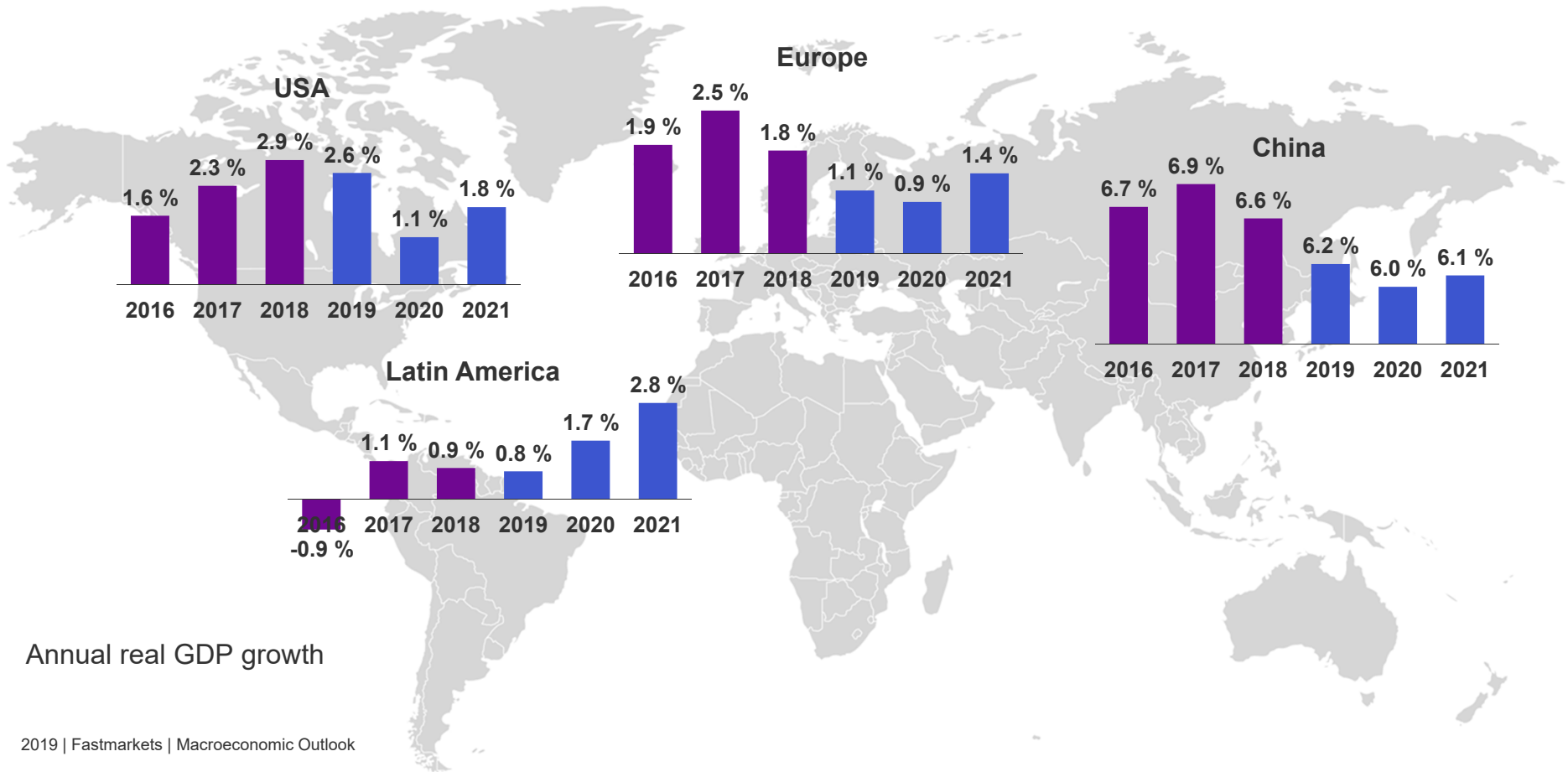
North American Pulp and Paper Outlook

SEPTEMBER 2019

ROD YOUNG

Chief Economist

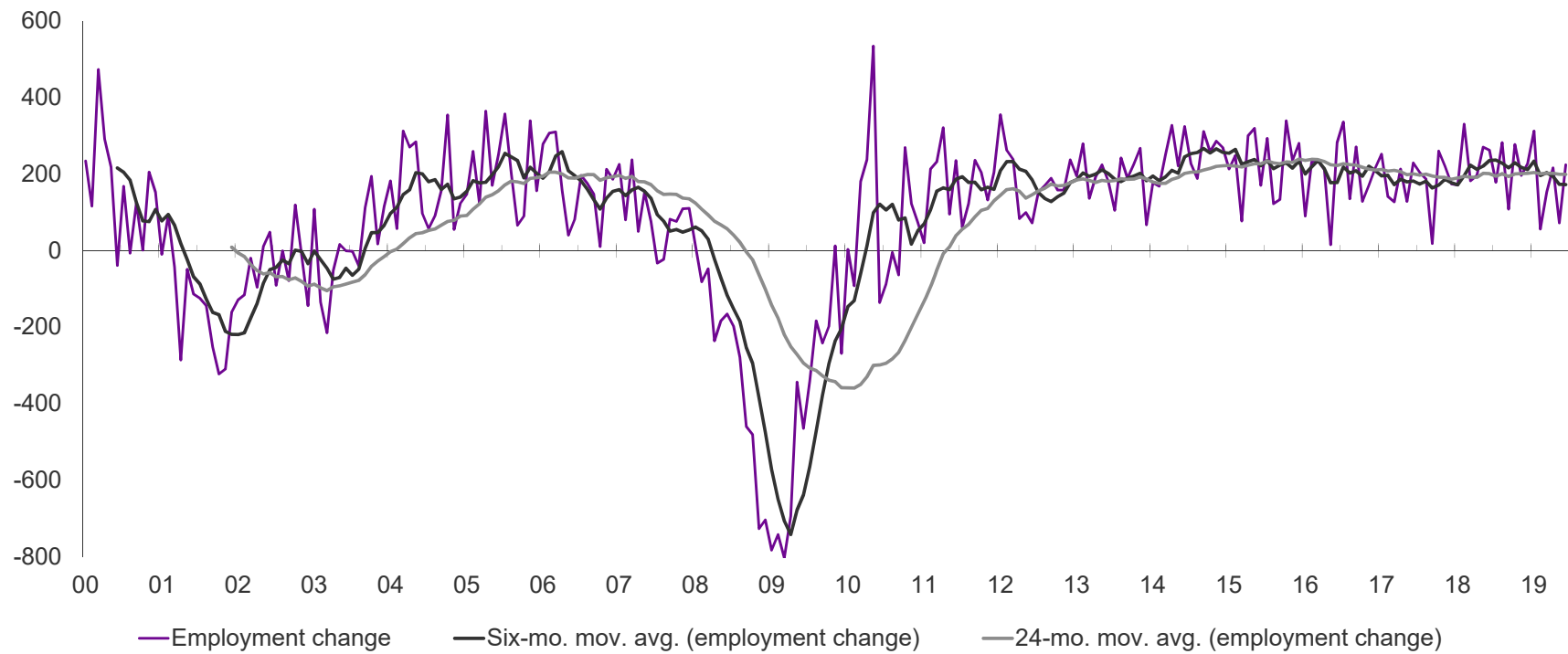
Global economy growing moderately, risks heightened



US job growth continues



Monthly employment change, total non-farm, thousands; six-month moving average; 24-month moving average



Dollar regained strength in 2018, remains strong



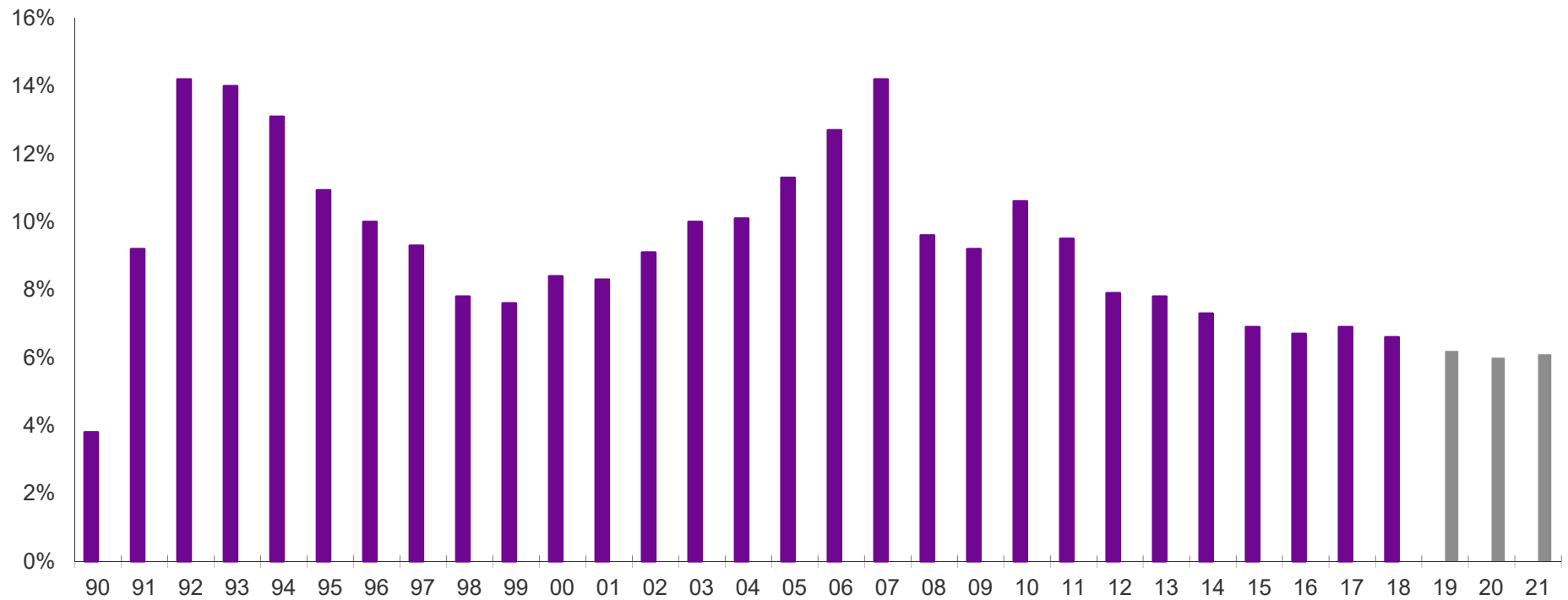
Trade weighted US dollar index: broad, goods, 1997=100



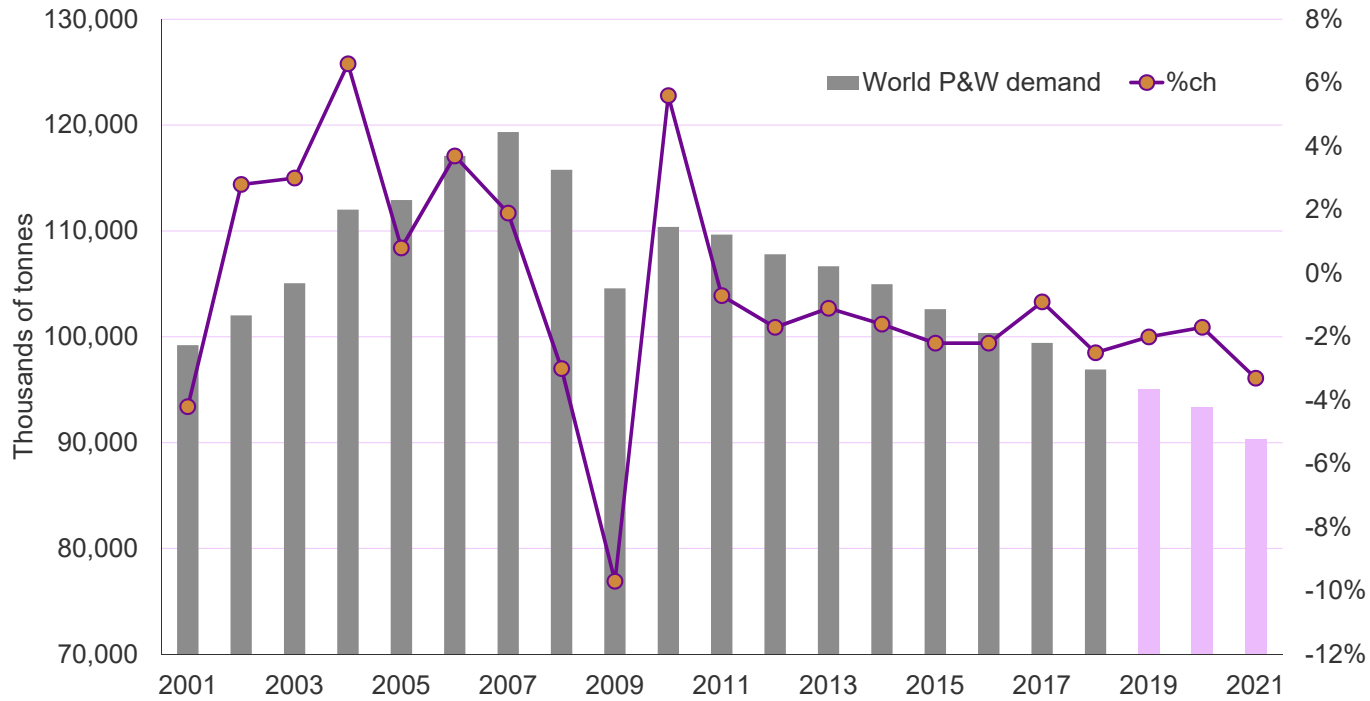
Chinese GDP trending lower, 2019 a slowdown



Real GDP growth, annual percentage change



Global P&W demand dropped 2.5% in 2018



2.5

Million tonnes of demand decline in 2018

12%

Smaller global market in 2018 versus 2010

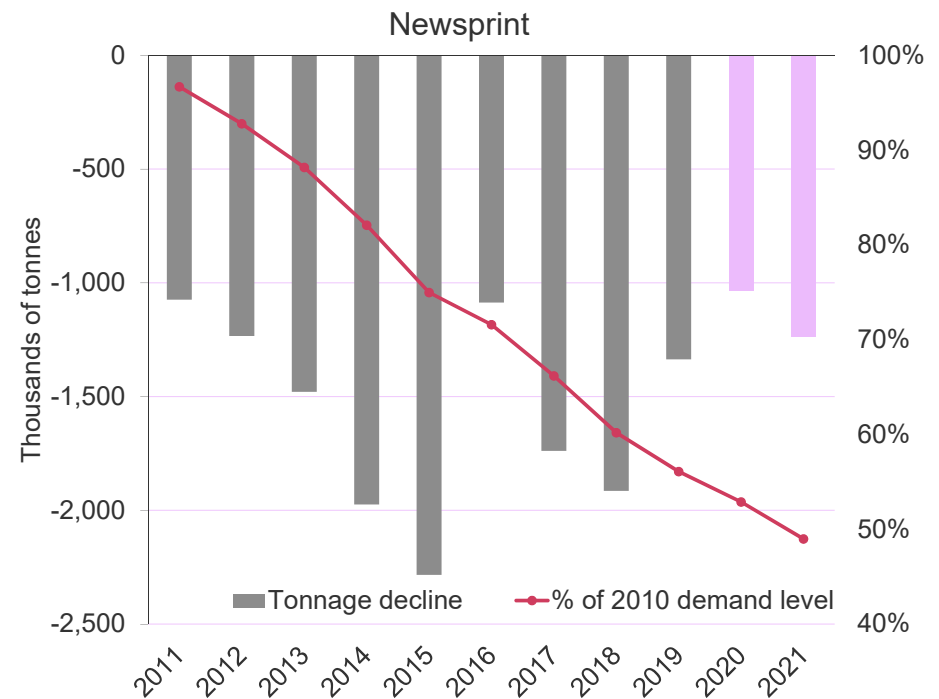
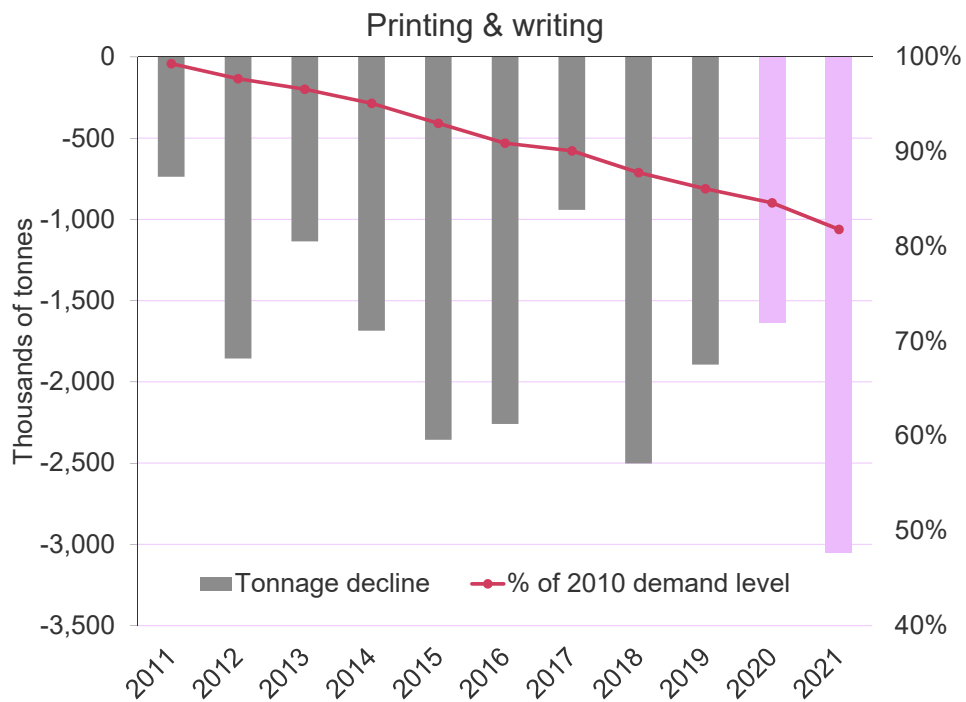
1.6

Millions tonnes of average demand declines in 2011-2017 and 2012-2014

Is global graphic paper demand accelerating down?

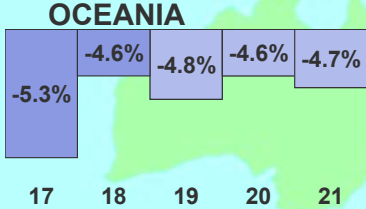
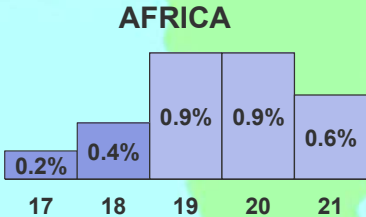
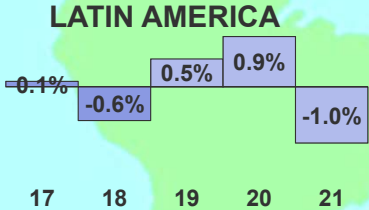
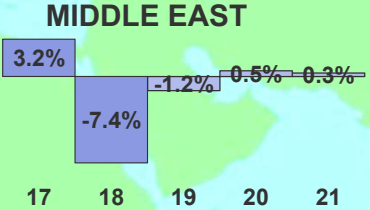
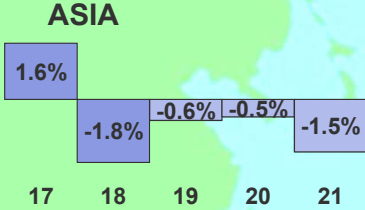
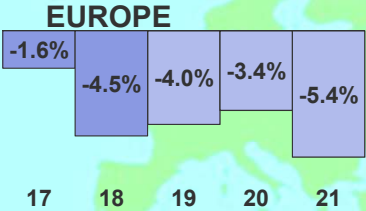
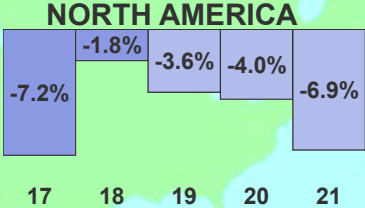


TONNAGE DECLINES STILL NOT SHRINKING DESPITE GREATLY DIMINISHED MARKETS



P&W Demand Growth in 2019-2021

Thousand Tonnes, Percentage Per Year



Three-Year Total Global Growth
-6.58
 Million Tonnes

-2.3%
 Average Percent Change

Global ADD/CVD duties on cut size copy paper

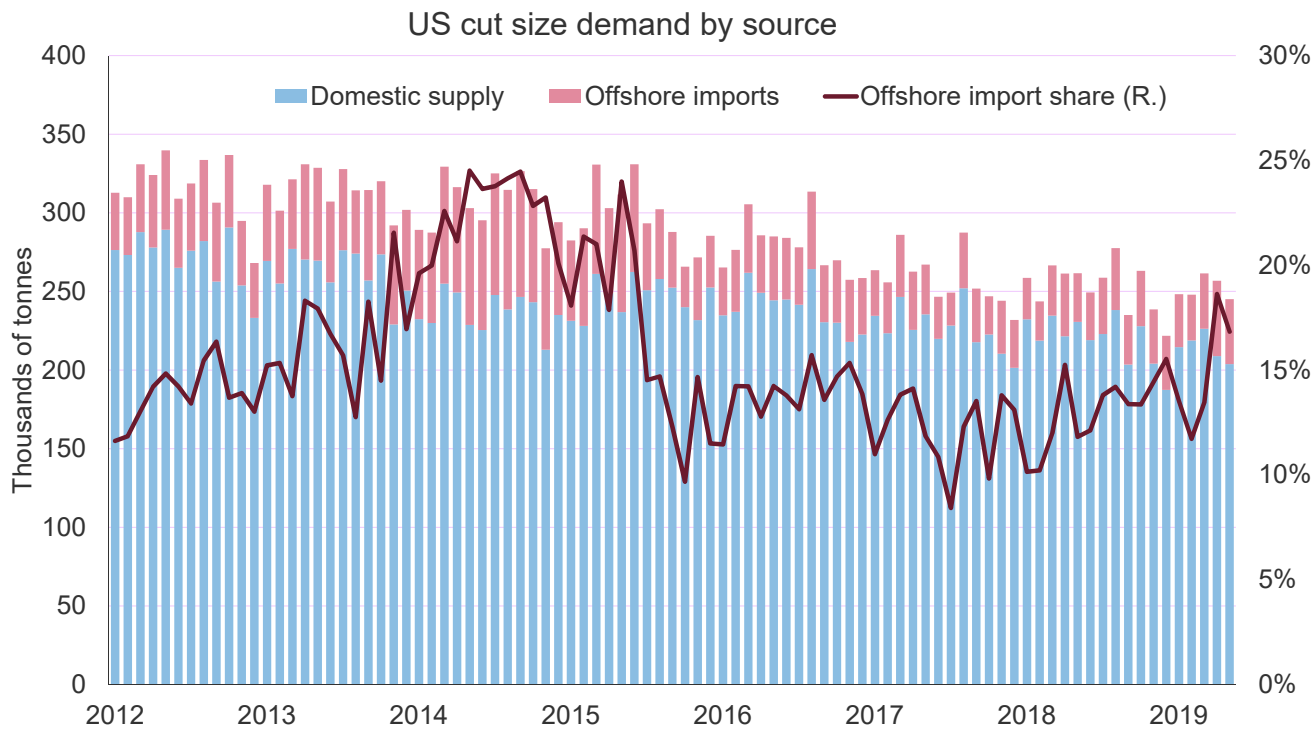


| | ADD | DATES |
|------------------|------------------|-------------|
| Australia | | |
| Austria | 21.6% | 2018 |
| Finland | 16.9% | 2018 |
| Russia | 4.2% | 2018 |
| Slovakia | 17.4% | 2018 |
| South Korea | 34.2% | 2018 |
| China | 3.1% to 34.4% | 2017 |
| Indonesia | 12.6% to 45.1% | 2017 |
| Brazil | 2.9% | 2017 |
| Thailand | 13.4% to 23.2% | 2017 |
| Pakistan | | |
| Japan | 39.1% | 2018 |
| Brazil | 35.9% | 2018 |
| China | 21.9% | 2018 |
| Thailand | 2% | 2018 |
| Indonesia | 10.62% to 20.66% | 2018 |

| | ADD | CVD | DATES |
|---------------------|---------------------------|------|-------------|
| USA | | | |
| Australia Paper | 222% | | 2015 |
| Suzano | 17% | | 2015 |
| Navigator (1) | 1.75% | | 2015 |
| APRIL Indonesia (2) | 2% | 4% | 2015 |
| APP Indonesia | 17% | 109% | 2015 |
| Asia Symbol | 84% | 7% | 2015 |
| APP China | 149% | 7% | 2015 |
| UPM China | 149% | 177% | 2015 |
| Sun Paper China | 149% | 177% | 2015 |
| India | | | |
| Indonesia | \$855/tonne minimum price | | 2018 |
| Thailand | \$855/tonne minimum price | | 2018 |
| Singapore | \$855/tonne minimum price | | 2018 |
| Mexico | | | |
| Brazil | 38% | | 2013 |

- 1) Navigator tariff changed from 8% to 37%, then back down to 1.75% in October 2018.
- 2) APRIL Indonesia ADD revised up from 2% in March 2019.

Despite tariffs, cut size imports back near peak market share in USA



22.5%

Offshore share of US cut size in 2014

12.9%

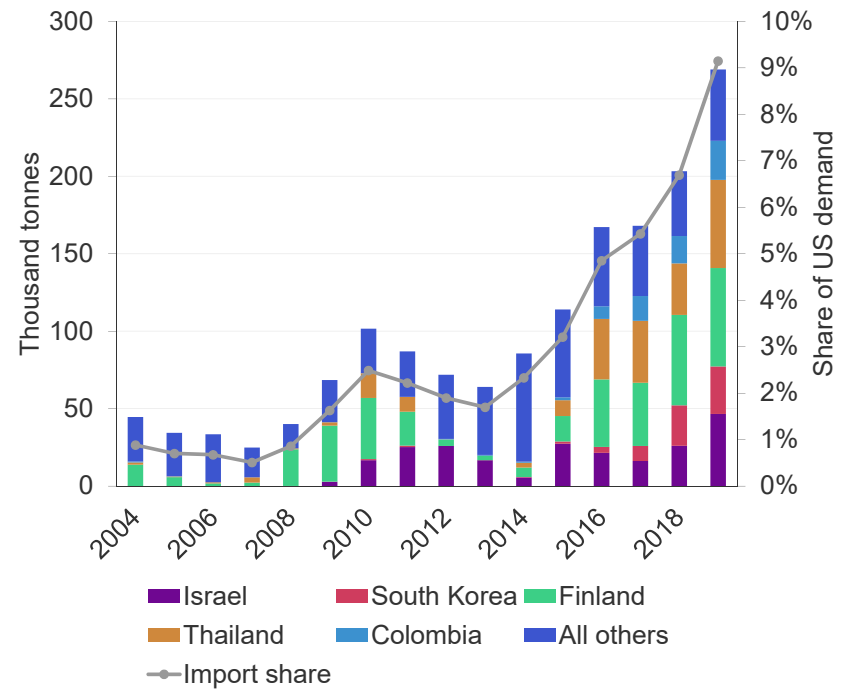
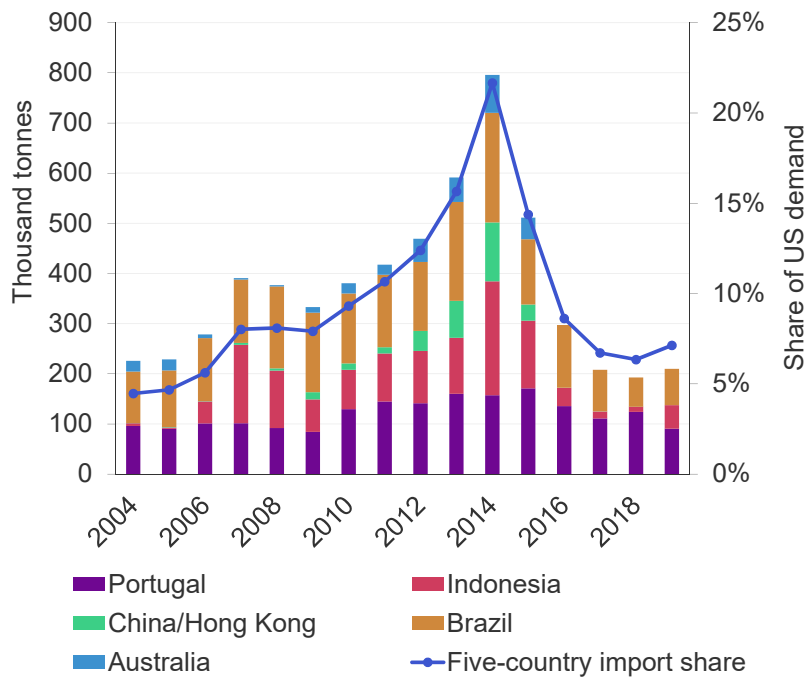
Offshore share of US cut size in 2018

Effect of tariffs on US cut size imports

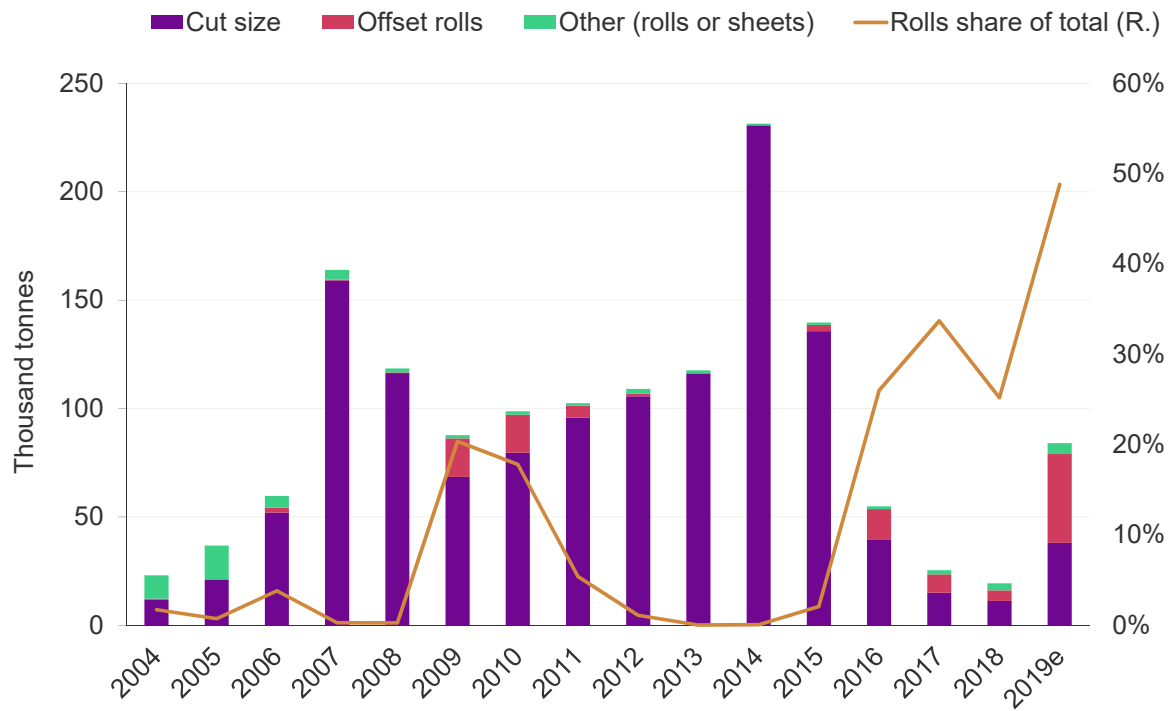


IMPORTS FROM FIVE TARIFF TARGET COUNTRIES

IMPORTS FROM NON-TARIFF COUNTRIES



Indonesia shifting US exports to rolls after tariff hike



2019 | Fastmarkets | RISI Outlook Presentation

2019 estimated based on 5 months of US customs data.



50%

Share for rolls for Indonesian exports to USA in 2019

Global coated paper machine shuts/conversions, 2019-2020



| COMPANY | MILL | COUNTRY | CAPACITY (TONNES/YR) | DATE | COMMENTS |
|-------------------|--------------------------|---------------|---|-------------|---|
| Arctic Paper | Grycksbo | Sweden | -45,000 CFS | Q1 2019 | Shut PM7 |
| Feldmuehle | Uetersen | Germany | -80,000 CFS | Q1 2019 | Shut PM2 |
| Lecta | Condat | France | -230,000 CFS | 2019 | Convert a PM to specialty |
| Stora Enso | Oulu | Finland | -1,080,000 CFS | End of 2020 | Shut PM6, convert PM7 to kraftliner |
| Arjowiggins | Bourray, Besse-sur-Braye | France | -348,000 CFS | 2019 Q1 | Mill closure |
| UPM | Plattling | Germany | -155,000 CME | 2019 Q3 | Shut PM10 |
| ND Paper | Biron | USA | -103,000 CME | Q3 2019 | Shift PM25 to packaging |
| New-Indy | Catawba | USA | -310,000 CME | n/a | Potential conversion to packaging |
| Verso | Luke | USA | -408,000 CFS | 2019 Q3 | Shut by June 30th |
| Nippon Paper Ind. | Fuji | Japan | -33,000 CME | 2019 | Shut PM11 |
| APP | Tijwi Kimia | Indonesia | -245,000 CFS | 2019 | Convert to packaging |
| Hokuetsu | Niigata | Japan | -161,000 CFS | 2019 | Close by end of June |
| Nippon Paper Ind. | Yufutsu | Japan | -88,000 CFS | 2020 | Mill shut |
| Daio Paper | Mishima | Japan | -150,000 CFS | 2019 | Conversion to kraft papers and paperboard |
| | | Global totals | -601,000 CME -2,835,000 CFS -3,436,000 total | | |

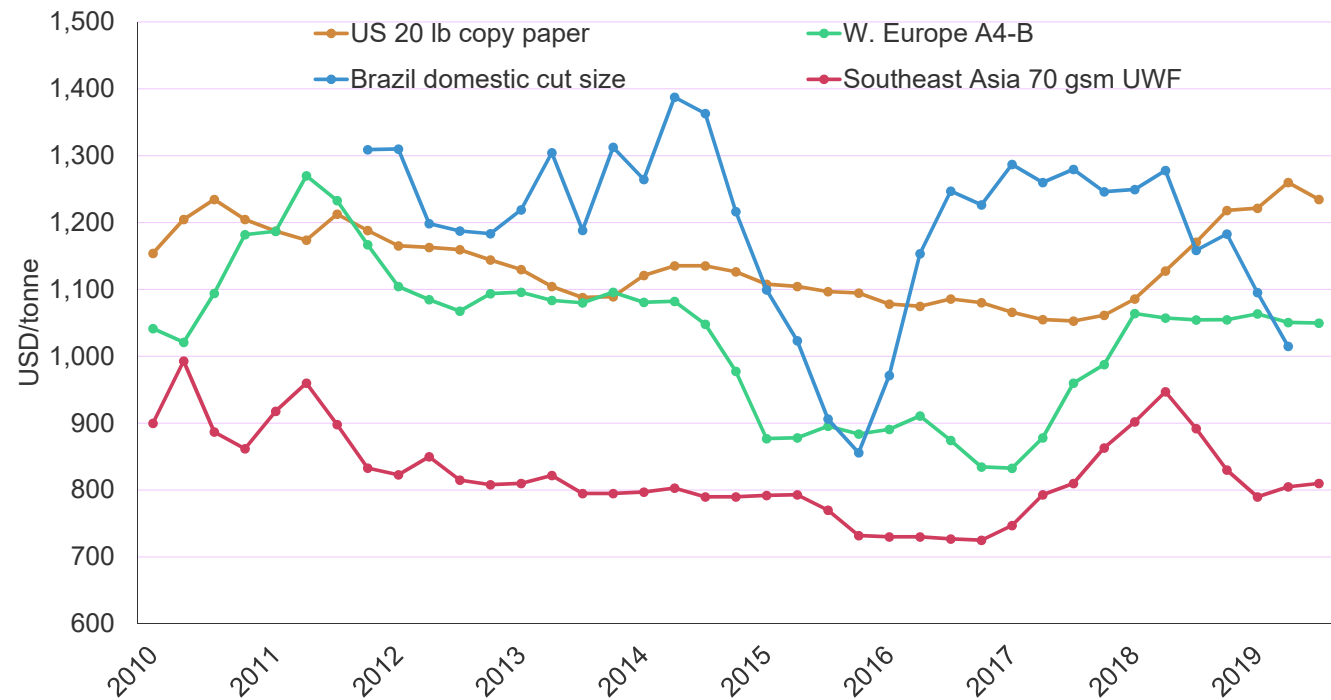
Note: There are currently no major coated paper capacity expansions occurring globally.

Global uncoated woodfree prices



HOW LARGE OF A GLOBAL PREMIUM CAN THE USA MAINTAIN?

- Brazilian prices can jump above US levels due to currency swings, premium versus offshore imports.
- US and European prices have historically been close, but wide gap has re-opened due to tighter US market.
- Asian gap with US prices at all-time peak of more than \$300/tonne in early 2019.



Signs that printing & writing profitability has peaked

MARKETS HAVE ALREADY STARTED TO WEAKEN

- Weak demand, more capacity startups and falling costs for fiber in Asia
- US producers forced to roll back some of 2019 UWF price hike despite G-P closure

AFTER SPIKING, MILL COST INFLATION IS ABATING

- Pulp prices in decline
- Energy down sharply, albeit starting to recover

RISE IN IMPORTS

- Global oversupply will increase competition
- Stronger US dollar and some tariff reductions

REDUCED CONVERSION OPPORTUNITY

- Less room for new containerboard machines, global economic risks



2-5%

Mexican USD P&W prices down 2-5% y-o-y in 3Q19

5-15%

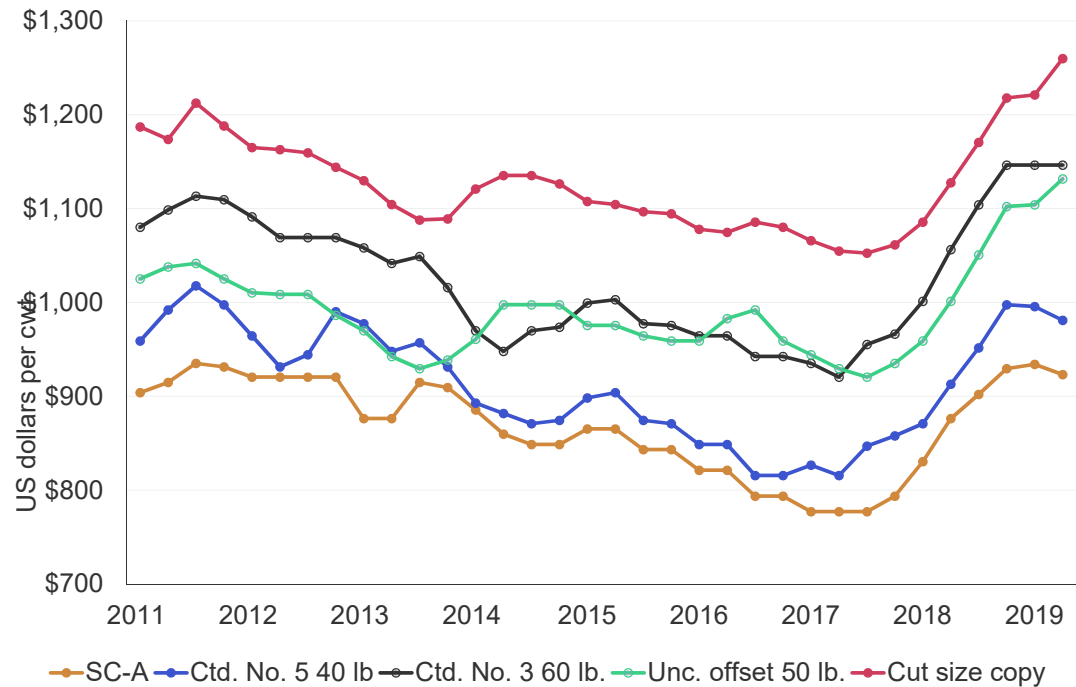
Brazilian P&W prices down 5-15% in first half of 2019

Next moves for US printing & writing prices will be down

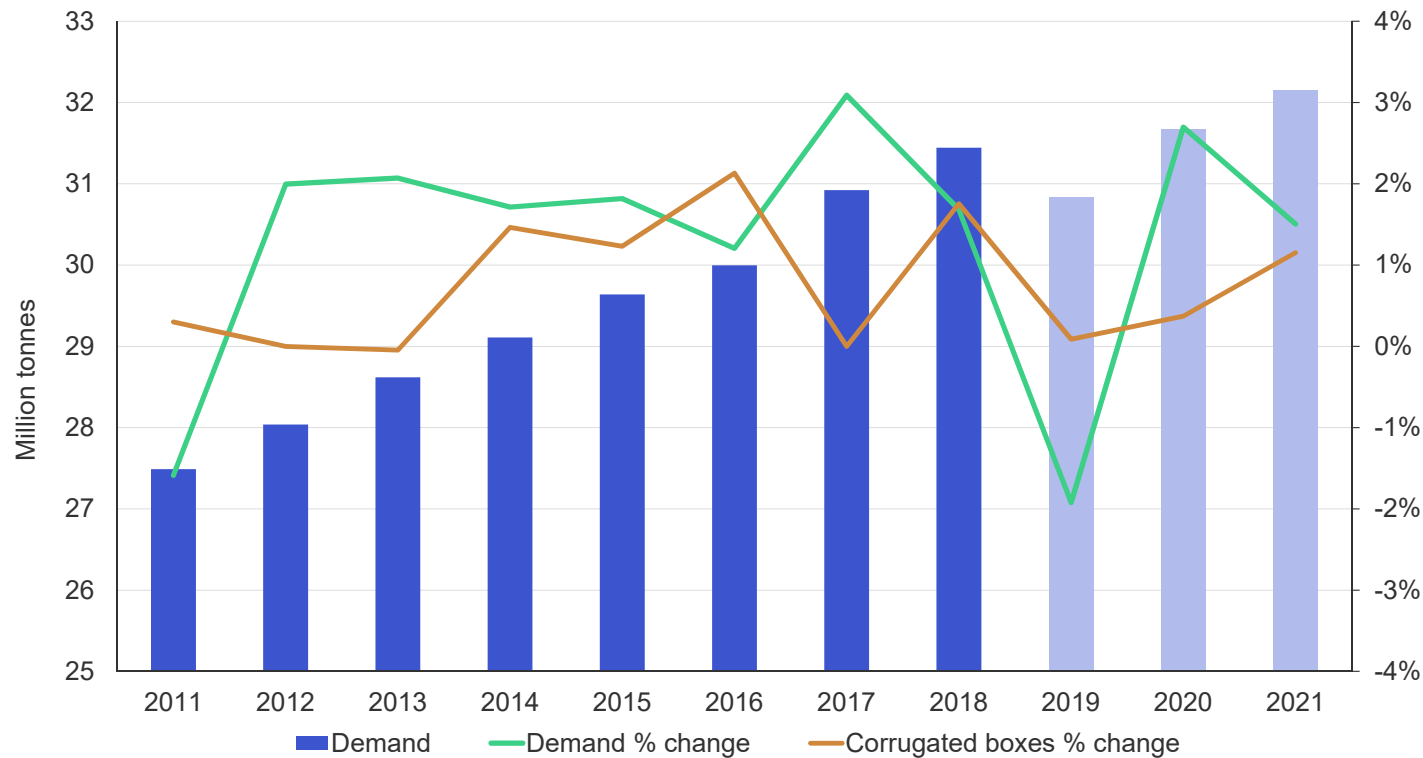


US PRICES 5-12% ABOVE YEAR-AGO LEVELS IN EARLY 2019

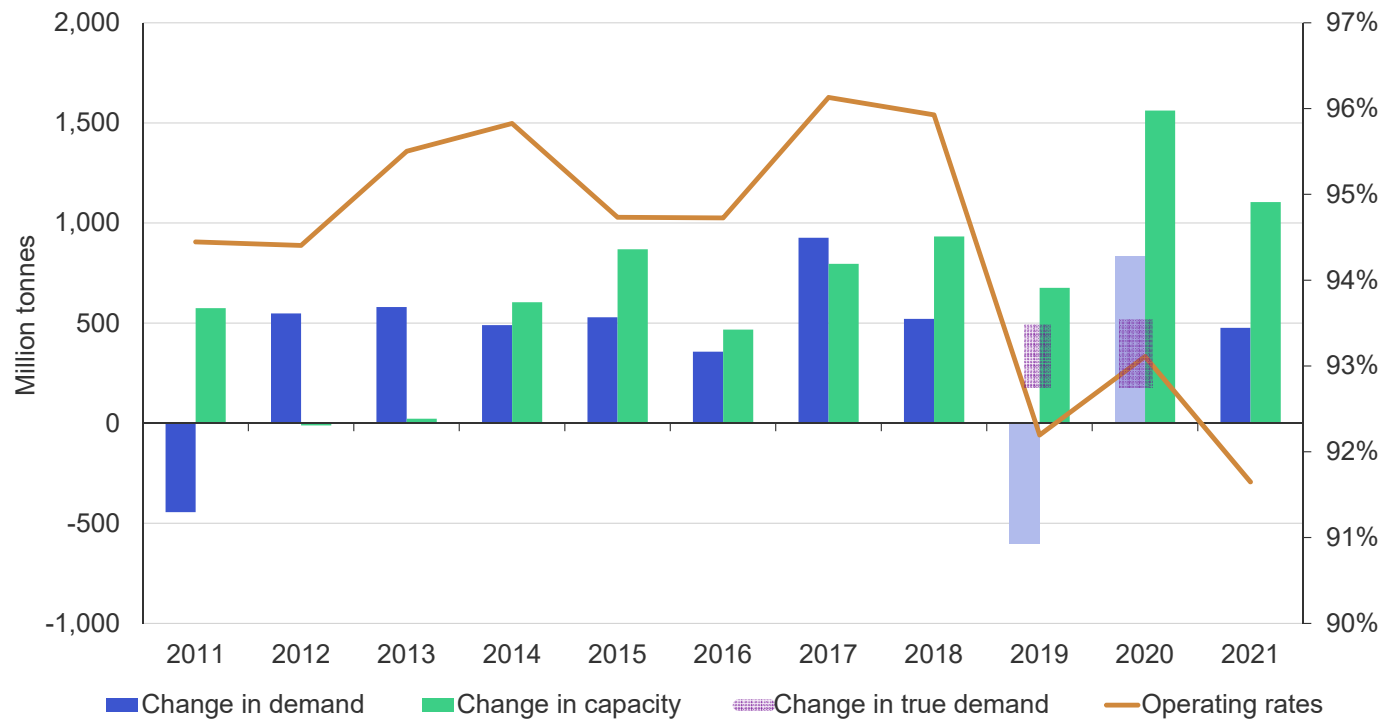
- No room for any further gains even with major capacity closures.
- Prices for most grades have already begun to erode.
- Any potential recession likely to trigger larger demand declines and result in price drops.



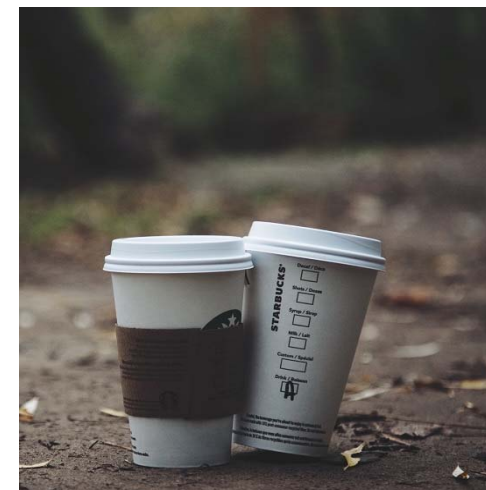
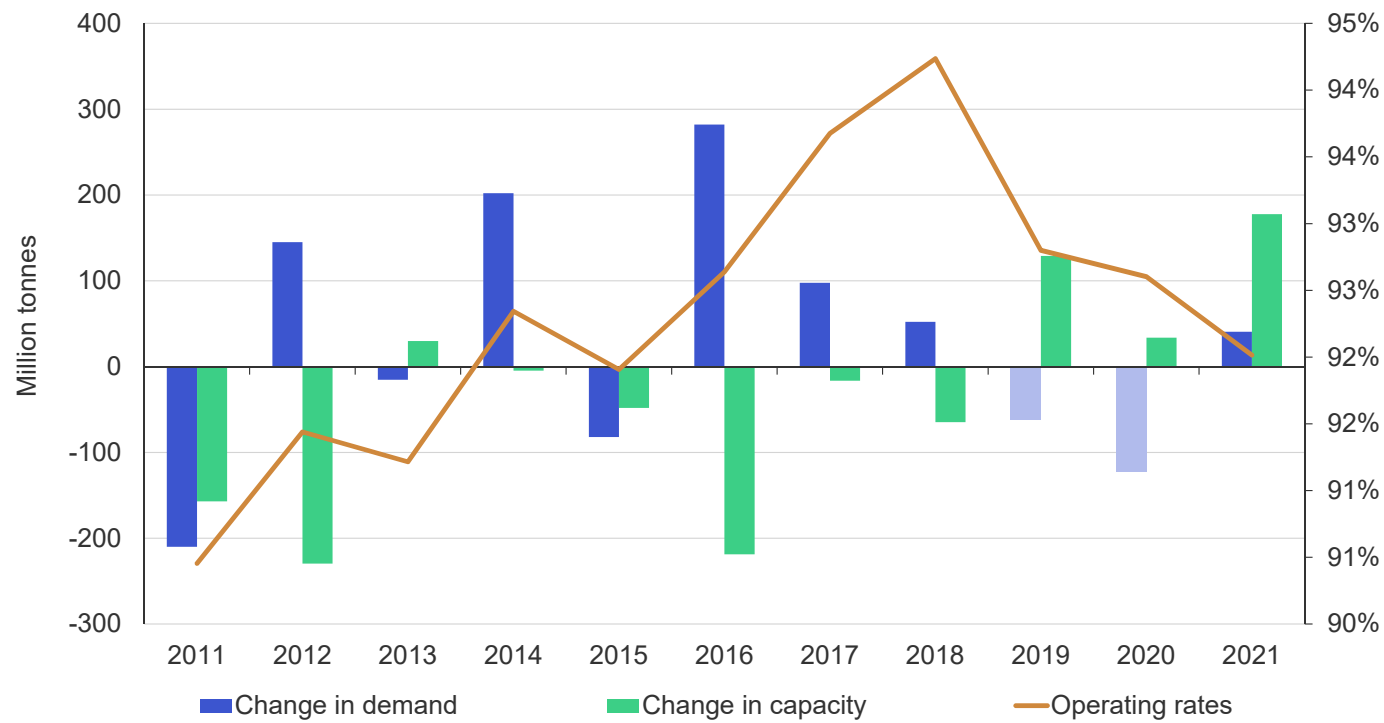
North American containerboard producers are taking economic downtime to address slower demand growth



Robust capacity expansion will keep North American containerboard operating rates depressed



Slow growth in North American boxboard demand and supply



Snapshot of 2018 Asian containerboard demand and supply



Chinese demand fell an estimated 3% in 2018

- Deceleration in economic growth
- Some substitution from paper to plastics
- E-commerce working to reduce its packaging footprint
- Significant uncertainty in the level of decline

Rest of Asia saw fairly steady growth at 3.8% in 2018

- Compared to average of 4.0% per year in 2016-2017

Chinese output tumbled while net imports soared

- Chinese production fell an estimated 5% or 2.5 million tonnes
- Net imports jumped almost 1.1 million tonnes
- Rest of Asia supplied much of this, with net imports climbing 800,000 tonnes

Entering 2019, demand conditions have been sluggish

- Economic weakness and effects of lingering US-China trade war



Chinese RCP policies are changing the way companies are operating



Constrained fiber supplies driving up imports and reducing production

- RCP imports fell from 25.7 million tonnes in 2017 to 17.0 million tonnes in 2018.
- Expected to fall to 10-12 million tonnes in 2019 and then 5-6 million tonnes in 2020 before total ban goes into effect in 2021.

Large companies are making investments in light of the new policies

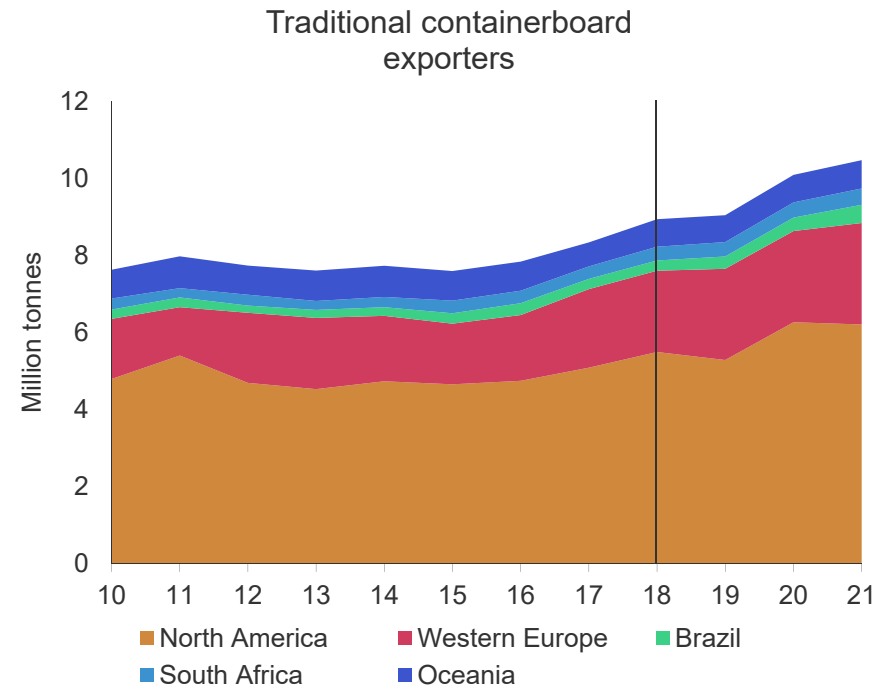
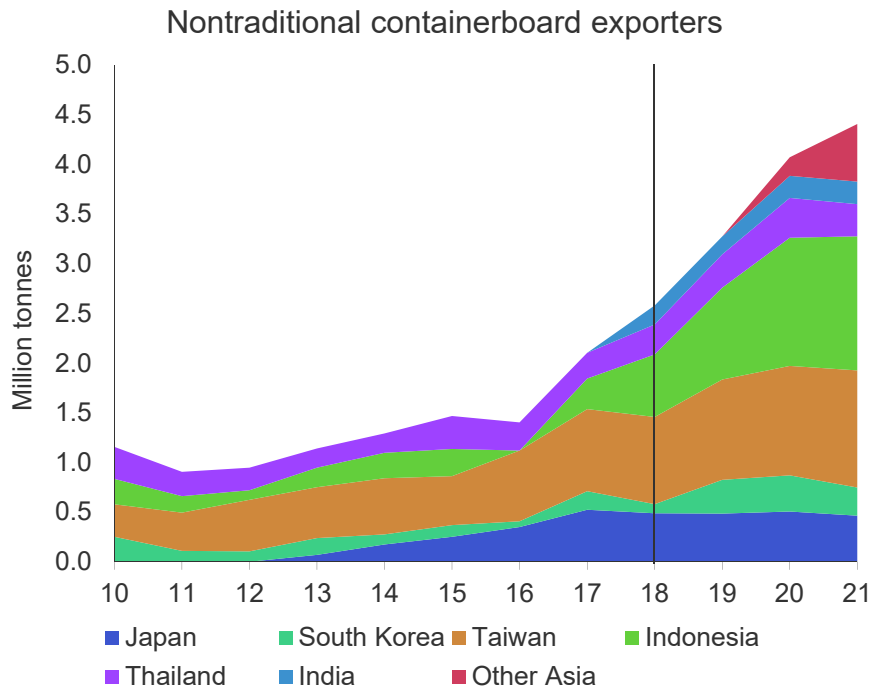
- Numerous projects in the works in Vietnam, Malaysia, Laos and India

Previously planned projects apparently being delayed

- Due to economic weakness and effects of lingering US-China trade war



The smaller exporters to the world reaped most of the benefits from the shift in Chinese policy (net exports to world)



China's containerboard market adjusting to new RCP policies

Year-to-year change



DEMAND WILL DROP AGAIN IN 2019 AND THEN MOVE UP IN 2020

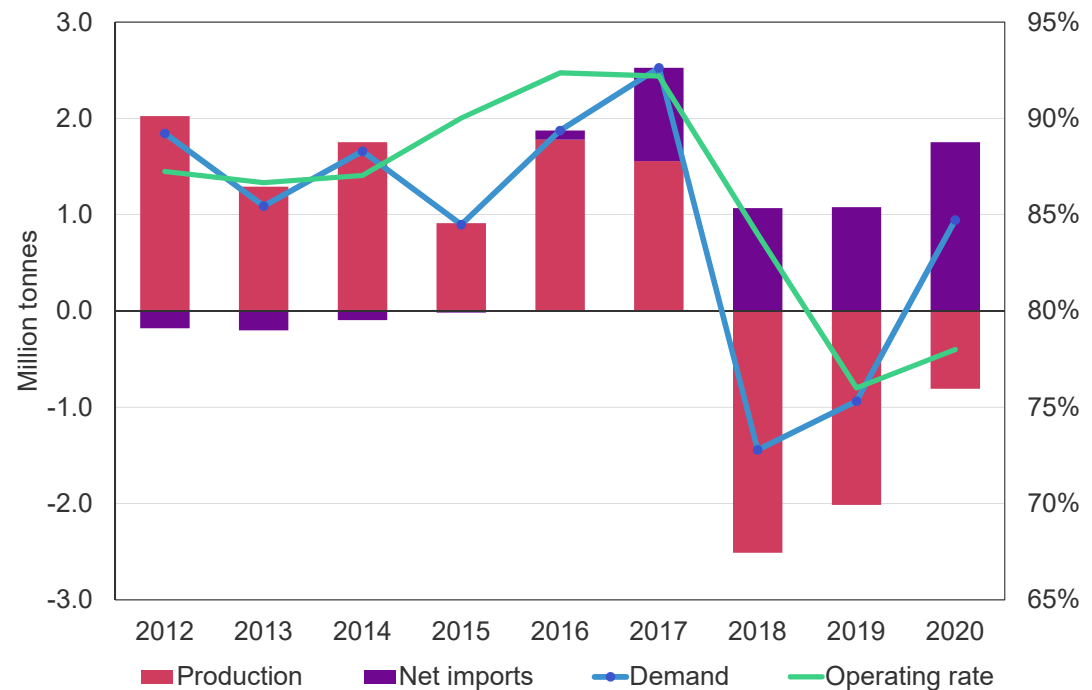
- Weak economy
- Dictated by fiber balance

PRODUCTION WILL FALL AND NET IMPORTS WILL CLIMB

- Output constrained by fiber
- Market attractive to other Asian suppliers
- But can imports continue to climb that much?

OPERATING RATES ARE TUMBLING

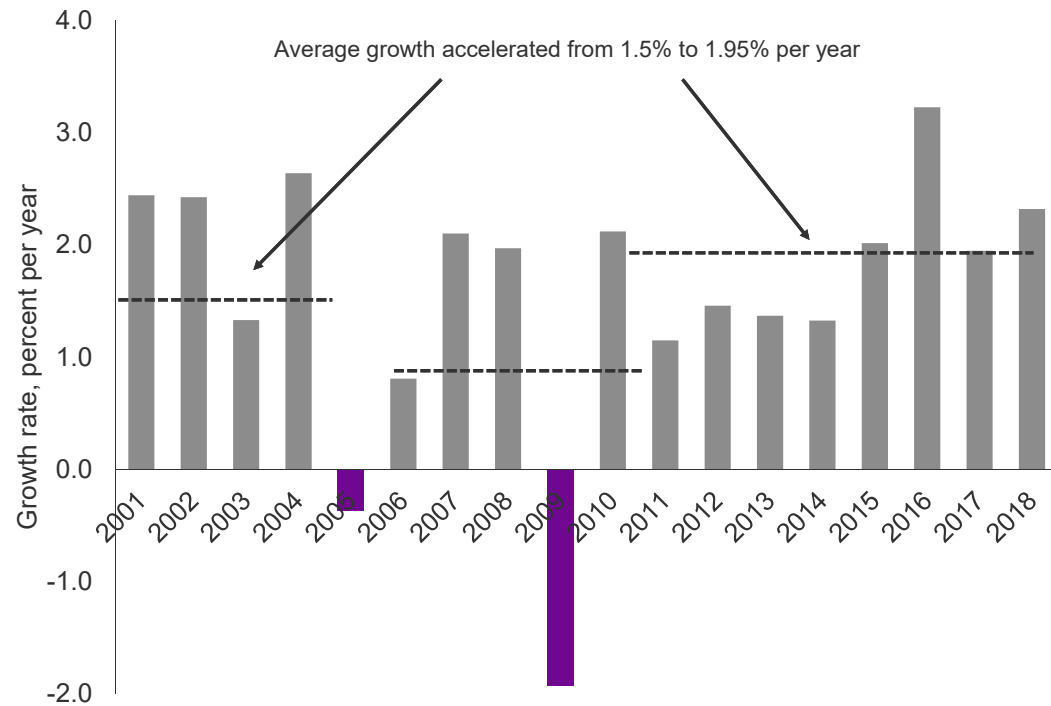
- Level dependent on capacity assumptions



The North American tissue market has been strong recently



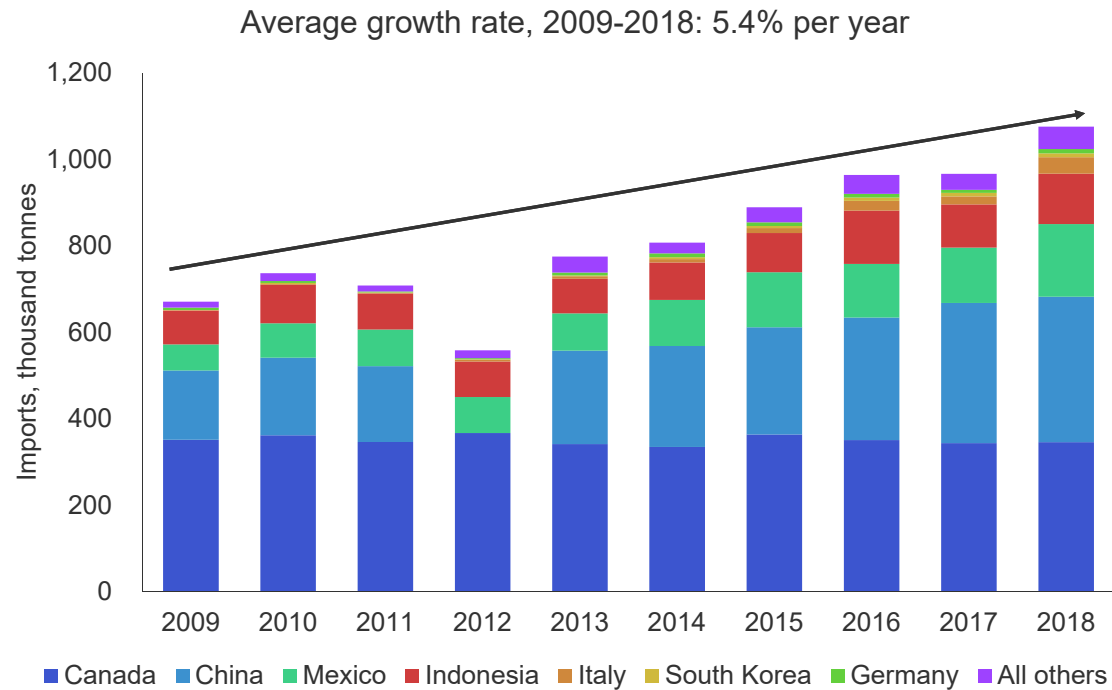
- The AfH sector in particular benefitted from the strong economy, low gasoline prices and changing lifestyle of younger generations.



US tissue import growth, 2009-2018



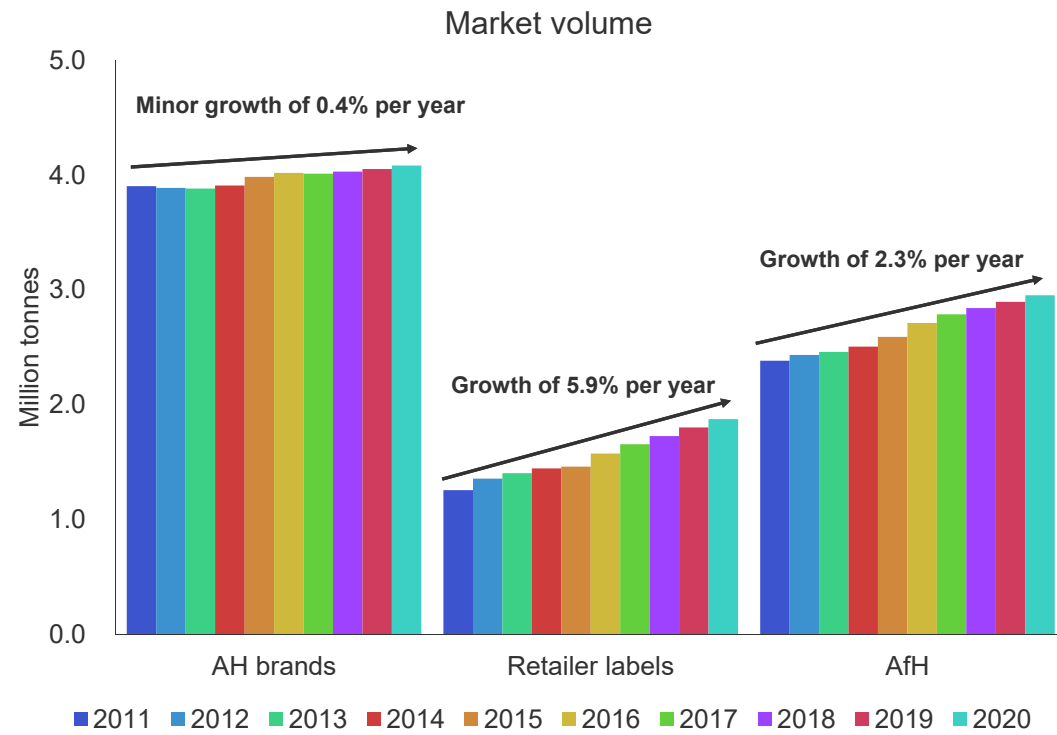
- Canada continues to be the main US import source for tissue, but China has taken second place ahead of Mexico and Indonesia.
- However, imports tariffs will restrict imports from China; the first five months of 2019 show decreases in the volume of Chinese tissue imported by the USA.





Expected growth in US tissue consumption by business sector

- At-Home retailer labels will show the strongest growth, while At-Home branded volume growth will remain moderate.
- AfH growth will rise above average At-Home growth.





Major tissue capacity changes in North America, 2018-2021

2018

| | |
|--|-------------------|
| • Georgia-Pacific, Augusta, GA, USA | -31,000 t/a |
| • Sofidel America, Circleville, OH, USA (2 x NTT) | 140,000 t/a |
| • Kimberly-Clark, Fullerton, CA, USA | -60,000 t/a |
| • First Quality Tissue, Anderson, SC, USA (TAD PM) | <u>64,000 t/a</u> |
| | 113,000 t/a |

2019

| | |
|---|-------------------|
| • Soundview Paper, Elmwood Park, NJ, USA (closure after two fires) | -110,000 t/a |
| • Clearwater Paper, Shelby, NC, USA (NTT PM) | 64,000 t/a |
| • Irving Consumer Products, Macon, GA, USA (TAD PM) | 64,000 t/a |
| • Cascades Tissue Group, Scarborough and Whitby, ON, Canada (mill closures) | -61,000 t/a |
| • Soundview Paper, Elmwood Park, NJ, USA (restart of PM11) | 60,000 t/a |
| • Georgia-Pacific Corp., Crossett, AR, USA (closure of the oldest PM) | -30,000 t/a |
| • Georgia-Pacific Corp., Palatka, FL, USA (TAD PM) | 72,000 t/a |
| • Sofidel America, Inola, OK, USA | <u>60,000 t/a</u> |
| | 119,000 t/a |

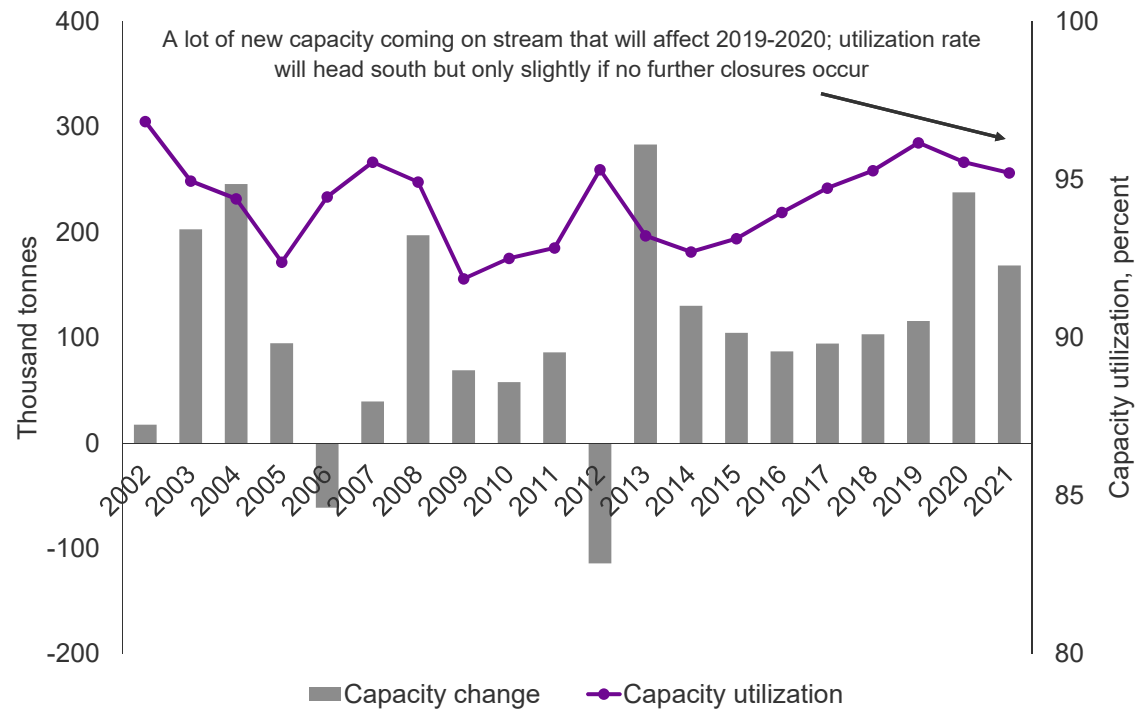
2020-2021

| | |
|---|-------------------|
| • First Quality Tissue, Lock Haven, PA, USA | 64,000 t/a |
| • Sofidel America, Inola, OK, USA | 60,000 t/a |
| • Georgia-Pacific, Naheola, AL, USA (replacement) | 8,000 t/a |
| • Kruger Tissue, Brompton, Sherbrook, QC, Canada (TAD PM) | <u>70,000 t/a</u> |
| | 202,000 t/a |

Net capacity change* and tissue operating rate in North America



- The outlook is surprisingly good despite the number of projects, but a lot depends on how much tariffs on imports from China change the net trade balance.
- We assume a conservative decline in net imports in this forecast (trend change).

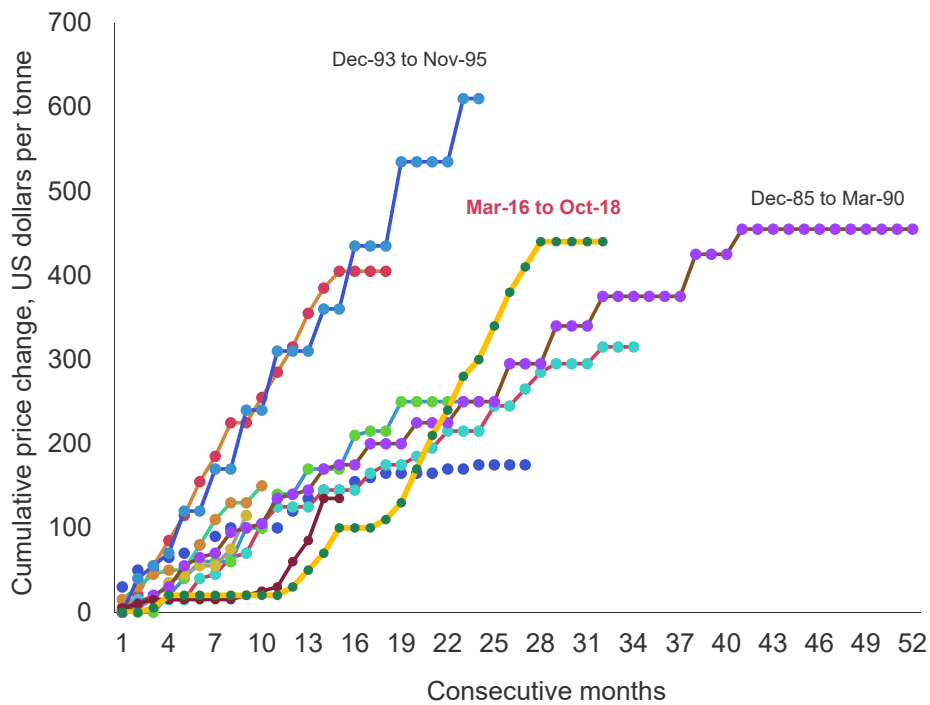


* Based on committed projects only.

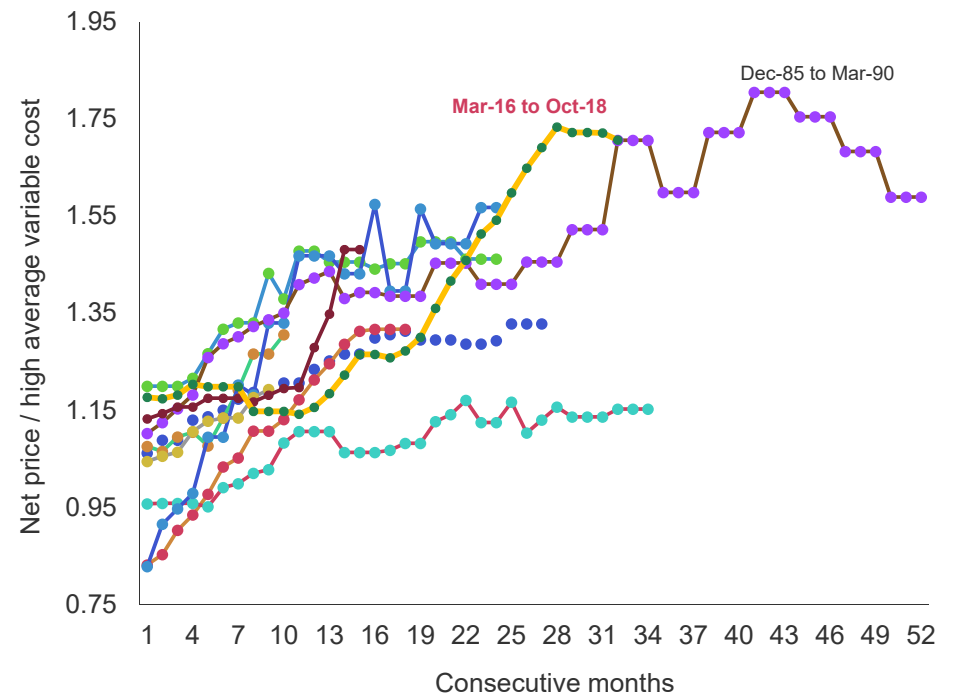
Pulp markets recently completed an historical run...



Cumulative price change



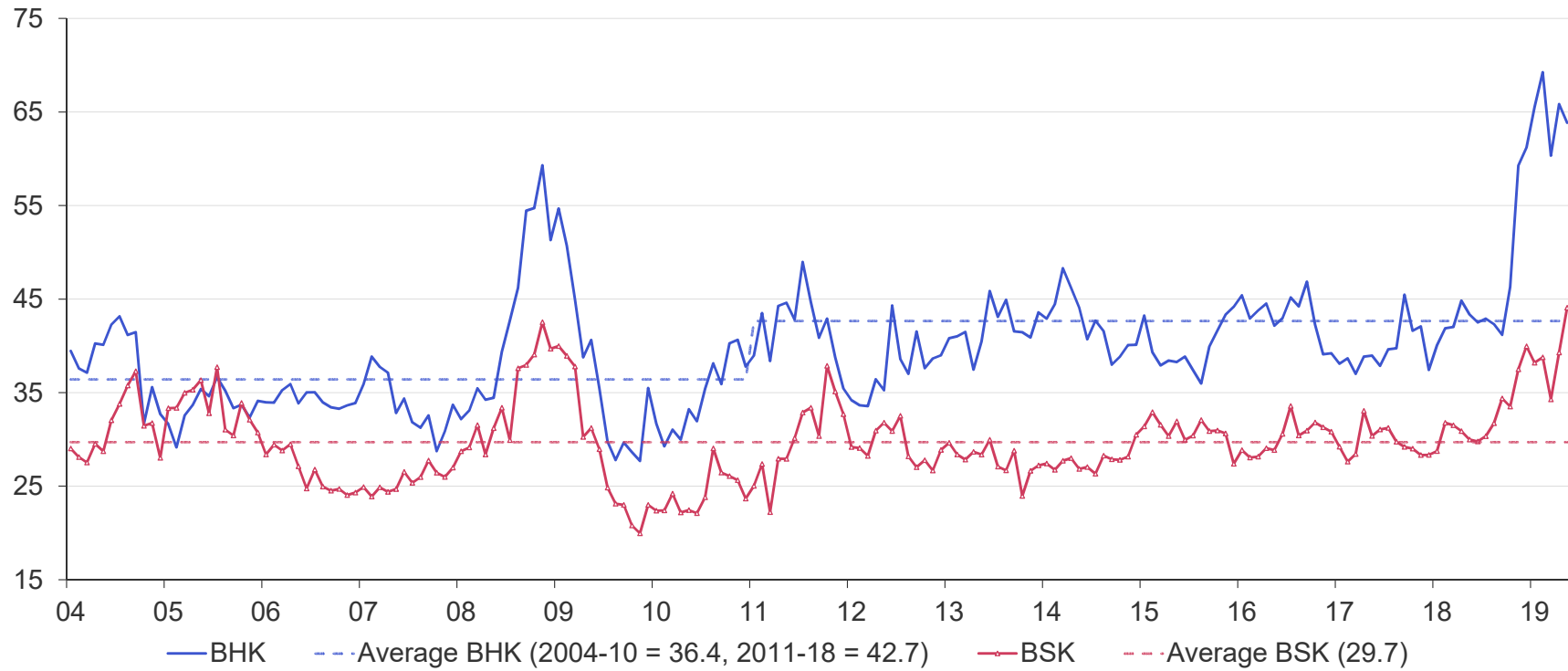
Net price / high average variable cost



Producer inventories reach a record high



Produce inventories, days of supply

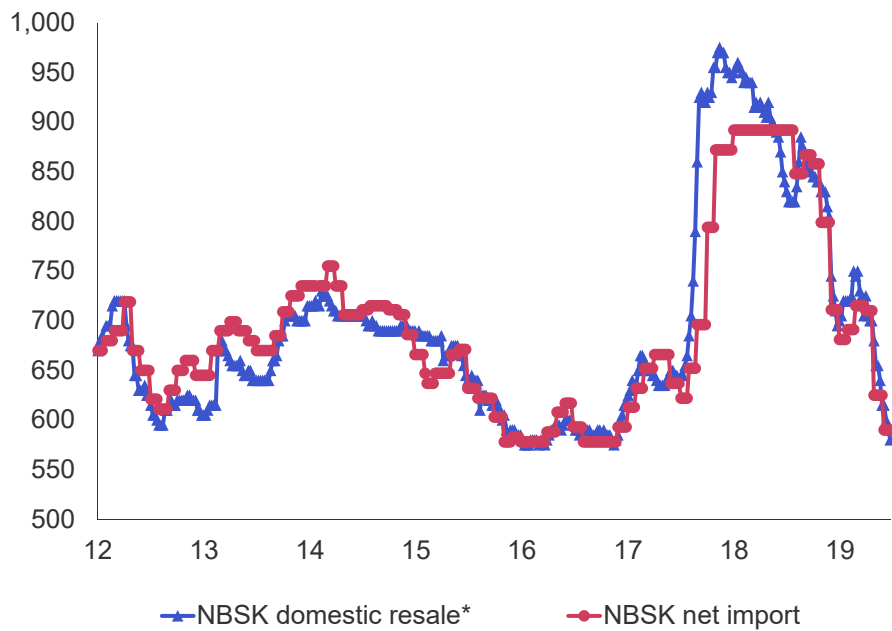


Source: PPPC, Fastmarkets RISI.

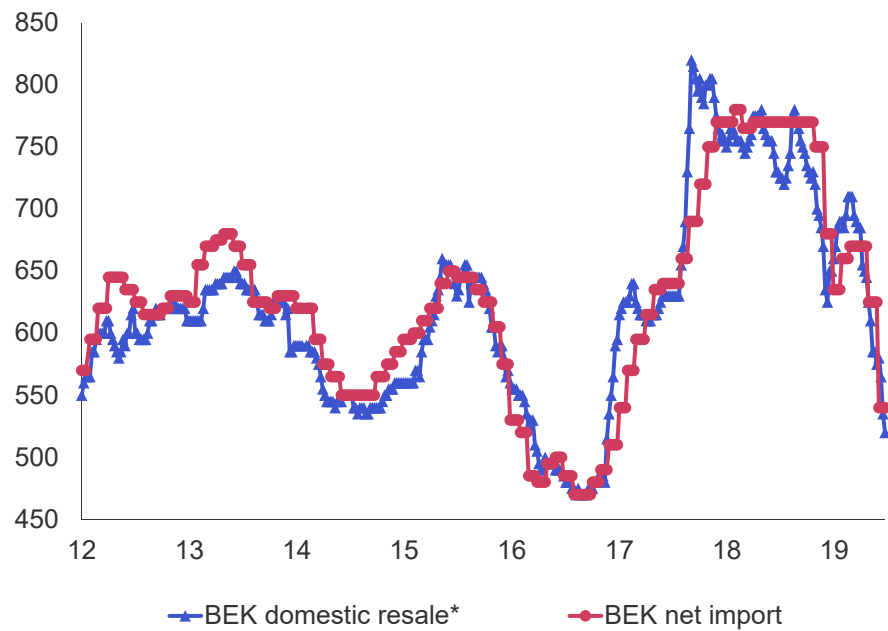
Domestic pulp prices in China searching for a bottom



NBSK prices in China, \$/tonne



BEK prices in China, \$/tonne



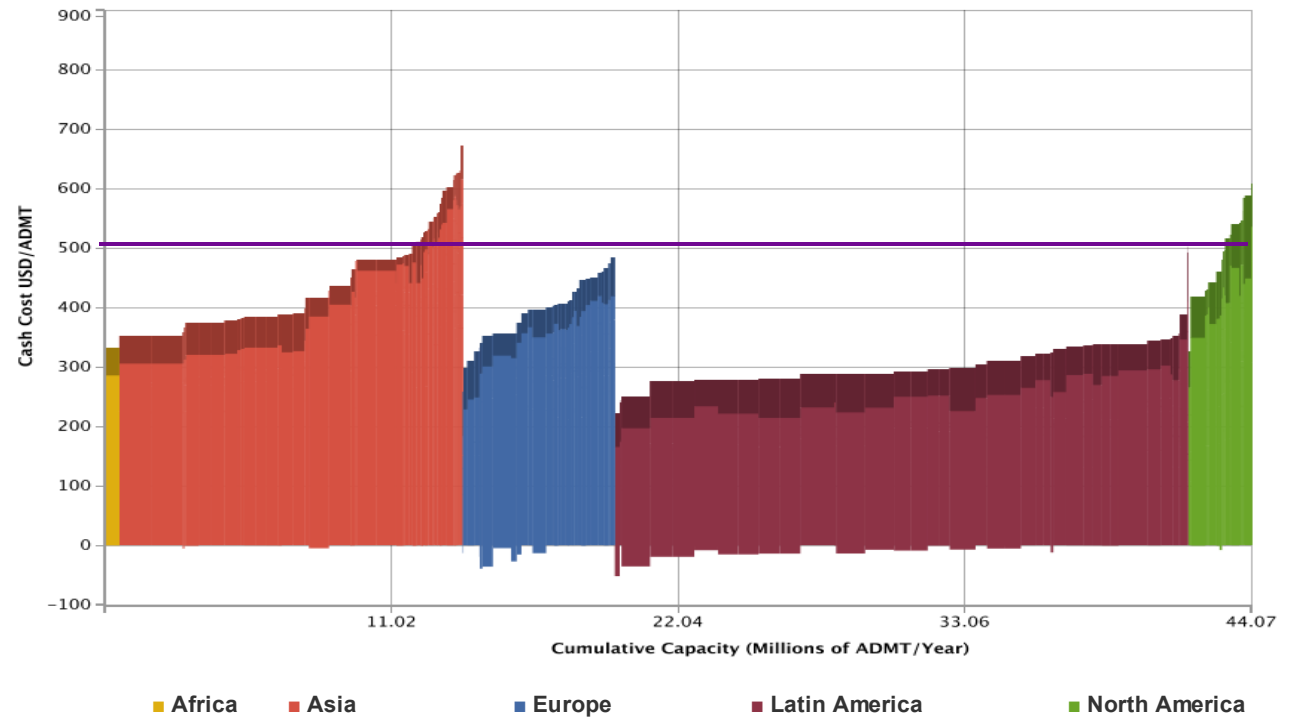
* Reflects net renminbi domestic resale price converted to US dollars, excluding VAT and logistics costs.

BHK cash cost curve from Mill Intelligence

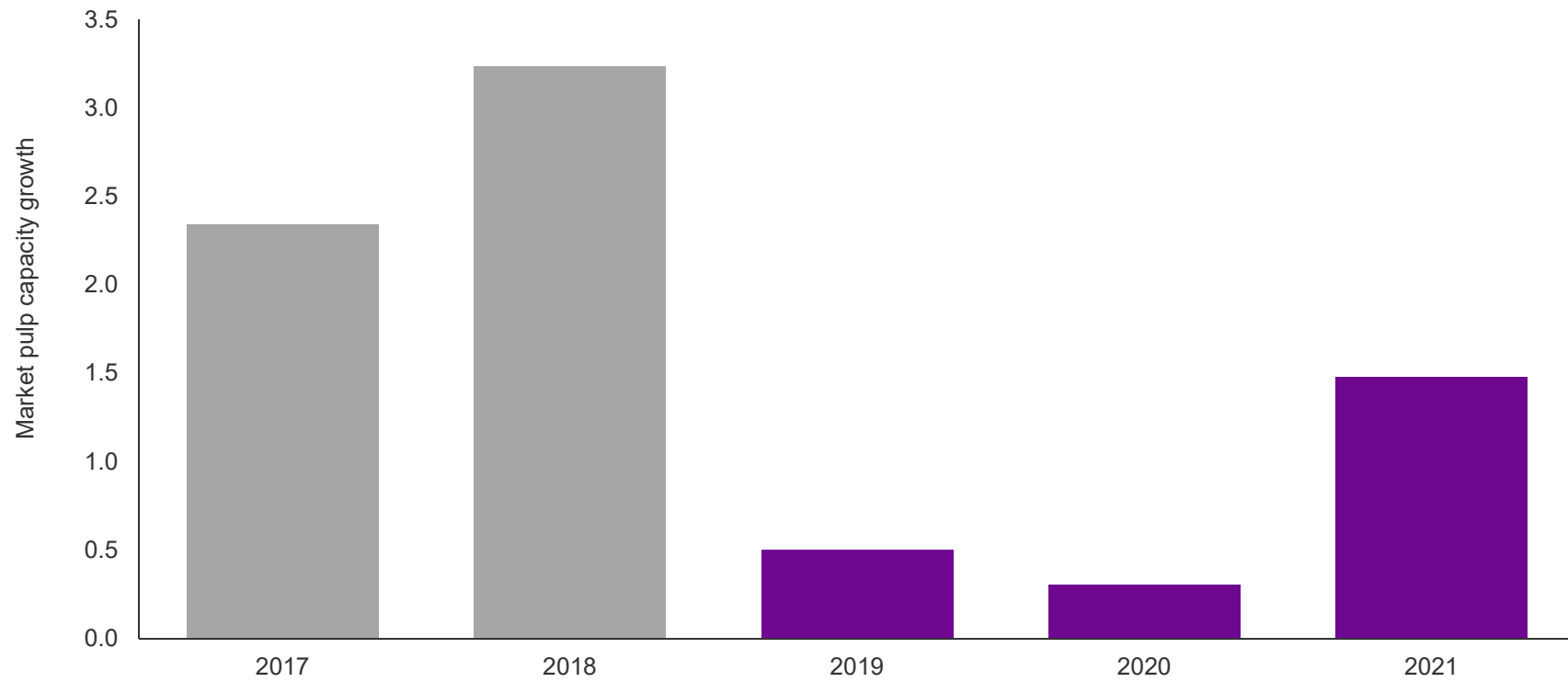


LATIN AMERICAN PRODUCERS DOMINATE THE LOW END OF THE COST CURVE

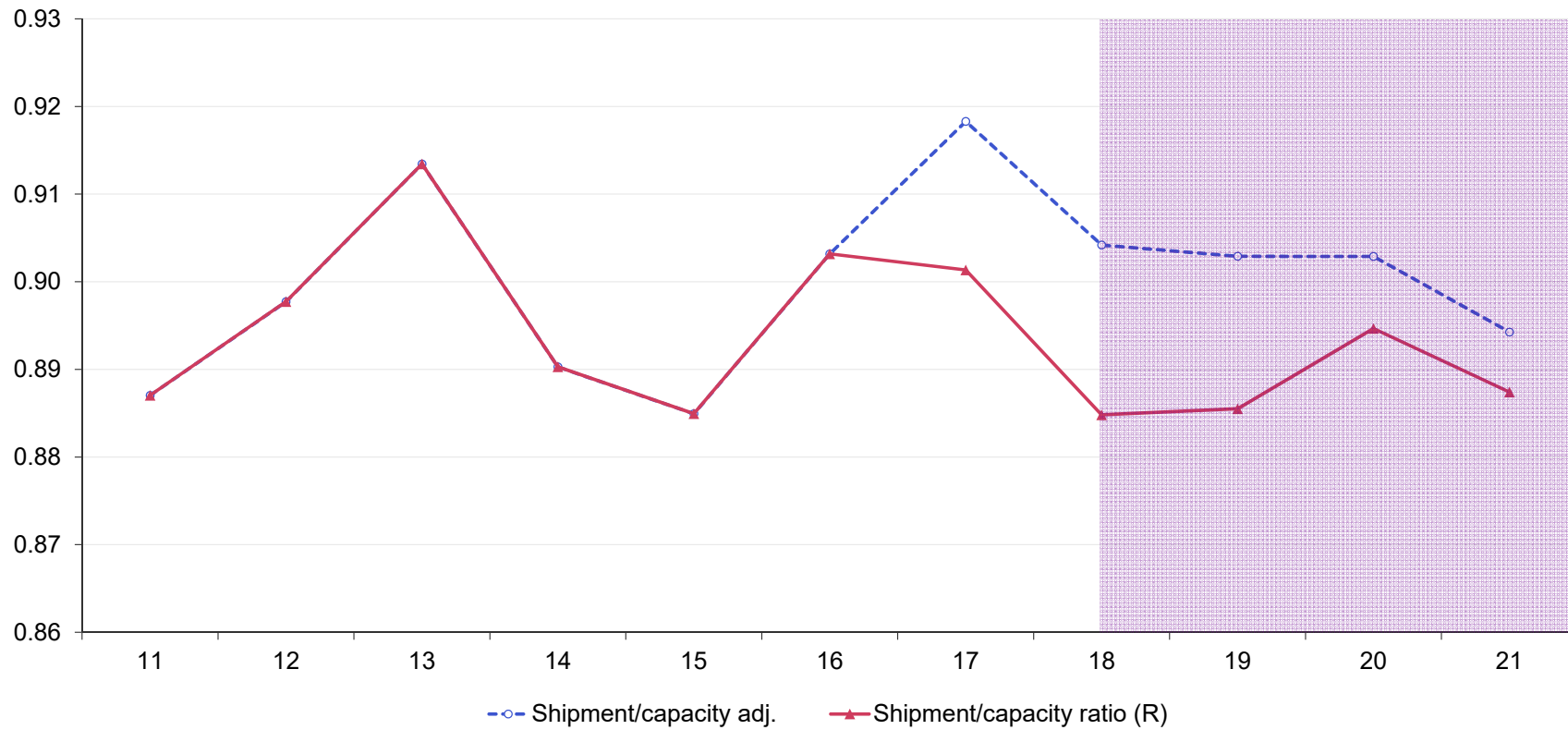
- Latin American producers benefit from low-cost wood and the exchange rate
- Higher-cost facilities tend to be much smaller and located in Asia and the Northern Hemisphere



Limited market pulp capacity expansion until 2021



Pulp market could remain weaker for longer

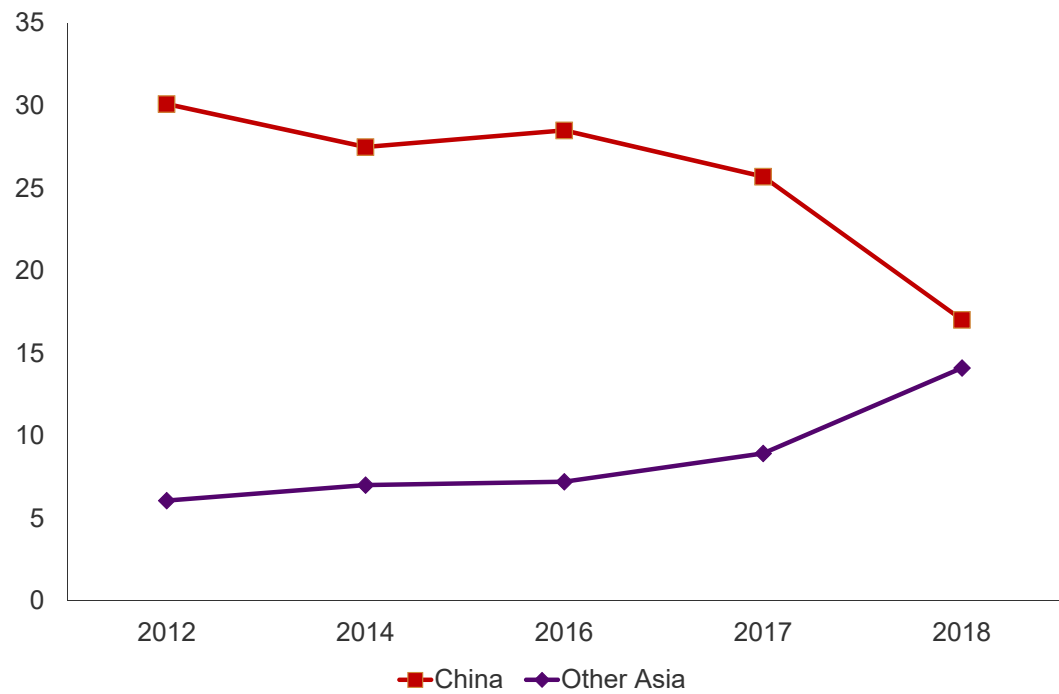


China and Other Asia: RCP imports

Million tonnes



OTHER ASIA CATCHING UP WITH CHINA

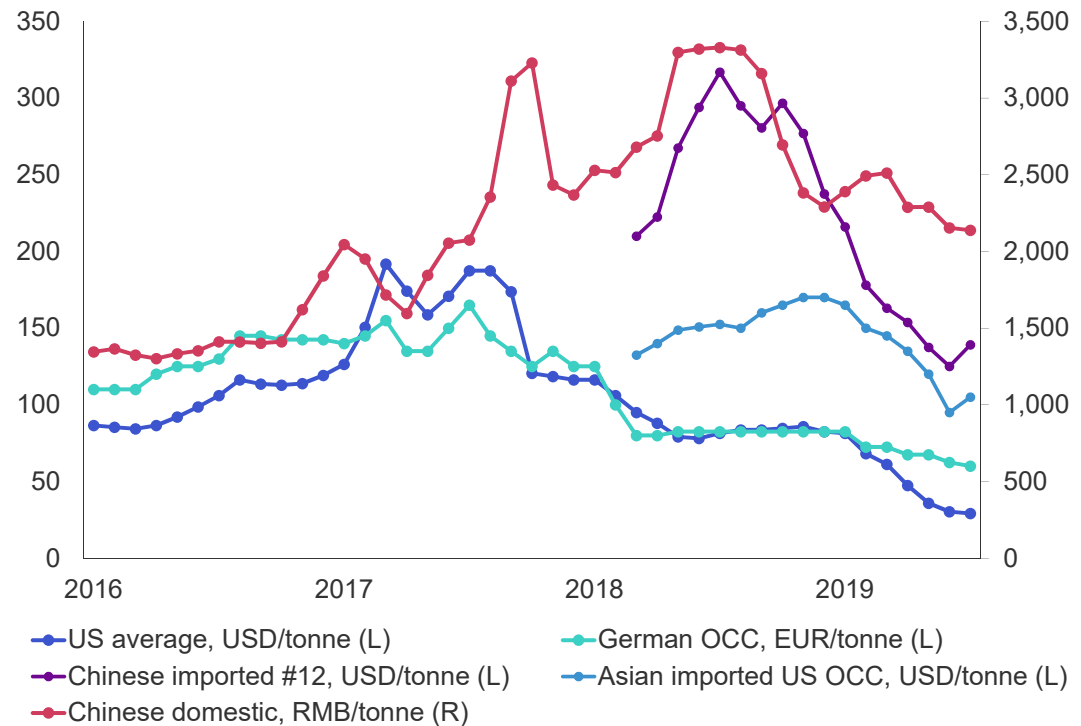


OCC prices in different regions



CHINESE PAPER COMPANIES FACING HIGH RECYCLED FIBER COSTS

- Before July 2017, one set of OCC prices
- Now, two sets of prices: Chinese price and prices outside of China
- Sharp drop in US and European OCC prices
- Low OCC import prices in Southeast Asia
- Domestically collected OCC became quite expensive in China due to the overall recycled fiber shortage issue in 2018
- Recent decline in OCC prices globally because of the weak paper packaging markets and reduction in Asian RCP purchases



China's investments in recycled pulp



ANNOUNCED AND ESTIMATED RECYCLED PULP PROJECTS

- Nine Dragons
 - Fairmont, USA: About 220,000 tonnes per year (started up already)
 - Biron, USA: 650,000 tonnes per year
 - Rumford, USA: About 400,000 tonnes per year
 - India: 500,000 tonnes
- Lee & Man
 - Myanmar: 680,000 tonnes per year
 - Malaysia: 550,000 tonnes per year
- Sun Paper: Laos: 400,000 tonnes per year
- Jingxing Paper: Malaysia: 550,000 tonnes per year
- Shanying
 - Wickliffe, USA: 120,000 tonnes per year
 - Malaysia: 550,000 tonnes per year
- Other