

Impacts of Illegal Logging Restrictions on China's Non-Coniferous Forest Products Trade

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Introduction

As China's wood products industry has expanded, it has become reliant on imports of logs to fuel its growth. Between 2003 and 2009, according to official statistics, China relied on imports to supply an average 33% of its total consumption of logs (SFA 2010). Many of these imports came from countries with poor records of environmental regulatory enforcement or high levels of historical forest degradation where illegal logging is a concern. Questions about the sustainability and legality of these imports have led to concern about

the magnitude of China's global forest footprint. Here, the CINTRAFOR Global Trade Model (CGTM) is modified to examine the effects of the removal of illegally logged resources from imports originating in five of China's primary source countries for logs on China's domestic production, consumption and trade flows. Using the CGTM enables the projection of changes in forest products prices, production, consumption, and trade flows that would occur if the incidence or severity of illegal practices changed.

Background

China's production, consumption and trade in products such as lumber and plywood have grown tremendously since the mid-1980s. Figure 1 dem-

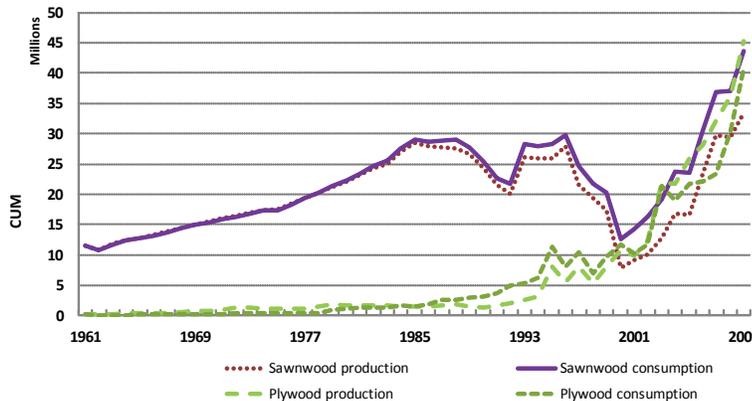


Figure 1. Production and consumption of sawnwood (all) and plywood in China, 1961-2009

onstrates a decline in lumber production in the period following Tiananmen, as well as the Asian Financial Crisis after 1997. In the period since 2000, China's rise as a producer and consumer of coniferous and non-coniferous sawnwood and plywood has occurred rapidly. These products are used most widely in the construction industry, infrastructure projects and in furniture manufacturing. Much of the plywood in China is made of fast-growing poplar, and as China's southern plantations have matured, more material has become available domestically. Additionally, many of China's plywood manufacturers are small- and medium-sized enterprises (SMEs) rely on inexpensive labor for production. Increasing labor

costs may significantly impact this sector in the years to come. China's plywood manufacturers also benefit from the 15% import tariff imposed by the Chinese government, which has encouraged increased domestic production. Despite all the growth in production, China's consumption of these goods exceeds domestic production, and therefore it must still import modest amounts of all three.

The growth in production has largely been facilitated by the increase in imports of coniferous and non-coniferous logs. Comparing log production against consumption, the magnitude of imports, particularly in the last decade, becomes apparent as the

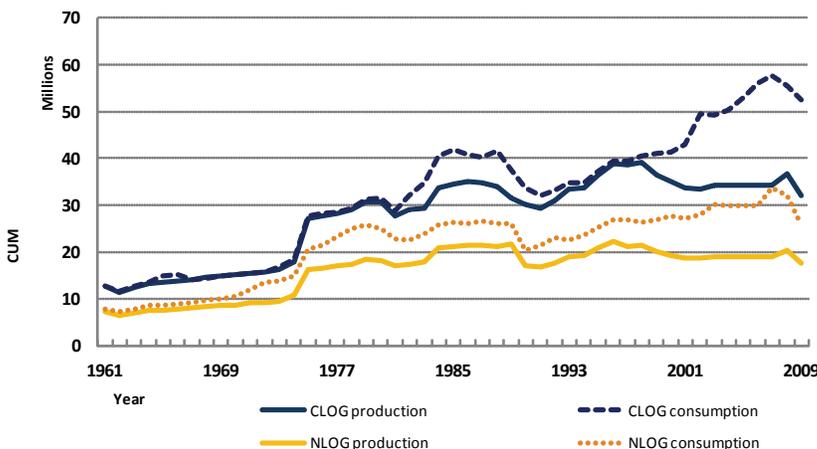


Figure 2. Log production and consumption in China, 1961-2009

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Director's Notes

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The Center for International Trade in Forest Products addresses opportunities and problems related to the international trade of wood and fiber products. Emphasizing forest economics and policy impacts, international marketing, technology developments, and value-added forest products, CINTRAFOR's work results in a variety of publications, professional gatherings, and consultations with public policy makers, industry representatives, and community members.

Located in the Pacific Northwest, CINTRAFOR is administered through the School of Environmental & Forest Sciences at the University of Washington under the guidance of an Executive Board representing both large and small companies, agencies, and academics. It is supported by state, federal, and private grants. The Center's interdisciplinary research is carried out by university faculty and graduate students, internal staff, and through cooperative arrangements with professional groups and individuals.

Recently, a large number of new laws, policies and programs have been adopted around the Pacific Rim that could significantly affect the specification, use and trade of US wood products. While some of these have been well reported, others are less well known. However all have the potential to affect the competitiveness of US wood products, and especially those manufactured and exported from Washington State. In the following paragraphs I will give a brief description of each program and conclude with my personal take on the potential impact of each program on US wood exports.

Japan Domestic Wood Program in Residential

Housing: Last year Japan adopted a program designed to promote the use of domestic wood in the housing sector. The Domestic Wood program is designed to increase the market share of domestic wood from its current 26% to 50% by 2020. A recent analysis conducted earlier this year by CINTRAFOR found that virtually every prefecture in Japan provides some type of subsidy to builders who use domestic wood to build their homes. **Potential Impact:** This program would have significant negative implications for US forest products exporters and CINTRAFOR is currently conducting a research project in conjunction with the US Embassy in Tokyo to evaluate the competitive impact of the Domestic Wood Program on the demand for US forest products in Japan. Preliminary estimates suggest that, if successful, the demand for imported timber would drop from 52.2 million cubic meters in 2011 to 38.8 million cubic meters in 2020, a drop of 26%.

Japan Wood Promotion in Public Buildings Act:

In October 2010 the Japanese Diet passed an Act requiring that, to the extent feasible, wood be given preferential treatment in public building projects. The Act seeks to increase the use of wood by requiring that public building (up to three stories high and with a floor area of less than 3,000 square meters) be built using wood or at least maximize the use of wood within the building. The Act requires that all national, prefectural and local government adopt plans to comply with the goals of the Act by March 2012. **Potential Impact:** While the Act has been designed to apply to both domestic and imported wood, the requirement that all structural lumber must be JAS approved prior to be used imposes a substantial cost burden on US manufacturers. However, it is expected that some wood products, such as LVL and Douglas-fir glue-laminated lumber, could see good market opportunities as a result of the Act.

Japan Eco-Points Program to Support Increased

Use of Domestic Wood: The Ministry of Agriculture, Forestry and Fisheries (MAFF) has appropriated approximately ¥10 billion for an eco-points program that is designed to promote the use of domestically produced lumber. The program will "reward" people building a new home with between 200,000-300,000 eco-points based on the amount of domestic lumber used in building a house. Each eco-point is worth 1 yen and can be used to purchase items such as furniture, appliances and electronic products. **Potential Impacts:** The eco-points program is basically a subsidy designed

to offset the higher cost of domestic lumber and thereby encourage home owners to select domestic lumber over imported lumber. While the relatively small size of the program will limit its overall impact on the demand for imported wood, this program, in conjunction with other prefectural subsidy programs, could have a substantial impact on the demand for imported wood.

Japan Fixed Price Biomass Purchasing

Program: In an effort to increase the competitiveness of low value, low quality forest residuals derived from forest health operations, the Japanese government has established a "Fixed Price Purchasing System for Renewable Energy" that essentially subsidizes the removal of forest residuals for the production of renewable energy. The price of ¥8,000 per m3 of woody biomass was established to ensure the profitability of operations to remove forest residuals. **Potential Impact:** This program should have minimal impact on the US forest products industry since USD exports of wood pellets and biomass for energy production are not substantial.

Japan Consumption Tax Increase: In August, the Japanese Parliament just passed a plan to raise the consumption tax from the current 5% to 8% in April 2014 and to 10% by October 2015. The last time the consumption tax was raised, from 3% to 5% in 1996, housing starts jumped by almost 12% as potential home buyers rushed to complete their purchases before the consumption tax increase took effect. **Potential Impact:** Given the large size of the current tax increase, we can expect a similar increase in housing starts and a commensurate increase in the demand for wood products. It is estimated that housing starts could jump from an estimated 825,000 in 2012 to 1 million units in 2013. Constraints on the ability of the domestic wood products industry to respond to the spike in demand in then near-term means that US wood exporters could enjoy increased demand for their products as a result of the consumption tax increase.

China Policy Measures to Support Export Sector:

The continued weakness of the Chinese economy, particularly the weak performance of the export sector, has Chinese officials contemplating a number of measures designed to boost Chinese exports. One possibility being considered is a full rebate of the 17% export tax, which would be in addition to the 84 billion yuan in export tax rebates provided during the first half of 2012 (which was a 16/4% increase from a year earlier). Other measures include speeding up the export tax rebate process to increase cash flow for small and medium-sized exporters as well as expanding export credit insurance and increasing loans for SME's. Manufacturing sectors that would benefit from this program include wooden furniture and flooring exporters. **Potential Impact:** While a tax rebate would adversely affect the competitiveness of wooden furniture and flooring made in the US, it could also increase demand for US logs and lumber in China.

China Investment in Infrastructure Expansion:

To provide additional stimulus to the domestic economy, the Chinese government has made huge investments in infrastructural development. The

twelfth Five-Year Plan calls for the building of 36 million affordable housing units between 2011 and 2016. In addition, a newly announced Infrastructure Spending Plan (October 2012) would invest 1 trillion yuan in 60 projects ranging from high speed rail lines to highways, ports and airports. **Potential Impact:** China's demand for imported construction grade panels and lumber is expected to increase as these infrastructure projects get under way. Perhaps more importantly, with housing starts exceeding 7 million units per year through 2016, the demand for value-added wood products will remain strong, providing opportunities for US manufacturers of both commodity products as well as value-added wood products ranging from flooring to furniture to cabinets and mouldings.

Russia Reduces Log Export Tariffs After Joining WTO: Following its accession to the WTO in late August, the Russian government announced that it was reducing its export tariffs on log exports, although the reductions vary based on wood species and market and are subject to a quota limit. The export tariff for spruce and fir logs within the quota limit was reduced from 25% to 13% (although it remains at 25% for log exports to Japan). The quota limit for the remainder of this year for spruce and fir logs was set at 1,986,900 m³ to Europe and 95,300 m³ to countries outside Europe while for next year the export volumes were set at 5,950,600 m³ to Europe and 285,900 m³ outside of Europe. Log exports outside the quota limit are subject to an 80% tariff rate. The tariff on red pine logs was reduced from 25% to 15% for all countries. The quota limit for the remainder of this year for spruce and fir logs was set at 1,215,300 m³ to Europe and 4,130,800 m³ to countries outside Europe while for next year the export volumes were set at 2,645,900 m³ to Europe and 12,392,300 m³ outside of Europe. The export tariff for birch logs (primarily going to northern Europe) was reduced to 7%. **Potential Impact:** While we could potentially see large increases in birch log shipments to northern Europe, it is unlikely that Russian log exports into Asian markets will increase substantially. Largely, this is due to the fact that the remaining tariff level for logs is not inconsequential but also because the trade has largely shifted to lumber exports into these markets, especially to Japan and China. In addition, there remains some ambiguity regarding the Russian intention to apply the lower export tariffs to log exports destined for China.

Legal Timber Legislation: In 2010, The US passed the Lacey Act amendment requiring that all wood products imported into the US be sourced from legally harvested timber. Similar legislation is scheduled to take effect within the EU in March 2013 while legal timber legislation has passed the Australian House and is being considered by the Senate. The settlement by the Gibson Guitar Company on the charges that it knowingly imported illegally harvested ebony from Madagascar has raised the profile and awareness about illegal logging laws. Wood manufacturing companies located in countries that import suspect timber and export finished wood products into the US are beginning to take steps to document their timber sources throughout their supply chains. **Potential Impact:** By emphasizing the legal pedigree of US hardwood and softwood timber, US exporters have a tremendous opportunity to supply their products to wood products manufacturers in Asia, particularly in countries where there is substantial concern about illegally sourced timber within the supply chain, such as China, Vietnam, Indonesia, Malaysia and Thailand. **Q**

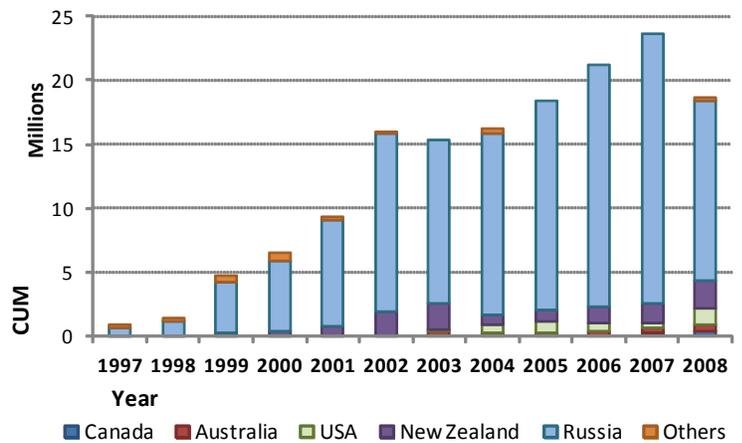


Figure 3. Coniferous log imports into China by source, 1997-2008

difference between the two (figure 2). In many regions, as demonstrated in the previous section, the coniferous and non-coniferous sectors follow vastly different trends; however, figure 2 demonstrates how the two sectors are more closely linked in China due to policy constraints. Production increased in the mid-1980s as timber markets were briefly liberalized, and then leveled off when they were placed back under state control after a period of intensive harvesting. The 1990s also experienced a steady increase in production as markets were opened yet again, only to be followed by a leveling off and then gradual decrease following the implementation of the logging ban in the period following the 1998 floods. Lastly, since 2007, production has been impacted both by the severe winter storms of 2008 and the global recession.

China plays a significant role in the international coniferous log sector; although it does not export any logs, it is a major importer. China's main sources of coniferous logs are Russia, New Zealand, the US, Australia and Canada (figure 3). Russia's exports to China declined in 2008 over 2007 by nearly a third from 21 million CUM to 14 million CUM, due to both the Russian log export tariff and the global economic downturn that began in 2007. However, Russian exports to China dwarf all other countries in this sector, accounting for 75%

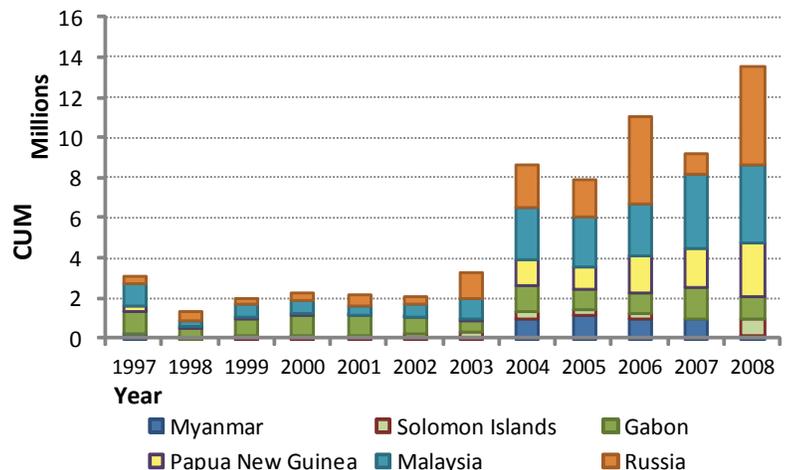


Figure 4. Non-coniferous log imports into China, 1997-2008

in 2008. Imports from Russia of coniferous logs remained more than six times the volume of China's second largest source for coniferous logs, New Zealand. Imports from the US have grown in recent years, reaching 1.35 million CUM in 2008; however, this level remains far below US-China export levels reached in the mid-80s, when US coniferous log exports exceeded 5 million CUM. The largest impediment to increasing US exports to China is cost; if log prices continue to rise, the US may again become a competitive supplier to China. However, as Russia prepares to enter the World Trade Organization, it is facing pressure to lower its export tariffs. As a result, if Russian log prices decline, then US logs may become less competitive.

In addition to being the largest global importer of coniferous sawlogs, China is also the single largest importer of non-coniferous sawlogs (31% of all imports worldwide). China's largest source of hardwood logs is once again Russia, which in 2008 supplied 25% of China's imports (figure 4). Other primary sources include Malaysia, Papua New Guinea, Gabon and the Solomon Islands. Myanmar has also served as a source for logs into China in previous years, but following the introduction of China's own import ban against logs from Myanmar, imports have fallen dramatically and are no longer significant in volume.

Many of China's primary non-coniferous (hardwood) and its primary coniferous (softwood) log sources have been labeled as exporting suspicious logs. These countries include Russia, Malaysia, Papua New Guinea, Gabon, and the Solomon Islands. Based on published reports of illegal logging (Lawson and MacFaul 2010; Li et al. 2008; Seneca Creek 2004), it is possible to estimate potential flows of illegally harvested products into China. Such calculations are based on official trade flows since there are no reliable calculations based on above-official import statistics. The most significant impact is on log imports, while lumber and plywood products are not as strongly impacted. When compared to China's total volume of official imports of logs, lumber and plywood in 2008, it would appear that illegal imports by China may have constituted 12-29% of log imports, 6-13% of lumber imports, and 5-6% of plywood imports.

Scenarios¹

This section describes the results from the scenarios introducing constraints on the flow of illegal logs into China. First, it will present the results from a reduction of illegal outflows of coniferous logs from Russia. Second, results from the elimination of illegal flows in the non-coniferous sector from Russia, Malaysia, Papua New Guinea, West Africa

and Oceania will be discussed.

Under both the coniferous and non-coniferous log sectors, the expansion of China's lumber and plywood production by 7% per annum is examined to determine changes. Consumption in China is also assumed to grow by the same amount, thereby precluding any significant exports of these two products, and simulating current production and consumption conditions. While production grows in China, it is held fixed for the rest of the world. This allows for the examination of how small changes in one assumption can affect changes to China's forest sector, all things being equal.

The coniferous sector

In this study, China's supply is modeled to reflect its current policy constraints on harvesting. China's coniferous sector is currently dependent on log imports from Russia. When those imports are restricted by the introduction of a tariff, two effects are felt. First, as the international cost of Russian logs increases, so too does the price of logs in China. Second, as this occurs, Russian log imports could be substituted both by increased Chinese production (if allowed) and by imports from elsewhere. If China's timber supply functioned more as a market system, and had the ability to increase domestic production, China would not be as reliant on imports in general. This can be described as a move to greater self-sufficiency, which China has been pursuing through a rigorous reforestation effort.

A 7% annual increase in China's production results in a commensurate 7% annual increase in its log consumption, effectively growing log consumption by nearly 140% by 2020 over 2007 levels. In turn, by 2020, China could be expected to consume 187 million CUM of coniferous logs. With the current timber quota in China, domestic production of logs would grow minimally in the first few years, and would only provide 36 million CUM, or 19% of the resources needed by 2020. Consequently imports would nearly triple over 2007 levels to 151 million CUM by 2020 (table 1).

With no tariff imposed on Russia's log exports, and with the assumption that Russia's supply is maintained at its current rate, Russian logs could be expected to fill about 37 million CUM, or a fifth of China's imports, by 2020. North America, New Zealand and Chile would have the greatest ability to provide the remaining needed supply. If a tariff of \$25 per CUM were imposed in an effort to reduce Russian exports, and if China's supply were held at its current rate, China would greatly reduce but not completely discontinue

Table 1. Coniferous log production in China and imports, given a tariff imposition on Russian exports and 7% annual increase in product production, as compared to no increase in product production (million CUM), 2020

	Timber production in China subject to quota system		Timber production in China subject to self-sufficiency policy	
	No Russian tariff	\$25 Russian tariff	No Russian tariff	\$25 Russian tariff
China production	35.88	36.24	89.41	90.69
China imports	151.14	150.78	97.62	96.33
North America	85.51	102.60	36.12	52.24
Russia	36.95	19.47	32.84	15.42
New Zealand/ Chile	28.69	28.70	28.66	28.67

Table 2. Changes in non-coniferous production and imports in China, given low and high restrictions in source countries (million CUM), 2020

	Timber production in China subject to quota system		Timber production in China subject to self-sufficiency policy	
	Low restriction	High restriction	Low restriction	High restriction
China Production	45.67	56.46	92.50	105.40
China Imports	86.84	76.05	40.01	27.11
<i>Malaysia</i>	53.41	48.03	28.73	21.30
<i>Papua New Guinea</i>	16.19	14.72	1.38	2.43
<i>Russia</i>	14.16	6.29	8.43	2.00
<i>West Africa</i>	1.28	5.22	1.21	0.00
<i>Oceania</i>	1.54	1.53	1.21	1.12

importing logs from Russia, and North America would largely supply the difference.

Should China increase its log production, potentially by nearly 50% to 89 million CUM, it would provide approximately half of the resources needed. Under a no tariff scenario, Russia would continue to provide a significant amount of the log import volume needed, with North America and New Zealand/Chile providing the remainder. Clearly, North America would not be likely to benefit as greatly if China were able to dramatically increase its domestic supply. The introduction of a tariff of \$25 per CUM would reduce imports from Russia until the price of logs in China and the cost of logs from Russia reached a point where logs from Russia would resume being competitive even with the tariff. North America and New Zealand are relatively high-cost producers and will continue to be outcompeted by Russia as long as the cost of logs remains lower than the cost of North American logs, even with a tariff.

The introduction of a graduated tariff demonstrates the potential impact on both production and exports of Russian coniferous logs. China is currently reliant on Russia for inexpensive coniferous logs, but Russia is also dependent on China as an export destination. Without a market for logs in China, Russian log production will decline dramatically. If Russia's log prices reflected the true cost of production, it would affect production immediately and likely bring about a significant decline in exports.

The non-coniferous sector

In 2008, 70% of China's non-coniferous log imports came from five sources: Russia, Malaysia, Papua New Guinea, Gabon and the Solomon Islands. This section describes the results of modeling constraints on timber production in these countries by simulating the implementation of a domestic policy aimed at reducing harvests, since it would better reflect the true cost of log production in these countries and prices would increase (as compared to a tariff). As quantity supplied in these regions is lowered, fewer resources will be available for export. In these scenarios, domestic demand for logs in these countries is assumed to be fixed; as a result, domestic demand will be met first before making resources available for export. Initially,

the supply curve in each country is relatively elastic, reflecting a condition where the costs associated with illegal logging are ignored.

A 7% annual increase in production of non-coniferous lumber and plywood would result in an increase in log consumption of 141% by 2020, with consumption in China reaching

133 million CUM. Under a low-restriction scenario, production is still allowed to increase, although prices would rise significantly. Price increases occur particularly if China's supply continues to be set by quota.

A more elastic supply in China would dramatically increase production in China and reduce the need for imports, under both the low-restriction and high-restriction scenarios (table 2). With a greater domestic supply, and with low imports, only Malaysia would continue to be a source of large volumes of logs for China's market as many other sources would diminish their exports to near zero. An important consideration when examining the results here is that the number of trade flows remains fixed to reflect presently existing flows. Other countries that could potentially gain from restricting trade flows but from whom China does not currently import large volumes include Europe and Brazil. North American hardwood logs have not been competitive in this sector due to their relative high cost. Temperate hardwoods from Europe are not a perfect substitute for tropical logs from Malaysia or Papua New Guinea, and would more likely replace Russian logs. Substitution of temperate for tropical hardwoods will depend both on cost and on how wood preferences evolve. With or without the introduction of new trading partners, China will have to balance domestic production with imports from a small number of sources.

Although the market share among the five countries listed above has varied over recent years, they continue to provide the largest volumes of hardwood logs. Whether or not this will continue to be the case will depend on how much China's timber harvests are allowed to grow and how costs will change.

Discussion

Under the scenarios in which China's domestic timber supply is maintained at the current harvest quota, China has little flexibility in terms of shifting from relying on imports to increasing production. Conversely, shifting to a more self-sufficient production system provides insight into how China's forest sector might behave if it were subject to greater market

forces, rather than government limits. As a result, the total volume of imports remains largely unchanged when production is subject to an inelastic supply curve, while imports of coniferous logs decline almost completely when China is modeled using an elastic timber equation.

This raises the question of China's ability to dramatically increase domestic supply. While the government has stated its goal of increasing domestic production, and has in fact increased the timber quota over the last two five-year planning cycles, more significant increases in log production will likely present a number of challenges. Natural forests have been severely drawn down, and the 12th Five Year Plan calls for reduced harvests from these forests. While plantations will increasingly provide harvestable resources, they are of inconsistent quality and their ability to provide dramatic increases in resources has been called into question (Bull and Nilsson 2004). Despite the stated goal of increasing production, it remains to be seen how effective this will be and what the impact will be on product quality. It is worth noting that while calculations in the CGTM for China are based on official calculations of inventory and growth, as provided by the 7th National Forest Inventory, it is certainly possible that these statistics are inflated and would therefore affect how much wood fiber is in fact available for production, regardless of quality.

Between 2000 and 2009, production of lumber in China grew at an average rate of 18% per year; plywood at 19%. The estimated 7% annual growth in production of sawnwood and plywood through 2020 included here is conservative compared to these growth rates, and conservative when compared to the 12% annual growth presented in the latest Forestry Development Plan. With an inelastic supply curve, growth in timber consumption would outpace growth in timber supply and China would need to increase its imports by more than 19% per year to reach the levels needed by 2020 to contribute to the production of lumber and plywood. In the coniferous sector, these logs will come not only from inexpensive suppliers such as Russia and New Zealand, but increasingly from relatively more expensive producers in North America. In the non-coniferous sector, China will continue to rely on its current sources, even if it faces higher prices. Expansion of production of sawnwood and plywood will be dependent on access to logs from outside of China. Regardless of whether or not China is able to expand domestic production, it would still need to increase its imports by 13% per year by 2020.

Chinese wood processing enterprises are highly dependent on wood resources and it seems improbable that growth in the product sector could grow at such a rapid rate without a concomitant increase in log consumption. Without significant efficiency improvements to their operations, there will be a continued heavy reliance on wood resources that are likely to become more expensive and come under greater legal scrutiny, particularly if Europe's Timber Regulations and the US' Lacey Act Amendment

are rigorously enforced.

China is the largest driver of demand for the trade in tropical logs and is becoming a significant driver of demand for trade in coniferous logs. Without a significant increase in domestic production of both coniferous and non-coniferous logs, it will continue to be reliant on imports to fuel its growth in wood manufacturing. In the coniferous sector, Russia, North America and New Zealand will be the greatest beneficiaries of increased imports. In the non-coniferous sector, there is greater concern about where China will draw its imports from. Even if it is able to increase non-coniferous log production, it will be unable to produce large volumes of tropical logs. These may continue to come from countries with suspicious logs, unless steps are taken to curb the flows. How China's demand for increased fiber resources will be met is of wide interest to those in industry, resource management, policy-making and the environmental fields.

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¹All data described in this section come from the Food and Agricultural Organization (FAO) of the United Nations. FAO data are used because the FAO is the only source of global production, consumption and trade flow data that have been collected for fifty years. The data are reported to FAO by each country's respective government and therefore represent official records. Units are reported in cubic meters (CUM). Although consumption figures are not available in the FAO data, production, imports and exports are. Apparent consumption is calculated by summing production and imports, minus exports.

² Historical data on production, consumption, imports and exports employed in the CGTM are from FAO. The development of the baseline involved calibrating the entire model to 2007, including updating historical data as well as calibrating the model parameters, so that the demand and supply equations were based on the most recent data available. Additionally, timber supply equations specific to China, Russia, Malaysia, Papua New Guinea, West Africa (Gabon) and Oceania (Solomon Islands) were developed. Certain data used to update the China sector were drawn from China's State Forestry Administration and sources and include the China Forestry Statistical Yearbook (2010) and the 7th National Forestry Inventory. Estimates of illegal logging rates come from Lawson and MacFaul (2010) and Li et al. (2008). 

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