



# **Dynamics in the Global Pulp Market**

Timberland Investment Group

2019

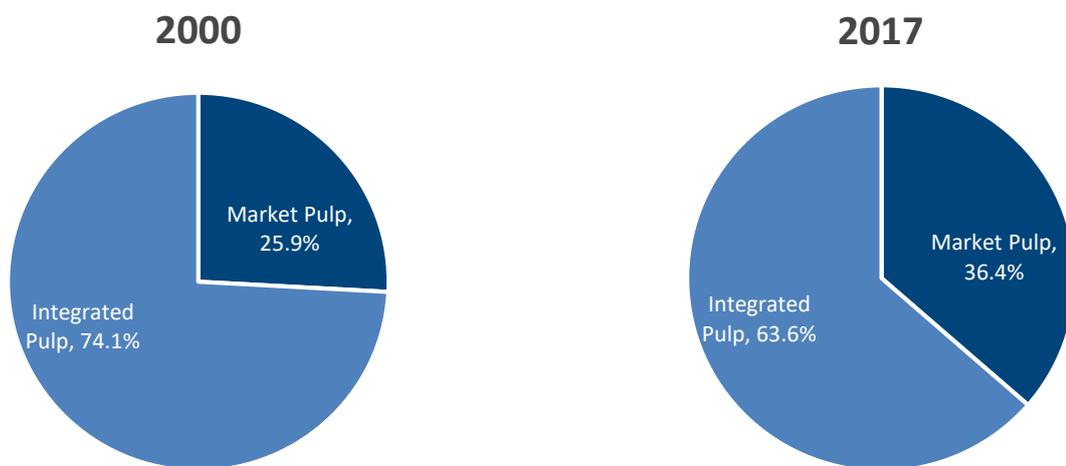
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## The Global Pulp Market

The global wood pulp market is a large driver of global timber demand. In aggregate, this market accounts for around 200.8 million metric tonnes (“MT”) of supply, representing around 10.5% of global industrial roundwood production. Of that, around 73.1 million MT relate to “market pulp,” reflecting pulp sold into the open market to meet the needs of mills that do not have integrated pulping operations or are unable to satisfy all of their pulp demand internally (Figure 1). The remainder of global wood pulp is integrated with producers’ paper and board manufacturing operations.

**Figure 1: Total Wood Pulp Capacity and Market Pulp Share**

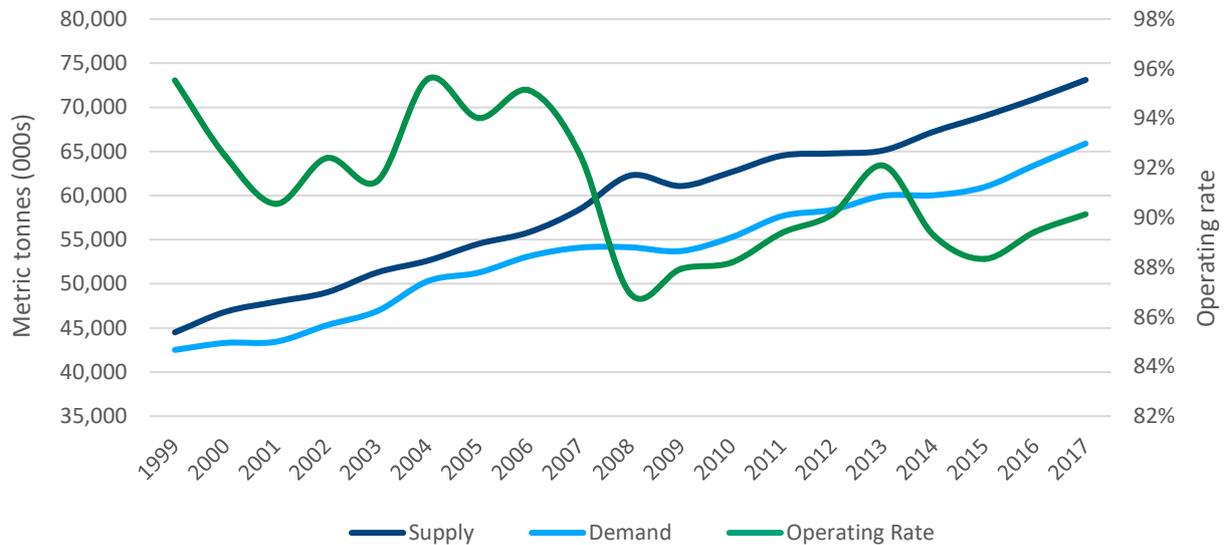


Source: RISI; TIG Analysis

Since 1999, global market pulp demand has increased at a compounded annual growth rate (“CAGR”) of 2.5% due to growing end-markets including packaging and tissue, and restrictive Chinese environmental regulations (which has encouraged pulp demand by limiting non-wood fiber consumption) while global market pulp supply has increased at a CAGR of 2.8% to meet this demand growth (Figure 2).

There are two primary categories of market pulp: hardwood and softwood. Hardwood pulp is derived from deciduous trees such as eucalyptus, oak, maple, and birch while softwood pulp is derived from coniferous trees such as pine and spruce. Given its shorter fibers, hardwood pulp is typically used to produce printing and writing papers as well as tissue products while softwood pulp, which has longer fibers providing strength and durability, is used to produce packaging materials such as containerboard and paperboard. Hardwood pulp has gained market share versus softwood pulp given emerging market growth, particularly in China, and as timberland owners, mainly in Brazil, have increasingly planted lower cost, fast-growing and high-yielding eucalyptus plantations.

**Figure 2: Global Market Pulp Supply & Demand**

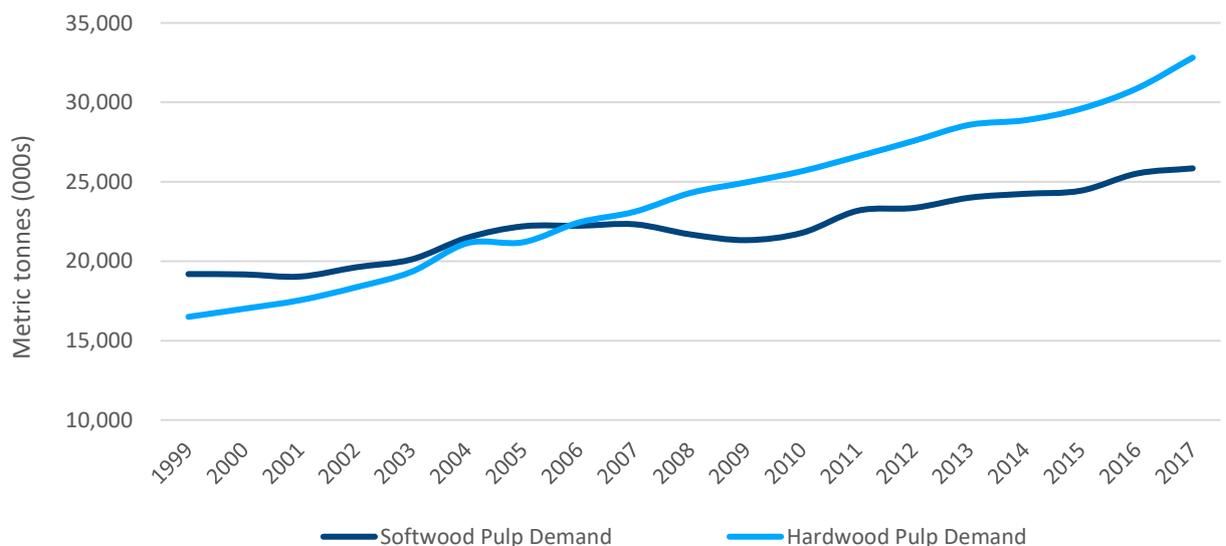


Source: RISI; TIG Analysis

## Pulp Demand

In aggregate, global market pulp demand amounts to around 65.9 million MT with softwood accounting for around 25.8 million MT and hardwood accounting for around 32.8 million MT. The remaining 7.3 million MT is comprised of sulfite, unbleached kraft, semichemical, and mechanical pulp (for definitions of these types of pulp, please refer to the Glossary on page 19). Since 1999, aggregate market pulp demand has been growing at a 2.5% CAGR with hardwood growing at 3.9% and softwood growing at 1.7% (Figure 3).

**Figure 3: Hardwood Market Pulp Demand versus Softwood Market Pulp Demand**

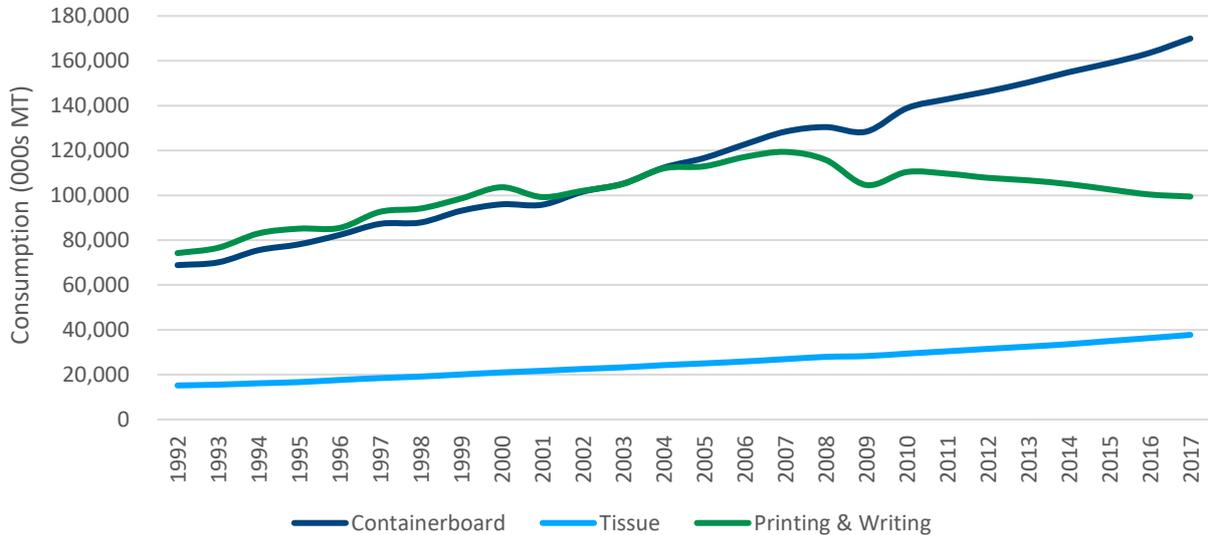


Source: RISI; TIG Analysis

Market pulp demand is driven by demand for end-products including paper, board, and tissue (Figure 4). While paper demand has been declining in developed regions such as North America and Western Europe leading

to lower pulp consumption, it continues to grow in Asia (a larger pulp consuming region than either North America or Western Europe), Latin America, and Eastern Europe. Moreover, containerboard and tissue continue to grow globally due to rising GDP, improving industrial production, increased e-commerce activity, growing populations, urbanization, and home delivery of consumer goods (for more details on end-market demand, please refer to our [Timber End-Markets and the Digital Economy](#) report published on June 25, 2018).

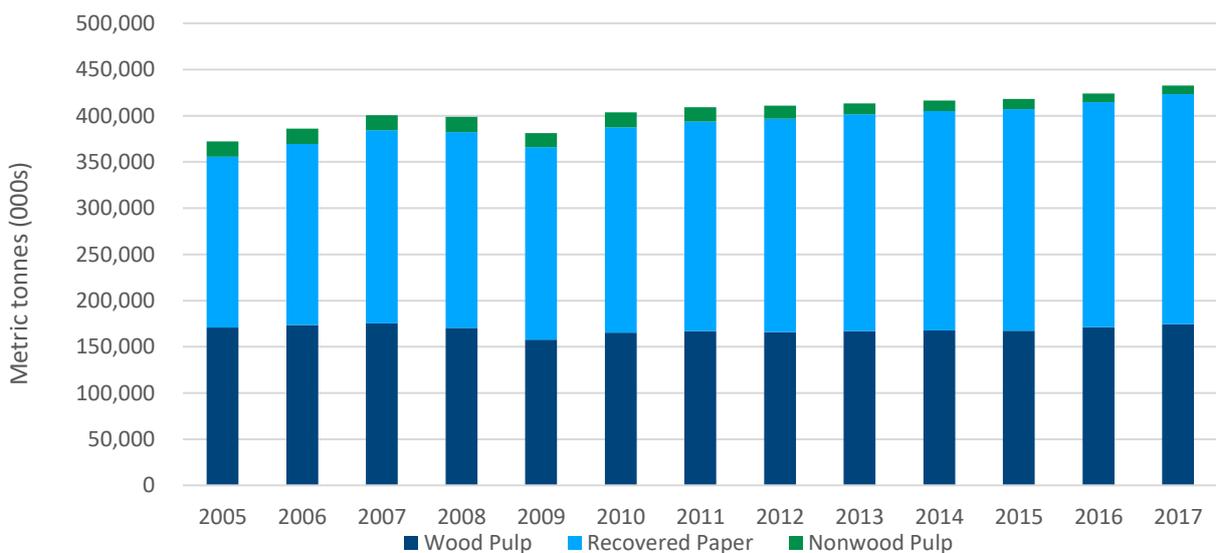
**Figure 4: Global End-Market Demand Breakdown**



Source: RISI; TIG Analysis

Certain products, such as containerboard that handles agricultural products, require the use of wood pulp given its durability. Moreover, some end-products use recycled pulp, which can only be reused 5-7x before it breaks down and becomes unusable. As such, wood pulp is still used in products even when recycled pulp is the dominant material (Figure 5).

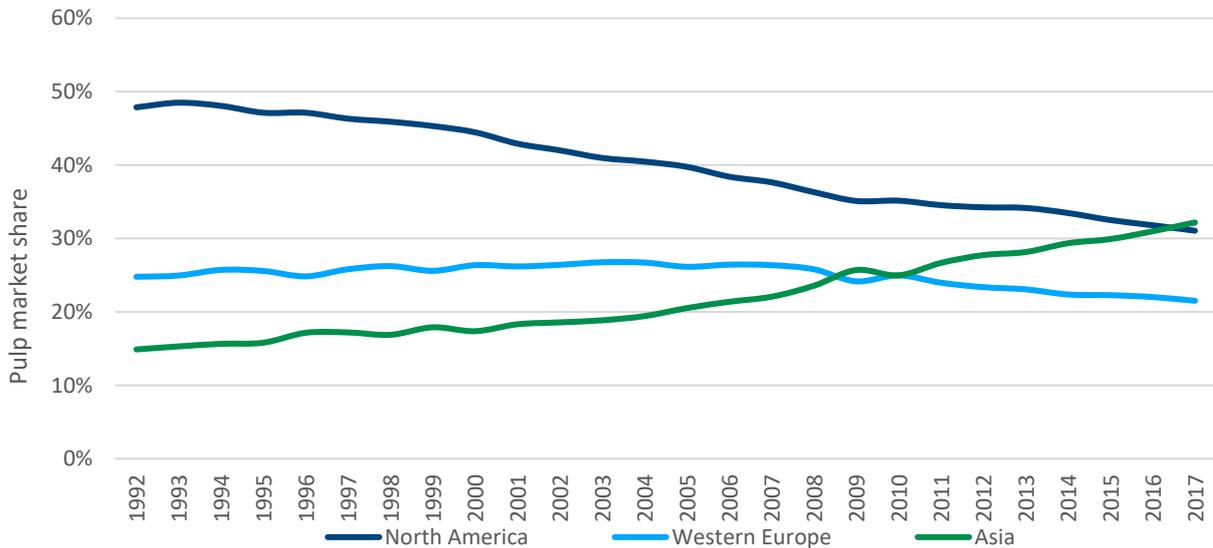
**Figure 5: Wood Pulp Consumption a Material Part of Total Fiber Consumption**



Source: RISI; TIG Analysis

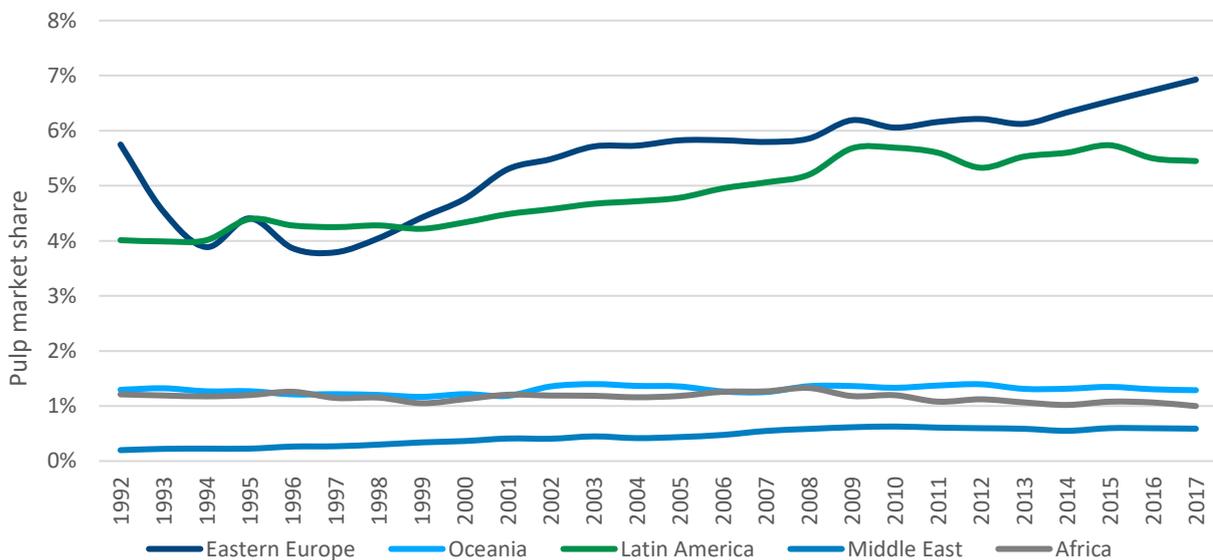
Until the early 2000s, Western Europe and North America had been the largest pulp consuming regions. However, while they remain sizeable market pulp consuming markets, they have experienced declines in market pulp demand driven by declining paper demand (Figure 6). Meanwhile, other regions - Asia, Eastern Europe, and Latin America - have experienced market pulp growth (Figure 7).

**Figure 6: Market Pulp Demand: North America, Western Europe & Asia**



Source: RISI; TIG Analysis

**Figure 7: Market Pulp Demand: Eastern Europe, Oceania, Latin America, Middle East & Africa**



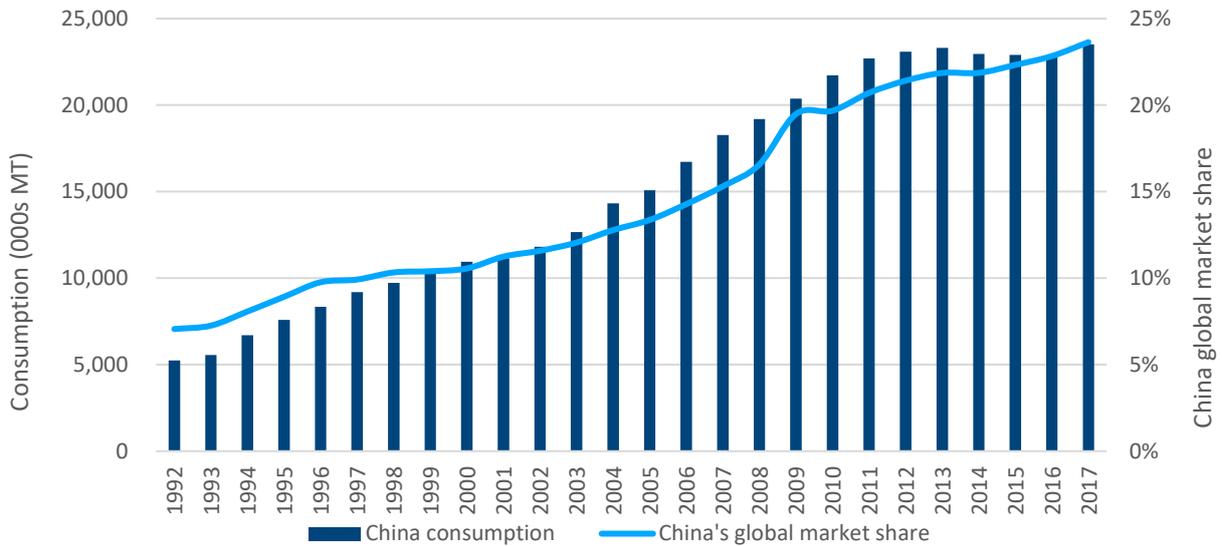
Source: RISI; TIG Analysis

### The Emergence of China

Over the last 25 years, China has emerged as an important driver of global pulp market demand given the country’s rapid industrialization, and currently accounts for roughly 19% of global pulp consumption. In the early 1990s, China accounted for around 7% of global printing and writing consumption, around 7% of global packaging paper and board consumption, and around 7% of global tissue consumption (Figures 8, 9, and 10). In 2017, these

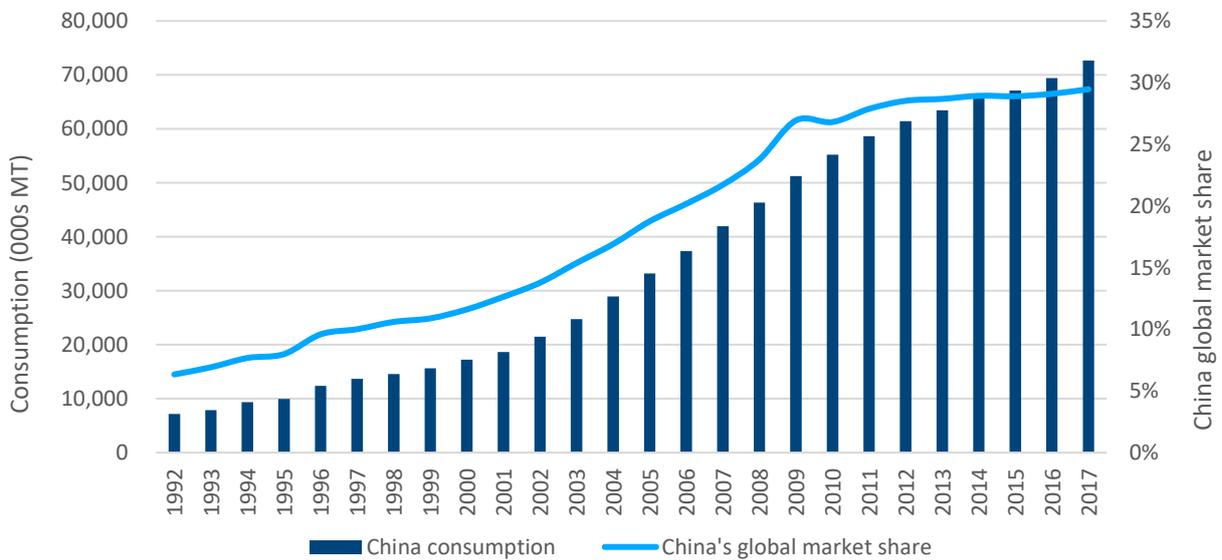
same consumption metrics were around 24%, 30%, and 22%, respectively. Specifically, Chinese hardwood market pulp demand has grown to 16.6 million MT from around 400,000 MT (16.0% CAGR) due to growth in the country's paper and tissue industries. That said, most of China's packaging industry uses old corrugated cartons ("OCC"), which is why Chinese consumption of softwood market pulp has grown at a more moderate pace to 8.3 million MT from around 740,000 MT (10.2% CAGR).

**Figure 8: Printing & Writing Demand Growth in China**



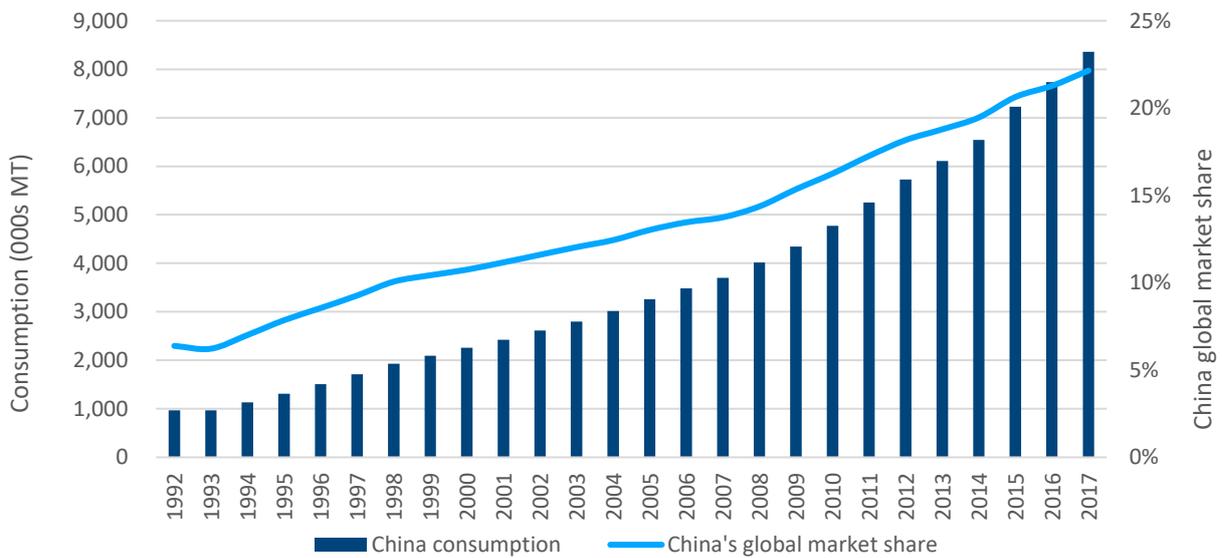
Source: RISI; TIG Analysis

**Figure 9: Packaging Paper & Board Demand Growth in China**



Source: RISI; TIG Analysis

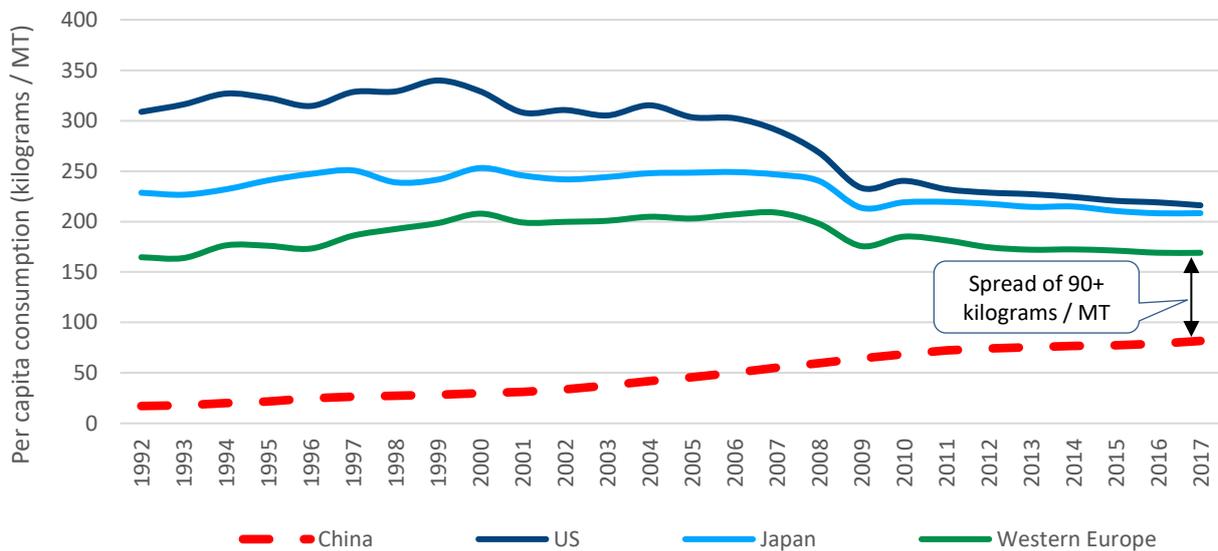
**Figure 10: Tissue Demand Growth in China**



Source: RISI; TIG Analysis

Importantly, total Chinese per capita paper consumption (of paper, board, and tissue) of 82 kilograms remains well below that of its peers, with the US at 217 kilograms and Japan at 208 kilograms (Figure 11). Moreover, Chinese tissue production has been growing at a CAGR of 9.3% since the early 1990s, but only comprises 8.0% of total Chinese paper and board production.

**Figure 11: Per Capita Paper, Board & Tissue Consumption in China versus Other Regions**

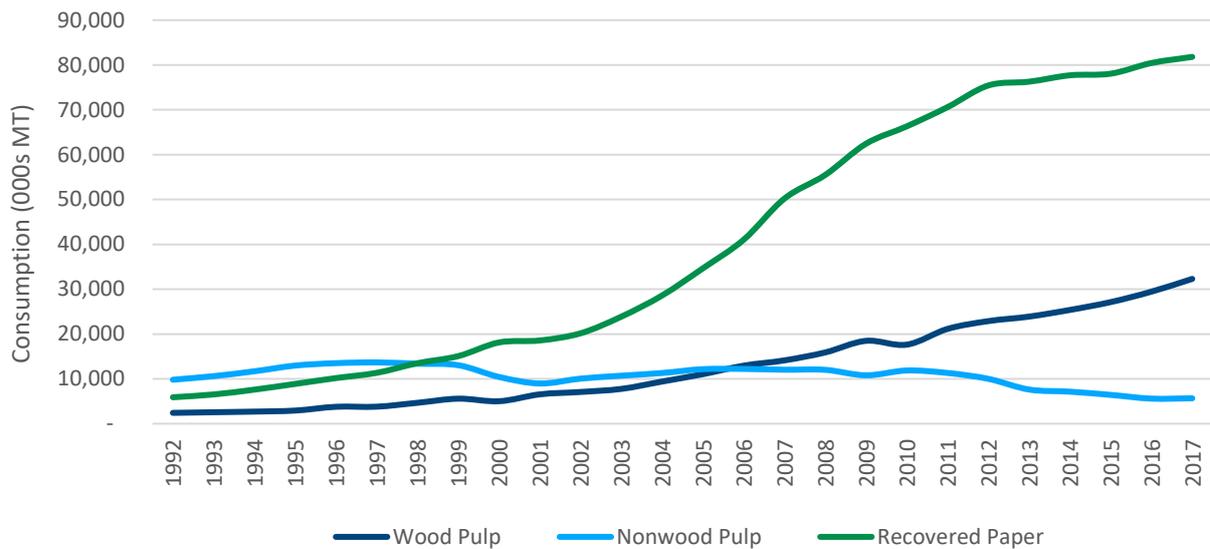


Source: RISI; World Bank; TIG Analysis

Aside from end-market growth, Chinese market pulp demand has increased as the Chinese government has focused on improving the environment by closing smaller, less productive paper mills, which use inputs such as straw and bamboo, and encouraging the development of larger, more efficient paper mills, which utilize market pulp (Figure 12). Since 2010, the Chinese government has closed at least 40 million MT of older paper and board capacity.

As part of its environmental focus, China also banned mixed paper use (effective July 2017), instituted a 0.5% contaminant rule on all imported recovered paper (effective March 2018), and restricted the number of recovered paper import permits, all of which has encouraged pulp imports. Meanwhile, China has restricted the amount of domestic poplar and eucalyptus plantations that can be harvested, effectively limiting domestic pulp production. Further, eucalyptus plantations where harvesting is permitted are primarily used to produce core veneer for plywood. In conjunction with slower Chinese timber growth rates due to poor soil fertility and management, this has further spurred Chinese market pulp purchases and increased overall market pulp demand.

**Figure 12: Chinese Fiber Consumption Breakdown**



Source: RISI; TIG Analysis

In late 2018, global pulp demand slowed largely due to moderating Chinese pulp demand given slower economic growth, trade issues given US tariffs, and elevated pulp inventories at Chinese ports. In 2018, China’s real GDP grew 6.6% year-over-year, the slowest rate of growth since 1990. This weaker growth was partially driven by a slowing industrial sector, which in turn led to excess paper and board supply and slowing pulp demand. Further, China received significant volumes of imported pulp in November, which discouraged additional pulp purchases. Moreover, in response to US tariffs, China imposed a 5% tariff on imports of US virgin pulp (10% on US recycled pulp), further eroding demand for pulp.<sup>1</sup>

In early 2019, concerns began to fade, particularly due to declining pulp inventories and given signs of a breakthrough in US / China trade negotiations as evidenced by the US indicating its desire not to further increase tariffs effective on March 1, 2019. Post Chinese New Year in mid-February, there have been indications of increased Chinese pulp buying, particularly as pulp producers, mainly in Brazil, have purposefully stopped selling pulp to Asia in order to help lower inventories and maintain pulp pricing.

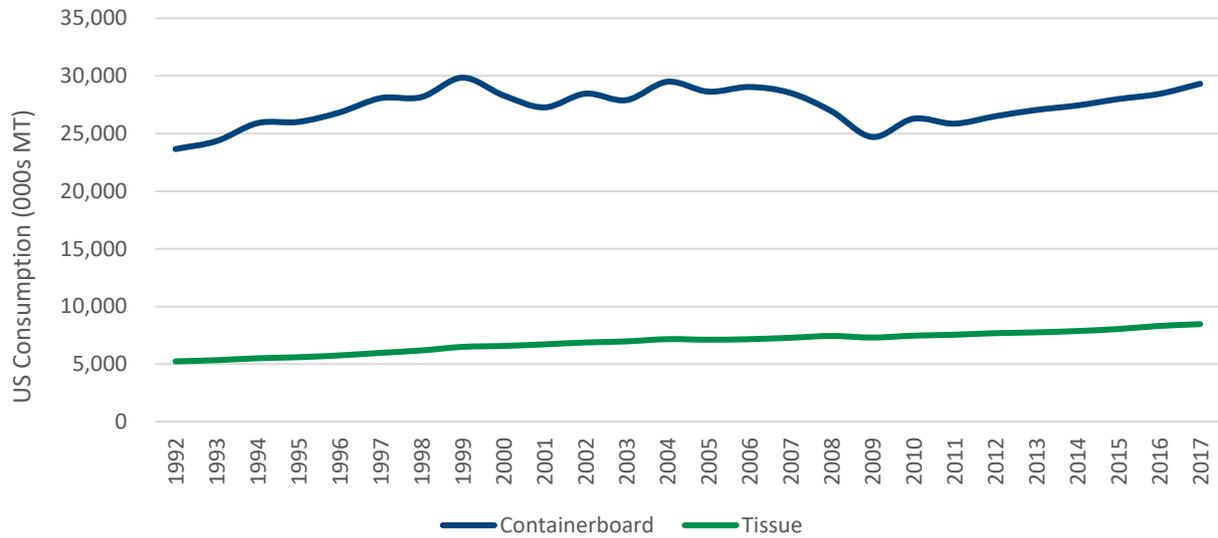
### US & Europe

In addition to Chinese market pulp demand, global market pulp demand is also driven by growth in board and tissue demand in the US and Europe (Figures 13 and 14). Containerboard growth is driven by an increase in industrial production of non-durable goods (in particular, protein and agriculture markets), shifting consumer preferences to more fresh food, which requires greater shipments in boxes from the field to the store, and strong

<sup>1</sup> RISI; TIG Analysis

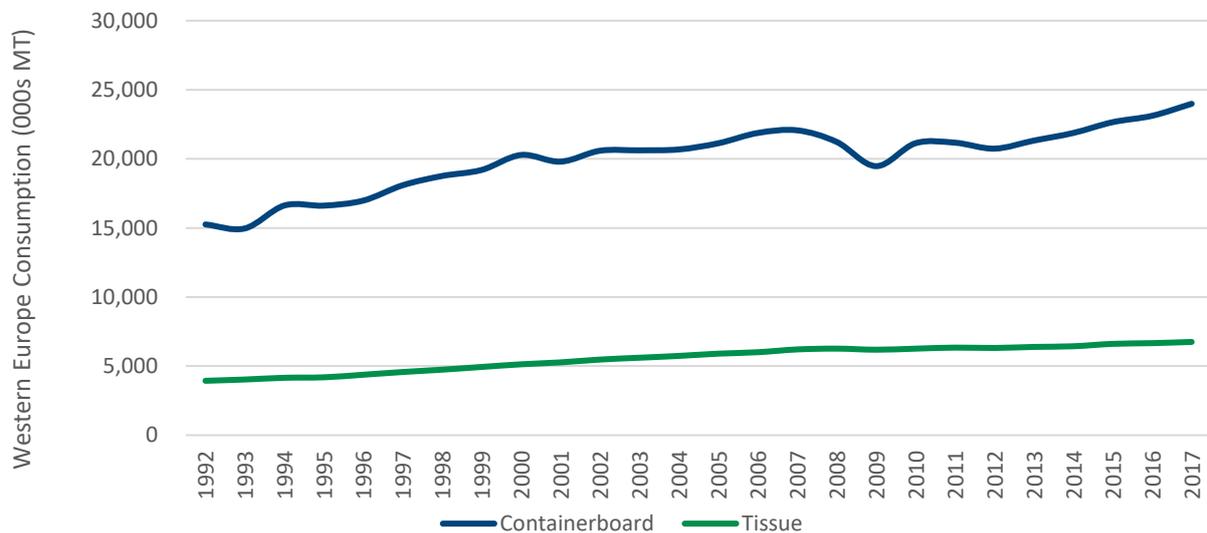
growth in e-commerce. Tissue, which has a variety of applications including facial, bath, and toilet tissue, paper towels, and napkins, has been growing due to population growth, rising employment, and an improving macro environment.

**Figure 13: US Containerboard & Tissue Consumption**



Source: RISI; TIG Analysis

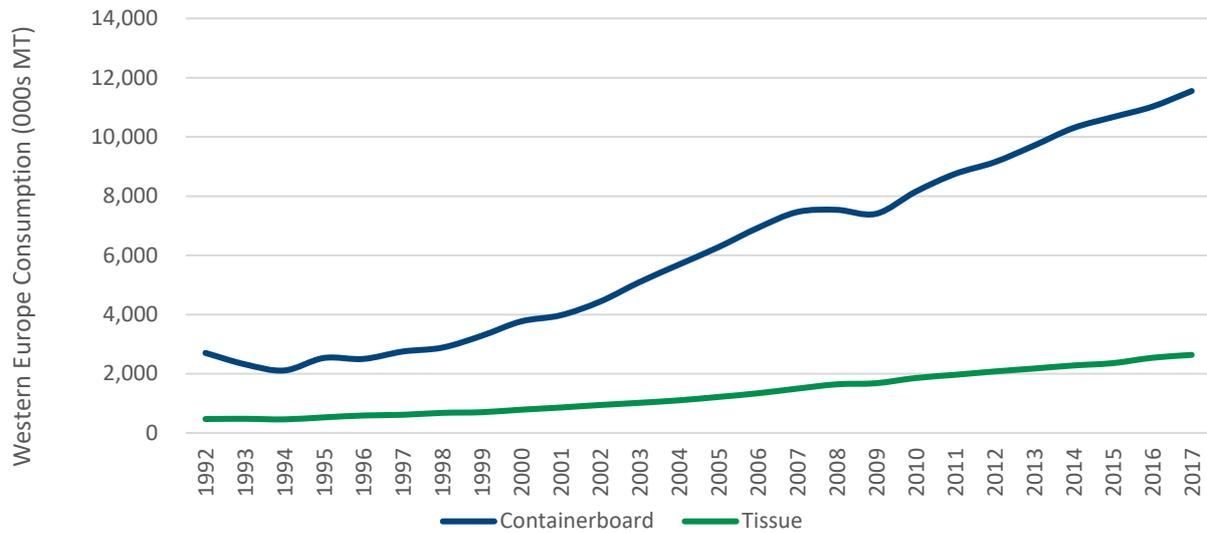
**Figure 14: Western Europe Containerboard & Tissue Consumption**



Source: RISI; TIG Analysis

Similar to China, Eastern Europe is growing at an accelerated pace as it continues to industrialize (Figure 15). However, Eastern Europe represents only a nominal amount of actual demand at present given its modest pace of industrialization.

**Figure 15: Eastern Europe Containerboard & Tissue Consumption**

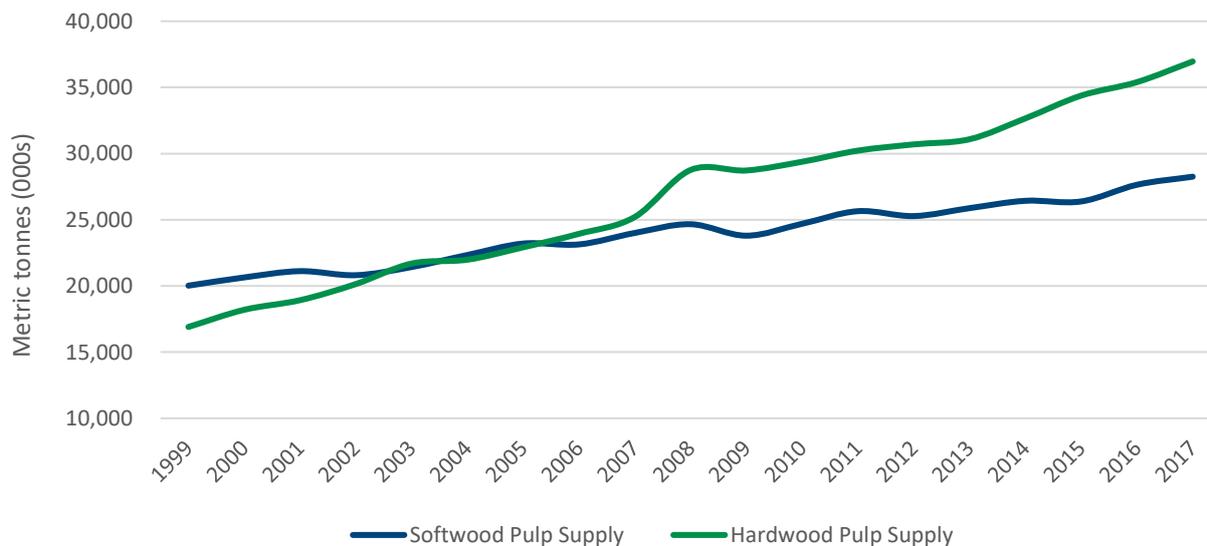


Source: RISI; TIG Analysis

## Pulp Supply

Overall, global market pulp supply amounts to around 73.1 million MT with softwood accounting for around 28.3 million MT and hardwood accounting for around 36.9 million MT. The remaining 7.9 million MT is comprised of sulfite, unbleached kraft, semichemical, and mechanical pulp. While softwood had historically been the dominant pulp category, growth of hardwood has been notable since 2006, causing it to overtake softwood pulp (Figure 16).

**Figure 16: Hardwood Market Pulp Supply versus Softwood Market Pulp Supply**

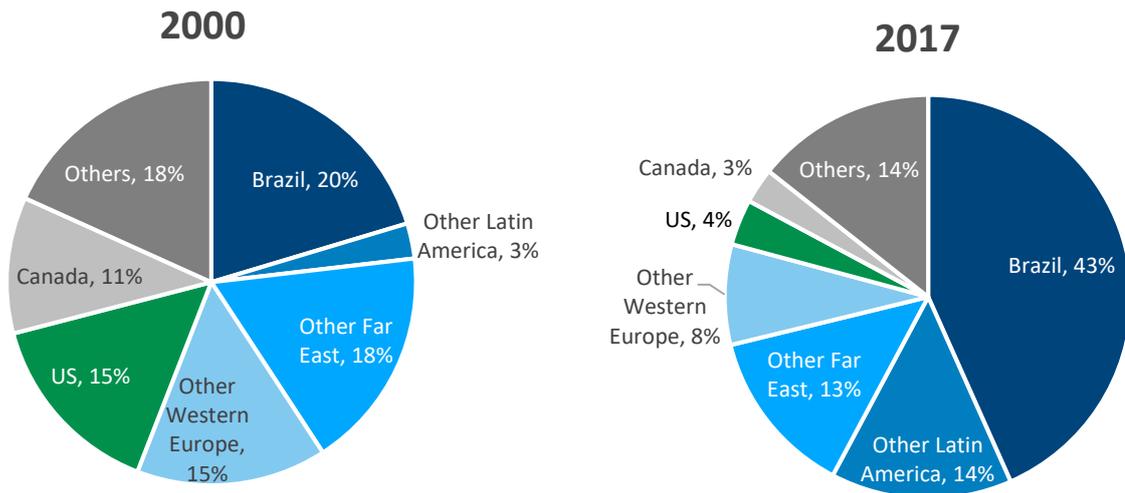


Source: RISI; TIG Analysis

Since 1999, aggregate market pulp supply has been growing at a 2.8% CAGR. Hardwood market pulp has been growing at a rate of 4.4% due to increasing Chinese demand while softwood market pulp has been growing at a rate of 1.9%. On a regional basis, 25.2% of global hardwood and softwood market pulp supply is based in

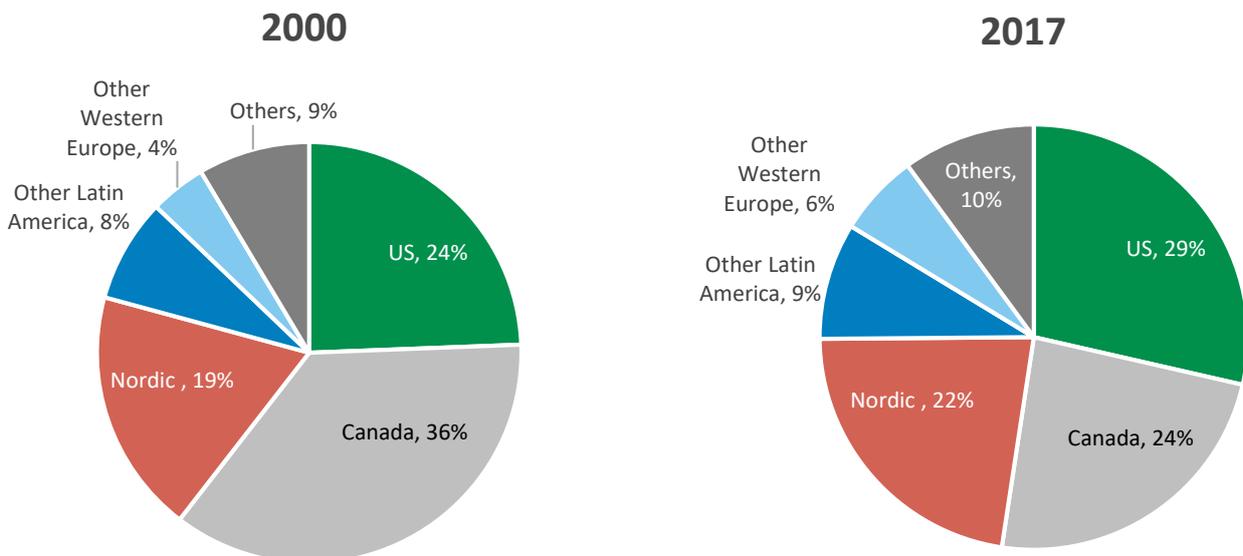
Brazil, 14.5% in the US, 12.0% in Other Latin America (e.g., Chile, Uruguay, etc.), and 11.9% in Canada. Brazil has emerged as the largest producing region of hardwood (eucalyptus) market pulp (Figure 17) while the US is the largest producing region of softwood market pulp (Figure 18). For context, in 2000, Brazil was only slightly bigger than the next hardwood market pulp producing region (Other Far East). Similarly, the US was a significantly smaller softwood market pulp producing region in 2000.

**Figure 17: Hardwood Market Pulp Supply by Region – 2000 & 2017**



Source: RISI; TIG Analysis

**Figure 18: Softwood Market Pulp Supply by Region**

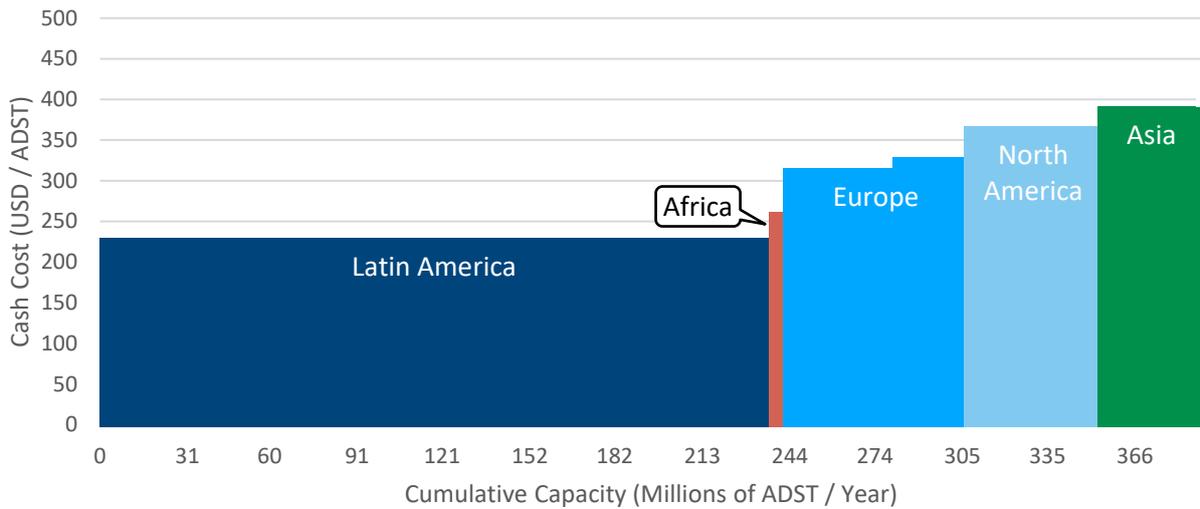


Source: RISI; TIG Analysis

### Cash Cost

Cash cost is a major factor influencing pulp supply, incentivizing or disincentivizing producers to continue production and / or proceed with new investments. Latin America is the lowest cash cost, and consequently the largest, hardwood pulp producing region at US\$ 209/MT due to low wood and energy costs (Figure 19). This is followed by Africa at US\$ 260/MT (low fiber, energy, and labor costs) and Europe at US\$ 332/MT (low energy costs).

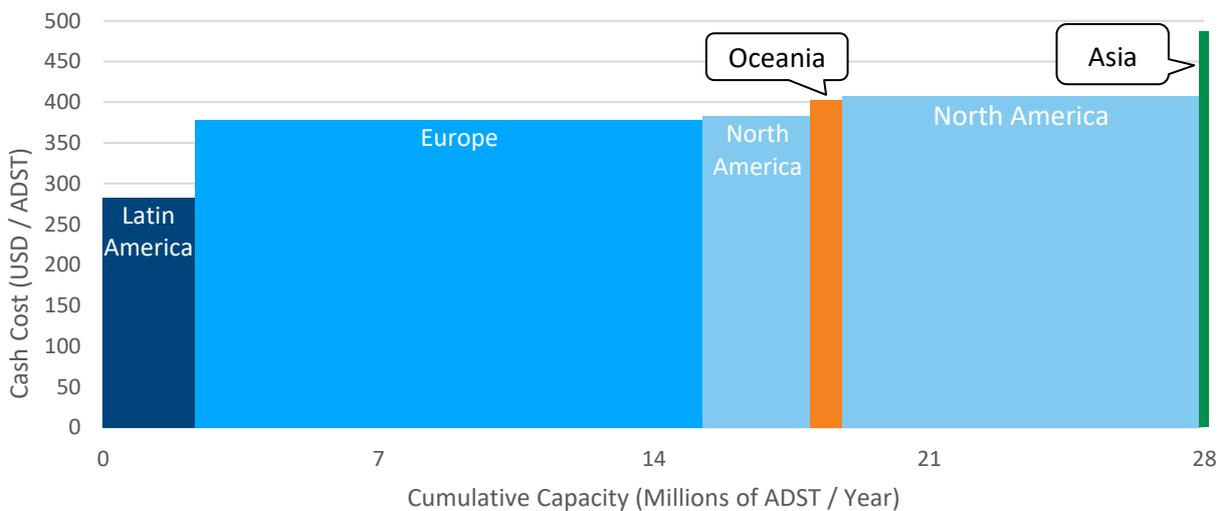
**Figure 19: Regional Hardwood Pulp Cash Cost**



Source: RISI; TIG Analysis

In softwood, Latin America is again the lowest cash cost producing region at US\$ 268/MT due to low fiber, energy, and labor costs (Figure 20). This is followed by Europe at US\$ 392/MT due to favorable energy costs.

**Figure 20: Regional Softwood Pulp Cash Cost**



Source: RISI; TIG Analysis

Cash cost also plays a role for importers of pulp like China. As China continues to develop its paper and board industries, the country will likely continue to focus on importing market pulp from regions with lower cash costs such as Latin America. Hardwood pulp cash costs average around US\$ 380/MT in China versus US\$ 209/MT in Latin America.

### Market Consolidation

Due to a variety of factors including a desire by market pulp producers to exhibit supply discipline, create additional scale and pricing power, and improve operational efficiency, there has been an increase in mergers and acquisitions activity in the industry. In 2018, Suzano (#5 global producer of paper grade market pulp and #2 global producer of hardwood market pulp) and Fibria (#1 global producer of paper grade market pulp and #1 global producer of hardwood market pulp) merged to create a global market pulp producer with a leading global market share in hardwood market pulp (around 11 million MT or close to 30% of total hardwood market pulp capacity of 36.9 million MT).

There has also been a desire on the part of Asian pulp / paper / board producers to acquire pulp mills to gain additional scale in pulp and/or to expand downstream. Paper Excellence, one of the largest global producers of pulp, which is owned by the Widjaja family and is a sister company to Asia Pulp & Paper, acquired a 49% stake in the Eldorado mill (capacity of 1.7 million MT) in Mato Grosso do Sul, Brazil from J&F Investments in 2018. APRIL, the fourth-largest global hardwood market pulp producer (#6 global producer of paper grade pulp) and a significant producer of uncoated freesheet paper and virgin cartonboard with operations in Indonesia and China, acquired the Lwarcel mill (capacity of 250,000 MT) in São Paulo, Brazil from the controlling Trecenti family.

### Net Future Supply Growth

Over the next several years, global market pulp supply is expected to grow, particularly as market pulp demand continues to expand. Based on company announcements, hardwood market pulp capacity is expected to increase around 7.5 million MT by 2023, a 20.2% increase versus today's supply of 36.9 million MT, with most of that increase likely to come from South America cementing that region as the leading global hardwood market pulp producing region (Figure 21). There are also close to 4 million MT of softwood market pulp expected to begin production by 2022, a 13.4% increase versus today's supply of 28.3 million MT.

**Figure 21: Market Pulp Capacity Expansions ('000s MT)**

Companies	Country	Start-up date	Hardwood	Softwood
Sveza (1.3 million MT hardwood and softwood ,ill; assumes 50/50 split)	Russia	2020	650	650
Arauco - MAPA	Chile	2021	1,560	-
UPM - Paso de los Toros	Uruguay	2021	2,000	-
Fibria - Tres Lagoas III	Brazil	2021/2022	TBD	-
Lwarcel - Line II	Brazil	2022	1,250	-
Eldorado - New line	Brazil	2023	2,000	-
ILIM - Ust-Ilimsk	Russia	2021	-	130
Finnpulp - new mill	Finland	2022	-	1,200
Siberwood - new mill	Russia	2022	-	600
Boreal Bioref OY - new mill	Finland	2022	-	500
Paper Excellence - Prince Albert restart	Canada	TBD	-	300
KaiCell - new mill	Finland	TBD	-	400
<b>TOTAL</b>			<b>7,460</b>	<b>3,780</b>

Source: RISI; TIG Analysis

That said, there have been a number of market pulp capacity closures over the prior two years with around 595,000 MT of hardwood market pulp supply and 345,000 MT of softwood market pulp supply closing due to conversions to tissue, conversions to dissolving pulp, and paper machine closures. In 2019, there could be around 645,000 MT of hardwood market pulp supply closures and 1.09 million MT of softwood market pulp supply closures due to grade conversions and paper machine closures (Figure 22). Relative to these total hardwood and softwood market pulp closures, there is still a net 6.2 million MT of hardwood market pulp capacity and 2.3 million MT of softwood market pulp capacity expected to begin production by 2023.

**Figure 22: Market Pulp Capacity Closures ('000s MT)**

Companies	Country	Closure / Conversion year	Hardwood	Softwood	Rationale
Resolute (Calhoun)	US	2017	(40)		Converted into tissue
Asia Symbol (Rizhao)	China	2017	(80)		Converted into dissolving pulp
Suzano (Mucuri)	Brazil	2017	(60)		Integrated line into tissue
Suzano (Imperatriz)	Brazil	2017	(60)		Integrated line into tissue
Asia Symbol (Rizhao)	China	2018	(90)		Converted into dissolving pulp
Sishui Huajin	China	2018	(70)		Closure
Domtar (Plymouth)	US	2018		(80)	Closing small line
Georgia-Pacific (Camas)	US	2018		(200)	Closing paper machine
Georgia-Pacific (Camas)	US	2018	(135)		Closing paper machine
Oji (Tasman)	New Zealand	2018		(65)	Grade switch
Navigator (Fábrica de Cacia)	Portugal	2018	(60)		Integrated line into tissue
Asia Symbol (Rizhao)	China	2019	(60)		Converting into dissolving pulp
Yueyang Forest & Paper	China	2019	(40)		Closing older line
Chenming (Shouguang)	China	2019	(155)		Closure
Oji (Tasman)	New Zealand	2019		(60)	Grade switch
BillerudKorsnäs	Sweden	2019		(130)	Integration into paperboard machine
Georgia-Pacific (Port Hudson)	US	2019		(230)	Closing paper machines
Georgia-Pacific (Port Hudson)	US	2019	(390)		Closing paper machines
Arauco	Chile	2019		(350)	Grade switch
Stora Enso (Enocell)	Finland	2019		(320)	Converting into dissolving pulp
<b>TOTAL</b>			<b>- 1,240</b>	<b>- 1,435</b>	

Source: RISI; TIG Analysis

## Implications for Timber

The growth in market pulp supply is likely to bode well for timber demand, particularly for smaller diameter logs such as pulpwood. Given green wood to pulp conversion factors, a new Brazilian hardwood market pulp mill with production capacity of around 2 million MT would require roughly 6-8 million MT of wood equating to roughly 150,000-200,000 hectares of planted area.<sup>2</sup> Meanwhile, a new Brazilian softwood market pulp mill with production capacity of around 500,000 MT would require roughly around 1.5 million MT of wood equating to roughly 45,000-50,000 hectares of planted area.<sup>3</sup>

## Pulp Inventories

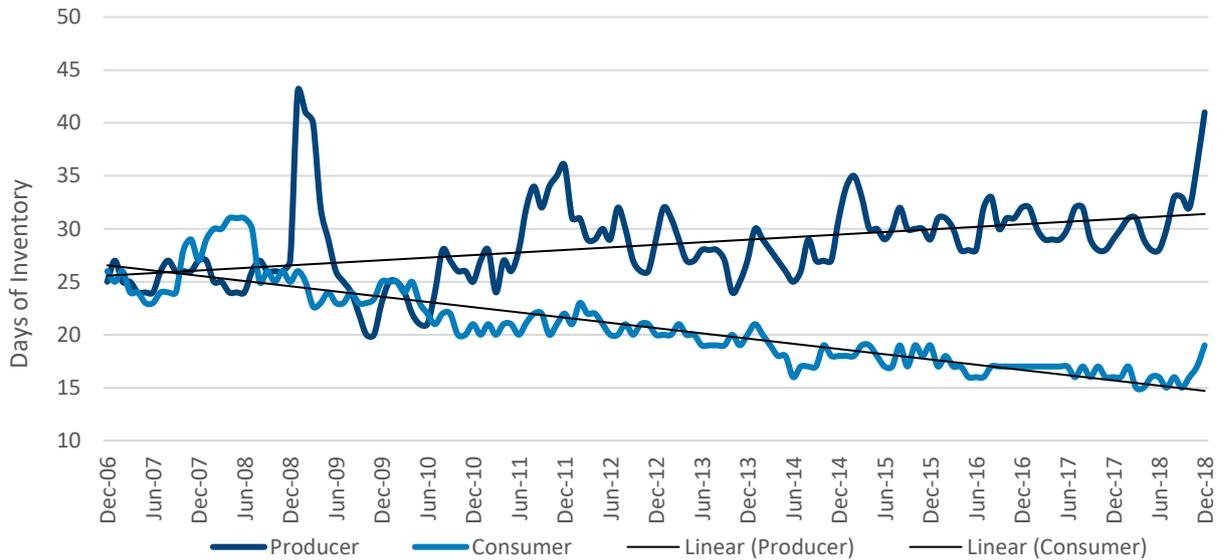
An important factor affecting both market pulp demand and supply is pulp inventories. If inventories are elevated, this could discourage buyers from purchasing additional market pulp. Similarly, elevated inventories could encourage producers to take downtime and stop producing market pulp in order to help work through any

<sup>2</sup> The analysis assumes a new 2 million MT hardwood market pulp mill in Brazil, a 7-year cycle, and mean annual increment of 40

<sup>3</sup> The analysis assumes a new 500,000 MT softwood market pulp mill in Brazil, a clear-cut in year 14, and mean annual increment of 32. In Brazil, most softwood mills are smaller, integrated, and utilize a mix of eucalyptus and OCC. Assumes that all areas will be planted under pulpwood regimes.

excess pulp supplies. In aggregate, softwood pulp producers’ inventories spiked during the Great Recession due to slower pulp demand, notably declined post-Great Recession, and have increased again in the years since. Meanwhile, softwood pulp consumers’ inventories have been on a downward trajectory as customers remain focused on lean inventories (Figure 23).

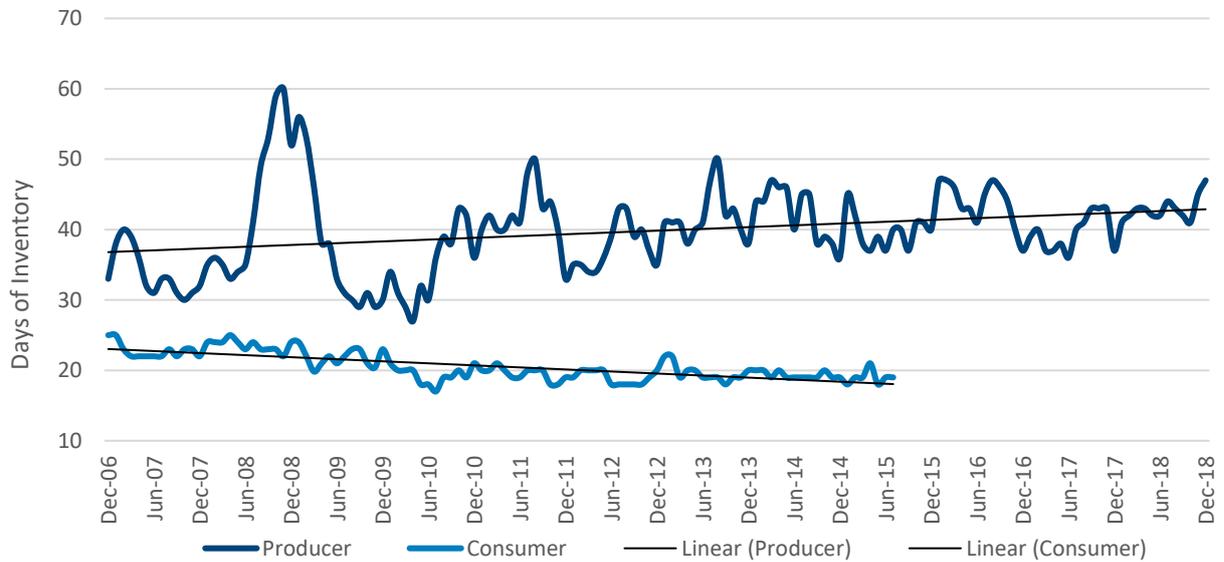
**Figure 23: Softwood Pulp Producer and Consumer Inventories**



Source: Pulp & Paper Products Council; Utipulp; TIG Analysis

Meanwhile, hardwood pulp producers’ inventories have followed a similar trend to softwood, increasing during the Great Recession, declining immediately afterwards, and then increasing again (Figure 24). That said, hardwood pulp consumers’ inventories generally have been lean over time with consumers actively managing inventory levels (unfortunately, data regarding hardwood pulp consumer inventories was discontinued in mid-2015 given a reluctance by producers to disclose data).

**Figure 24: Hardwood Pulp Producer and Consumer Inventories<sup>4</sup>**



Source: Pulp & Paper Products Council; Utipulp; TIG Analysis

## Conclusion

The global pulp market is one of the largest drivers of global timber demand, especially for smaller diameter logs, representing around 10.5% of global industrial roundwood production. Since 1999, global market pulp demand has increased at a CAGR of 2.5% due to growing end-markets including packaging and tissue and restrictive Chinese environmental regulations (which has encouraged pulp demand by limiting non-wood fiber consumption) while global market pulp supply has increased at a CAGR of 2.8% to meet this demand growth. Hardwood pulp has gained market share against softwood pulp given emerging market growth, particularly in China and, as timberland owners, mainly in Brazil, have increasingly planted lower cost, fast-growing, and high-yielding eucalyptus plantations. Given favorable long-term market dynamics in hardwood pulp, combined with anticipated pulp capacity expansions in South America and pulp market consolidation, there could be opportunities for investors to strategically invest in timberland in South America.

<sup>4</sup> Consumer hardwood inventories stopped being tracked in mid-2015 given a reluctance by producers to disclose data

## Glossary<sup>5</sup>

1) Sulfite pulp – Wood pulp produced using an acid chemical process in which the cooking liquor contains excess sulfur dioxide. The sulfite liquor is a combination of a soluble (such as ammonium, calcium, sodium, or magnesium) and sulfurous acid. Sulfite pulp is used to make shipping containers, paper bags, printing and writing papers, and other products requiring strength.

2) Unbleached kraft pulp – Wood pulp not treated with any bleaching chemicals. Unbleached kraft pulp is used to produce grocery bags, cement bags, and specialty paper.

3) Semichemical pulp – Wood pulp produced utilizing a combination of chemical and mechanical means. This type of pulp is used to produce corrugated medium, the wavy, inner layer of corrugated combined board.

4) Mechanical pulp – Wood pulp manufactured using a mechanical process, including stone-ground wood, chemigroundwood and chip mechanical pulp. Mechanical pulp is used in newsprint, specialty papers, tissue, toweling, paperboard, and wallboard.

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<sup>5</sup> American Forest & Paper Association (<https://afandpa.org/our-products/paper/paper-products-glossary>)

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