TIMBERLAND INVESTMENT RESOURCES LLC

Growing value for our clients every day

How Much Exposure
Do You Have to China?

Chung Hong Fu, *Managing Director, Economic Research and Analysis*

April 2020

Executive Summary

As China has ascended to become the world's second largest economy, it also has become the world's leading consumer of timber and wood products. Chinese imports of softwood logs, for instance, increased from 4.8 billion cubic meters to 42 billion cubic meters in 20 years through 2019 (Figure 3). This represented an eight-fold increase from 1999. Today, nearly half of the logs shipped globally are destined for China. Beyond logs, China also is a leading importer of lumber, wood chips and pulp.

It is important for timberland investors to understand the level of exposure a timberland region has to China's wood markets because when those markets shift, it can create undue volatility within one's portfolio.

To assess the manner in which wood markets are linked with, and impacted by, China's economy, we (a) analyzed year-over-year changes in timber prices from a broad range of global markets and (b) calculated how well they each correlated with China's wood market over both 10-year and five-year periods. This analysis showed that more than half of the world's wood producing regions have had strong correlations of greater than 0.60. This included areas favored by timberland investors, such as New Zealand, Australia and Brazil. The major takeaway is that investors can easily build globally diversified timberland portfolios while inadvertently assuming heavy exposure to China.

When building a portfolio of timberland assets, TIR recommends analyzing its current or intended composition to determine the overall level of exposure it is producing, or will produce, to China's wood consumption markets. If the average correlation with those markets is high (say >0.60), the portfolio's geographic allocation may require attention because its risk exposure may be greater than an investor's risk tolerance. This kind of dislocation can be addressed by adding forest investments to one's portfolio in markets that have lower correlations with China's wood markets so as to create better balance.

Image 1. China is a major consumer of exported logs, like these, which are being transported by cargo ship.

Introduction

The virtues of diversification have been sung consistently across all classes of real assets, including timberland, since the investment world first embraced the concepts of Harry Markowitz's Modern Portfolio Theory and investing along the "Efficient Frontier."

Investors have long known that a pool of forest investments ideally should be diversified across geographies, species, products, and tree maturities to reduce a timberland portfolio's risk exposure. While that rule is as relevant today as it was when the timberland asset class first emerged as an investment option three decades ago, there is an added wrinkle that investors must consider – the outsized impact to China's wood markets can have on the performance of one's portfolio.

Within the past decade, China has come to dominate the global trade of wood and wood products. The "Middle Kingdom" is now a leading global consumer of logs and lumber. It is also a key producer of pulp and paper, wood panels, and furniture. The "China Factor" must be understood when building a properly diversified portfolio of timberland assets because of its capacity to introduce volatility. In this white paper we investigate and quantify the influence China's appetite for timber and wood products can have on global timber markets. By understanding this dynamic, investors can make more informed decisions about how to strike the right balance between risk and return within their timberland portfolios.

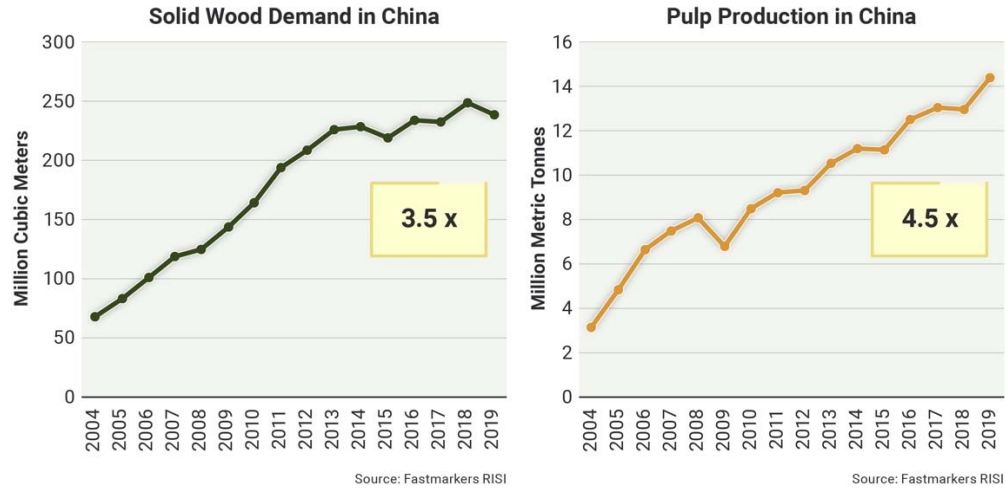# China's Growing Role in Global Wood Trade

As China has ascended to become the world's second largest economy, it also has become the world's leading consumer of timber and wood products. Chinese demand for lumber and wood panels, for instance, has increased by 350 percent since 2004 (Figure 1) – reaching 239 million cubic meters in 2019. For the sake of comparison, the United States, the world's largest economy, and the second largest user of wood products, consumed 114 million cubic meters in 2019 – or half of China's volume. In the same manner, global pulp demand has increased four-fold over the last 15 years (Figure 2) as China's need for paper, packaging and tissue products has grown in relation to rising average incomes of its population. However, China's levels of demand for lumber and pulp have outpaced the capacity of its own forest resources to provide adequate supplies.

During China's post-World War II period of economic development, much of the nation's arable land was converted to agriculture to feed its growing population, which currently stands at approximately 1.3 billion. After decades of deforestation, the Chinese government also has instituted a ban on further harvesting within its remaining native forests.

Consequently, China must meet its growing wood deficit through imports. In fact, half of its wood requirements are supplied by imports from elsewhere in the world.

Figure 1 and 2.
Source: Fastmarkets RISI

Solid Wood Demand in China
3.5 x
Source: Fastmarkers RISI

Pulp Production in China
4.5 x
Source: Fastmarkers RISI

Chinese imports of softwood logs, for example, rose from 4.8 billion cubic meters to 42 billion cubic meters in 20 years through 2019 (Figure 3), an eight-fold increase. Today, close to half of the logs shipped globally are destined for China. More than just logs, China also is a leading importer of lumber, wood chips and pulp.

Figure 3.
Sources: Fastmarkets RISI, Wood Resource Quarterly

Softwood Sawlog Imports into China
Sources: Fastmarkets RISI, Wood Resource Quarterly
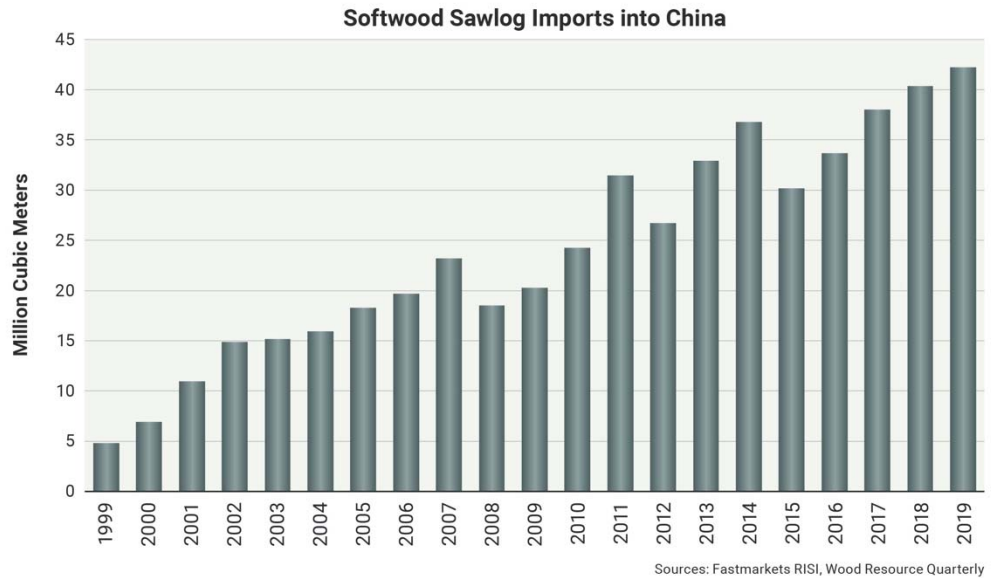
Outlook is for Slower Growth, but Sustained Gains.

Following a rapid expansion in its rate of wood imports during the last several years, China is expected to shift to a slower pace of growth in the future. Economists believe its economy will grow at a rate that is closer to 4-to-6 percent in the coming decade – before it eventually converges with the growth rates of other, fully-developed Asian nations, including Japan, Singapore and South Korea. However, this slower rate of growth is unlikely to reverse China's voracious appetite for timber. While its economy may not continue to expand at a double-digit rate, the average household income in China is expected to continue rising as more and more Chinese citizens enter the middle-class. This paradigm will, in turn, propel demand for even more wood products by China in the years to come.

On the trade side, China's heavy investment in the "One Road One Belt" initiative will facilitate greater levels of trade across rail and sea routes. The strategy is an initiative of Chinese President Xi Jinping. It is meant to promote economic development and commercial trade by improving connectivity and cooperation among 78 countries spread across the continents of Asia, Africa, and Europe. It is expected to make the cost of shipping logs, lumber, pulp and wood chips to China from all parts of the world faster and more efficient. Its successful implementation will mean that China will continue to be the "800-pound gorilla" of global wood markets in the future.

Reliance on China Varies by Country

While China certainly plays a major role in the global wood trade today, how the "One Road One Belt" initiative could affect the global market for timber could vary greatly from one country to another. For instance, New Zealand exported 22.5 million cubic feet of softwood logs in 2019 – and 80 percent of this total, or 18 million cubic meters, went to China. Since half of New Zealand's timber harvest is exported in the form of whole logs, this meant that two out of every five radiata pine logs produced in New Zealand eventually landed at a Chinese port. By comparison, the United States – the world's largest timber producer – exported 3.0 million cubic meters of softwood logs to China in 2019. That represented just two percent of the 142 million cubic meters of softwood saw logs that the United States produced in 2019 – or one in 50 logs. It should be noted, however, that certain regions of the United States are more dependent on the China export market than are others. In particular, the coastal areas of the U.S. Pacific Northwest (i.e., Oregon and Washington west of the Cascades) export as much as one quarter of their harvest to China – either as whole logs or lumber products.

For a timberland investor, it is important to understand the level of exposure a timberland region has to China's wood markets because when Chinese markets shift it can create undue volatility within a portfolio. A case in point is the outbreak of the

COVID-19 coronavirus, which emerged from the Chinese city of Wuhan in late 2019. When large parts of the Chinese economy shut down in early 2020 because of the pandemic, radiata pine logs produced in New Zealand were stranded at its ports, unable to ship to China. In addition, Australia saw its exports of hardwood and softwood chips evaporate. The same was true of pulp exports from Brazil. If an investor held a portfolio of forest investments that consisted of holdings in these three countries, its whole performance would have been undermined by China's coronavirus-induced shutdown. Despite being well diversified across three countries that served three different end-use wood markets, such a portfolio would have experienced excessive volatility because its revenue-generation profile reflected a very high level of exposure to China's overall level of wood consumption.

The diagram below maps the trade flows of wood products that serve China (Figure 4). Although the illustration is not fully inclusive, as many countries that supply China's wood needs are not displayed, it still provides useful insight on the reach and depth of China's wood-focused trade links.

Figure 4. Highlights of China's significant wood imports from various countries.

Where China Gets Its Wood

Evaluating the Market Interdependence with China

One simple way to measure how global wood-producing markets are affected by demand from China is to compare statistical correlations by country. If a country's timber prices move in tandem with those of China, then they have a high correlation value. A perfect correction value would be 1.00. Therefore, a correlation of 0.50 would mean 50 percent of a given market's price movements could be explained by the movement of China's market. If, on the other hand, prices moved independently of each other, the correlation value between that country's wood production market and China's wood consumption market would be zero (0).   As one would surmise, a negative correlation value would mean that prices tend to move in opposite directions.

Methodology

To assess global wood market links to wood demand from China, TIR (a) took year-over-year changes in timber prices from a range of prominent wood markets across the world and (b) calculated their country-by-country correlations with China's wood market.   Not every country has publicly available pricing data, but we utilized prices as reported by RISI's *World Timber Price Quarterly* and WRI's *Wood Resource Quarterly*. Because China only emerged as a major wood consumer in the mid-2000s, we focused on the last 10 years and five years of timber price data. We chose year-over-year price changes to eliminate seasonal factors that could skew the results by showing more of a correlation than might have actually existed.
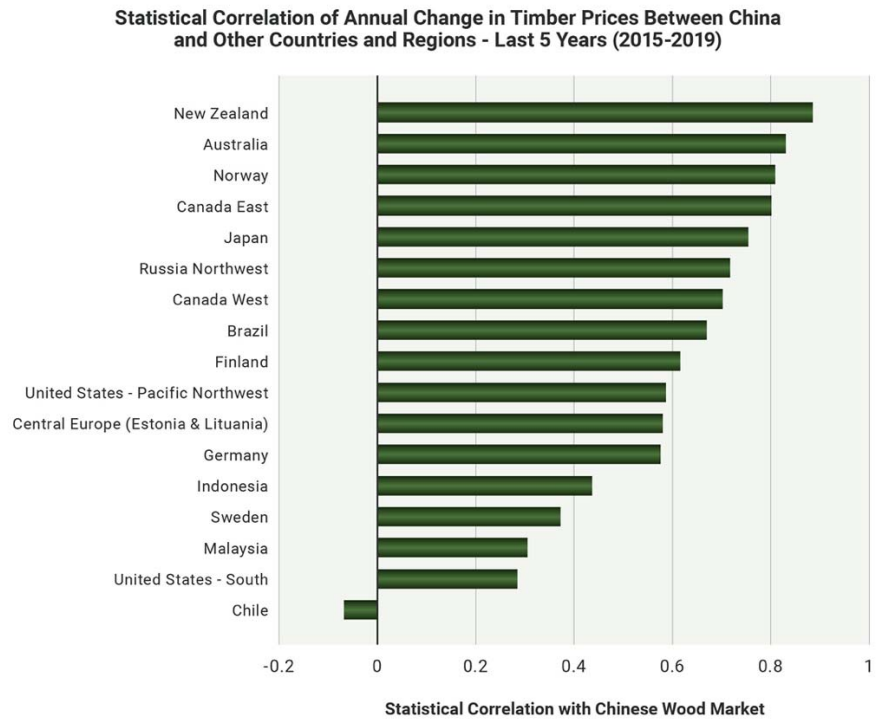
Results of Correlation Analysis

Using a sample of countries (and regions) from Europe, North America, Latin America and Asia, we ordered the correlation from high to low as shown in the tornado charts in Figures 5 and 6. The first chart represents price correlations over the 10-year period between 2010 and 2019. The second chart illustrates price correlations over the five-year period between 2015 and 2019.

Figure 5. The statistical correlation of year-over-year change in quarterly timber prices between China and other global wood markets over the 10-year period of 2010-2019. Sources: Wood Resource Quarterly, Fastmarkets RISI.

Statistical Correlation of Annual Change in Timber Prices Between China and Other Countries and Regions - Last 10 Years (2010-2019)
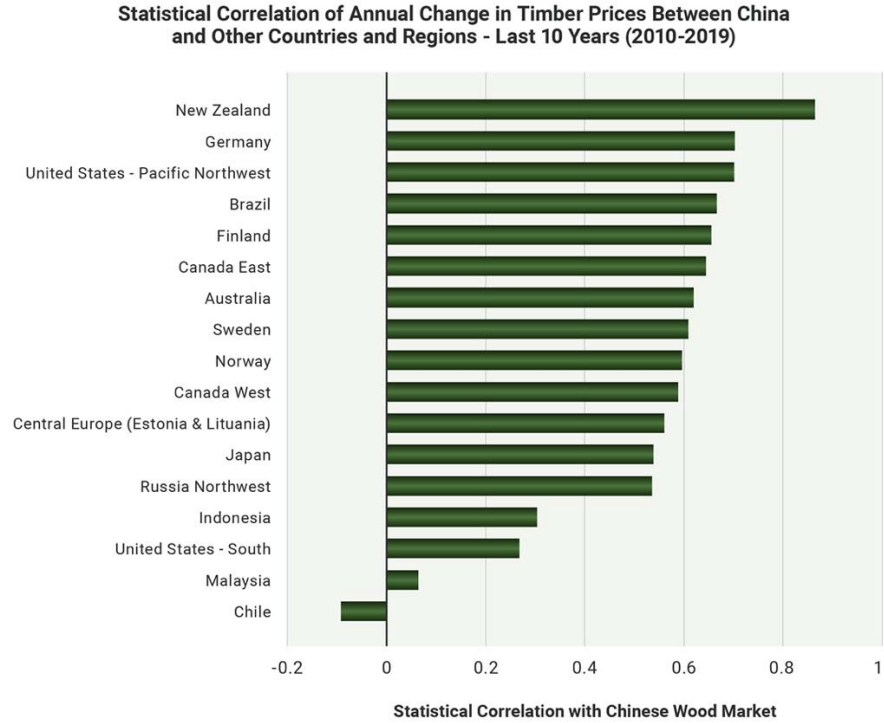
Figure 6. The statistical correlation of year-over-year change in quarterly timber prices between China and other global wood markets over the five-year period of 2015-2019. Sources: Wood Resource Quarterly, Fastmarkets RISI.

Statistical Correlation of Annual Change in Timber Prices Between China and Other Countries and Regions - Last 5 Years (2015-2019)

Note: The US Northeast and Lake States were not included in the correlation analysis above because there is no single dominant species that is exported to China, rather a diverse range of species (e.g., oak, cherry, etc.) that have very different price histories.

Observations of Correlation Data

The two charts demonstrate that global wood market relationships with wood demand from China can vary significantly by country. Nevertheless, taken as a whole, more than half of the world's primary wood producing regions have strong correlations of greater than 0.60 with the Chinese market. During the five-year period between 2015 and 2019, only four regions – or one-fourth of the 17 sampled – had correlations lower than 0.40. This suggests that China's footprint on the global wood trade is significant and pervasive. The key takeaway is that *an investor could easily build a timberland portfolio that is seemingly well diversified from a geographic standpoint while being inadvertently and heavily exposed to the Chinese market.*

It is notable, but unsurprising, that New Zealand and Australia are highly dependent on the China market for log and chip exports. The market correlation for both countries is quite high for the five-year and 10-year periods. This is relevant because, outside of the United States, New Zealand and Australia are the two locations where timberland investors have concentrated the largest percentages of invested capital. According to a 2019-survey by the timberland investment consultancy, TimberLink, LLC, about 23 percent of global timberland investments, or US$11 billion, have been made on a combined basis in New Zealand and Australia.[1]

Latin America is another large target for foreign investors' capital and close to US$5 billion was invested in timberland assets there in 2019. Here, our correlation analysis produces a somewhat mixed message. Brazil is highly exposed because its expansive eucalyptus plantation resource is heavily reliant on pulp demand from China. In contrast, Chile has a more broadly diversified export market, which includes the United States, the European Union, and the Latin American trade bloc, Mercosur. Consequently, Chile's price correlation to the China market is the lowest among those countries analyzed.

Interestingly, the United States has a split personality. Timber markets in the U.S. Pacific Northwest have a much stronger relationship with China than do those of the U.S. South. However, TIR can envision this link weakening over time as a potential recovery in the U.S. housing market causes more timber that is produced in the Pacific Northwest to be sold in the domestic market rather than in the China export market. In addition, the recent trade frictions between China and the U.S. have accelerated this process. This may help explain why the US Pacific Northwest's correlation ranking

---

[1] Timberlink's *TIMO Survey Report* (June 30, 2019)

fell from #3 out of 17 for the 10-year period (2010-2019) to #10 for the five-year period (2015-2019).

Recommendations

Classic guides for diversification remain as pertinent today as they ever were for timberland investors. It is important to diversify one's timberland holdings across geography, mill procurement areas, species, log products, and timber maturities because it can help reduce the risk profile of a timberland portfolio. The added wrinkle, however, is the China factor. A timberland investor must be aware that disparate global markets can be strongly linked to China, which can cause one to underestimate the collective volatility of one's timberland assets.

To help address this challenge, Table 1 below measures the relationships between different wood-producing markets and the Chinese wood market. The wood markets of different regions are simply judged as low (1 star), moderate (2 stars) or high (3 stars) based on their relative correlations with China's wood markets. As was previously explained, this is based on TIR's price correlation analysis. In cases where price data was not available, we based our judgments on what we know and understand about these markets.

Table 1.

Perceived Correlation in Wood Markets Between China and Various Forest Regions

Timberland Investment Region	Associated with China Market
North America	
U.S. Pacific Northwest	★ ★
U.S. South	☆
U.S. North (Northeast and Lake States)	★ ★
Canada	★ ★ ★
Europe	
Central Europe	★ ★ ★
Northern Europe (Scandinavia, excluding Sweden)	★ ★ ★
Western Europe	★ ★
Latin America	
Brazil	★ ★ ★
Chile	☆
Other (Uruguay, Peru, Colombia, Central America)	★ ★
Asia	
Vietnam and Japan	★ ★ ★
Indonesia and Exporters of Tropical Hardwoods	★ ★
Malaysia and India	☆
Oceania	
Australia	★ ★ ★
New Zealand	★ ★ ★

Key:

☆	★ ★	★ ★ ★
Low Association	**Moderate Association**	**Strong Association**
Price correlation of <40% with China	Price correlation of 40-60% with China	Price correlation of >60% with China

When building a portfolio of timberland assets, TIR recommends analyzing the portfolio for its overall exposure to China. If the average straddles closely to a high correlation (three stars), the portfolio's geographic allocation may need attention because its risk profile could be more aggressive than an investor's risk tolerance. This can be addressed by balancing the portfolio with more low correlation (one star) or moderate correlation (two star) investments.

TIMBERLAND INVESTMENT RESOURCES LLC

Having considerable exposure to China does not necessarily mean a timberland portfolio is excessively risky or unbalanced. Investors, however, should be cognizant of the additional volatility that China brings to a portfolio – and the need to therefore increase its targeted rate of return (or discount rate) accordingly. Ignoring the "China risk premium" can cause a timberland portfolio to underperform on a risk-adjusted basis over the long run.

In conclusion, there are four points investors should consider based on TIR's analysis:

1.   China has great potential to drive timberland investment returns across the globe because of its voracious appetite for wood products.

2.   China's demand profile is having a major influence on global wood flows' and it will continue to have a considerable impact on the world's wood markets in the future.

3.   It is wise not to concentrate too much of a timberland portfolio's exposure in regions that are over-exposed to China because the performance of its economy could have an outsized impact on the performance of one's holdings.

4.   It is wise to diversify one's timberland portfolio prudently and intelligently – and that includes having an informed and strategic perspective on how linked a region's wood production market is to China – the world's largest consumer of wood products.

Appendix

The table below identified the types of wood products that were used in TIR's analysis to correlate a country's wood market to demand for wood products from China.

Table 2.

Great Region	Timber Producing Region or Country	Timber Products	Source	China Price Correlated Against
Asia	Indonesia	Hardwood Pulpwood	WRQ	Imported Tropical Hardwood CIF
	Malaysia	Meranti Sawlog	RISI	Imported Tropical Hardwood CIF
Europe	Central Europe (Estonia & Lithuania)	Pine Sawlog	RISI	Imported Russian Softwood CIF
	Finland	Pine, Spruce and Birch Sawlog	RISI	Imported Russian Softwood CIF
	Germany	Spruce Sawlog	WRQ	Imported Russian Softwood CIF
	Japan	Hinoki and Sugi Sawlog	RISI	Imported Radiata Pine CIF
	Northwest Russia	Pine and Spruce Sawlog	WRQ	Imported Russian Softwood CIF
	Norway	Pine Sawlog	RISI	Imported Russian Softwood CIF
	Sweden	Pine and Spruce Sawlog	RISI	Imported Russian Softwood CIF
Latin America	Brazil	Pine Sawlog	RISI	Imported Radiata Pine CIF
	Chile	Radiata Pine Sawlog	WRQ	Imported Radiata Pine CIF
North America	Canada East	Softwood Sawlog	WRQ	Imported U.S. Sawlog CIF
	Canada West	Douglas Fir, Hemlock & Spruce/Pine/Fir	WRQ	Imported U.S. Sawlog CIF
	U.S. Pacific Northwest	Douglas Fir and White Woods	RISI	Imported U.S. Sawlog CIF
	U.S. South	Southern Pine Sawlog	RISI	Imported U.S. Sawlog CIF
Oceania	Australia	Softwood and Hardwood Pulpwood	WRQ	Imported Radiata Pine CIF
	New Zealand	Radiata Pine Sawlog	RISI	Imported Radiata Pine CIF

Key:

RISI: Fastmarkets RISI's *World Timber Price Historical Data*

WRQ: WRI's *Wood Resource Quarterly*

CIF: Stands for cost, insurance and freight. It is the price for delivering the product to the destination port.

TIMBERLAND INVESTMENT RESOURCES LLC

For questions and additional information, contact:

Chung-Hong Fu
Managing Director of Economic Research and Analysis
Timberland Investment Resources, LLC
1330 Beacon St., Suite 311
Brookline, MA 02446
Phone: (617) 264-4767
E-mail: fu@tirllc.com

Disclaimer