China's Impact on the Tropical Timber Value Chain in Gabon: The Disruptive Nature of Shifting Centres of Consumption

Drs. Anne Terheggen

PhD Research Student
Development Policy and Practice (DPP),
The Open University, Milton Keynes MK7 6AA
a.terheggen@open.ac.uk, www.commodities.open.ac.uk

Conference paper submitted to the 21st CEA (UK) conference
Global Economic Recovery: The Role of China and other Emerging Economies
12-13 July 2010, University of Oxford

Abstract

Over the past decade, commodity prices have increased sharply and over a longer period than in previous price booms. Whereas past booms largely arose due to supply disruptions, the 2003-08 boom can be ascribed to China's non-marginal impact of consumption, i.e. the small-country assumption of trade has to be suspended due to China's size and its resource-based growth trajectory. The Sino-driven developments are a disruption to a historical decline in commodity prices and falling terms of trade.

This study uses examples from the tropical timber industry in general and primary data from Gabon in particular to examine the impact of resource consumption in China on producer countries in the South. Trade is increasingly organised in global value chains, which are often dominated by key global buyers. The flow of tropical logs originating in the South has shifted away from OECD countries towards China. By comparison, buyers in China have a different set of standards than their Northern counterparts regarding the degree of domestic processing, product- as well as environmental standards. As a result, the division of labour and thus the organisation of the tropical timber value chain have changed, as there is a renewed focus on extractive activities rather than processing ones in producer countries. In light of the global value chain framework, which propagates industrialisation by increasing domestic value-adding activities, this study finds that Chinese markets have a disruptive impact on the organisation of global value chains.

1. Introduction

It was initially thought that developing countries' terms of trade would improve given their exports of raw materials to commodity hungry post-WWII countries. However, Prebisch (1950) and Singer (1950) challenged this hypothesis by showing that the terms of trade of developing countries were actually declining. The most common cited explanations for the falling terms of trade are the greater income and price elasticities for manufactured goods relative to primary products[1]. The terms of trade (and its volatility) has been a prominent subject for discussion over decades. Still, the general conclusion was that the terms of trade were discriminating against commodity producing developing countries for most of the 20th century.

Development policy advice in the 1960s and 70s consequently propagated a manufacturing-led development path in clear favour of (import-substitution) industrialisation and away from commodities. The Washington Consensus further stressed the importance of trade participation and liberalisation. The newly industrialised countries (NICs) have set positive examples for other developing countries around the world that it can work in general, and outward-orientated industrialisation in particular.

China seems to have replicated the success of the NICs: economic growth enabled by significant structural changes, FDI inflows, and an outward-oriented trade strategy. Chinese merchandise trade as a percentage of GDP increased from 20% in 1980 to over 60% in 2007 after it began to fall due to the global economic crisis. China is now the third largest economy in the world measured in current GDP, and is likely to overtake Japan this year. China experienced average GDP growth rates of around ten percent over the last three decades[2]. Yet, this is not an extraordinary achievement. Based on comparisons of logarithmic growth rates from the base year of export surge (Kaplinsky, 2006a), as well as across vectors of exports, FDI, balance of payments, and terms of trade (Zhu, 2010), China behaves similar to other industrialised countries at their early stages of economic development.

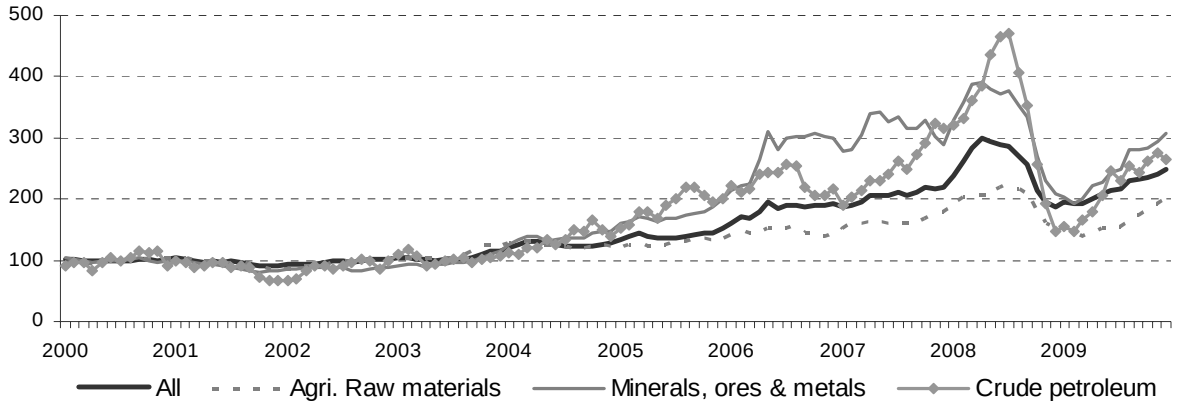
Over the past decade, commodity prices have increased sharply, from 100 index points to 300 in aggregate, and over a longer period than in previous price booms in 1951-53 and 1972-1975 (Figure 1). Whereas past booms largely arose due to supply disruptions, the 2003-08 commodity boom unfolded because of unanticipated shifts in demand. More specifically, the surge in prices across all

[1] For a full discussion, see Prebisch (1950), Singer (1950 & 1975), Cashin & McDermott (2002), Ocampo & Parra (2003), and Kaplinsky (2006b).

[2] All extracted from World Development Indicators by the World Bank, accessed May 2010, http://databank.worldbank.org

groups of commodities can be ascribed to China's economic expansion (Farooki, 2010; Goldstein et al., 2006; Hache, 2008).
China's economy is at a resource-intensive stage of growth and thus consuming natural resources to fuel its industrialisation. At the same time, China's population is at an estimated 1.3 billion or around 20% of world population compared to a 5% share of the US population[3]. Just by sheer size, China has a non-marginal impact on international markets and prices, thus requiring a suspension of the small-country assumption of trade. The resulting developments are a disruption to a historical decline of the (net barter) terms of trade.

Figure 1 Commodity Price Indices (monthly averages of free-market prices, 2000=100)



Source: Based on Commodity Price Statistics by the United Nations Conference on Trade and Development, accessed May 2010, http://www.unctad.org

Apart from commodity prices, the impact of the growing Chinese market should also be reflected in changes of physical commodity trade flows. The rationale is that trade is increasingly organised in global value chains (GVCs), which map the segmentation of production processes often across geographic distant locations (Gereffi et al., 2005; Sturgeon, 2000). The research hypothesis states that given the organisation of production and trade in GVCs, often coordinated by dominant chain actors, changes in the direction of trade away from traditional buyers in the North towards China, will lead to changes in the organisation of then possibly Sino-driven global value chains. This raises the question how such a re-direction of trade translates to producer industries in the South through changes in the coordination of domestic value chains, and whether the assumed change in chain governance is of a disruptive nature.

The discussion starts with the establishment of a shift in tropical log trade flows on a global level and the case of Gabon, where China replaced France as the dominant export market. The following sections establish the differences between these two

[3] World Population Prospect by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, accessed May 2010, http://esa.un.org/unpp/

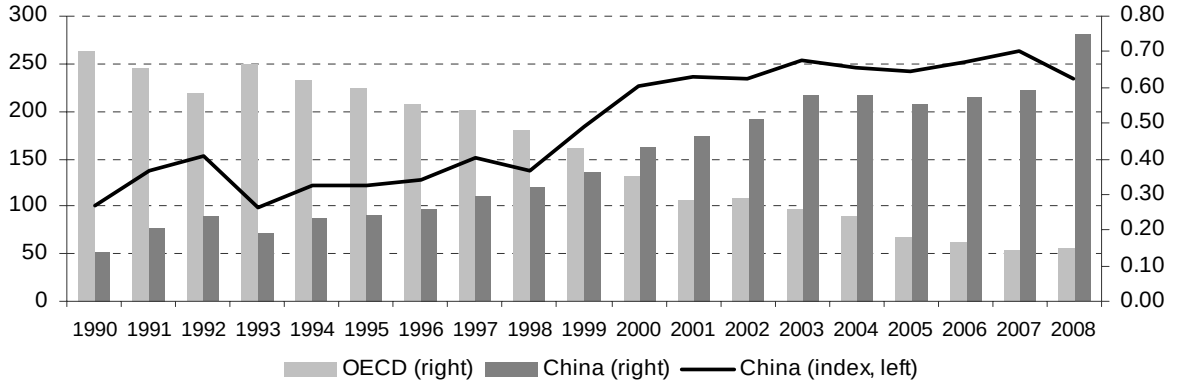
markets. The first part analyses discrepancies between European and Chinese buyers, based on data collected during fieldwork measuring the perception of producers and processors in Gabon on buyer standards. The second part relates these discrepancies between buyers to differences in the nature of demand of China and Europe, using both secondary data and case study material from Gabon. The final section concludes the analysis and discusses the implications of research results with respect to Gabon's timber industry and to theory.

2. The Shift in Tropical Timber Markets

From a global perspective, the economic growth of China and the resulting need for raw materials that feed into domestic processing industries led to a significant shift in trade flows of tropical timber. China's imports of tropical logs grew by close to 160% between 1990 and 2007 (Figure 2), while tropical log imports to OECD countries in aggregate fell by 87% over the same period.

Chinese processing industries consumed a share of around 75% of global tropical log imports in 2008, in contrast to a 15% share for OECD economies. By comparison, in 1990 these numbers were 14% and 70% respectively for China and the OECD as a group[4]. China has replaced the North as the driver of global tropical log trade, or in fact cushioned the steady fall in global import levels, which consequently led to a re-direction of tropical log trade flows away from OECD countries and now directed towards China.

Figure 2 Tropical log import shares for the OECD and China (percentage), and China's tropical log import index (1990=100)



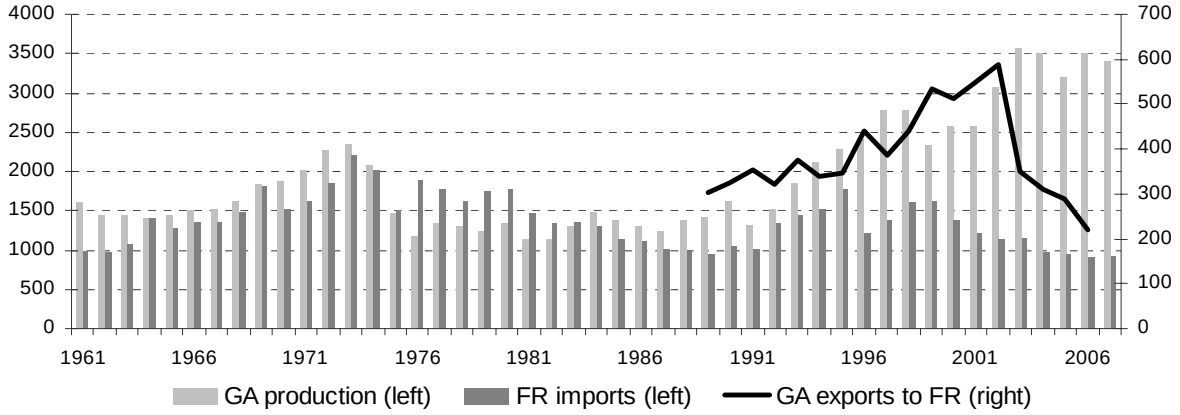
Source: Calculated from ForesSTAT by the Food and Agriculture Organization of the United Nations, accessed May 2010, http://www.fao.org/

Concerning Gabon, France was the key force that shaped Gabon's timber industry in the 20th century. Timber exports from Gabon to France started with colonial settlements during the 1850s-80s, and persisted after Gabon gained independence

[4] All numbers calculated from ForesSTAT by the Food and Agriculture Organization of the United Nations, accessed November 2009, http://www.fao.org/

in 1960 (Wunder, 2003). Indeed, Omar Bongo Ondimba, one of the world's longest reigning presidents who passed away in the summer of 2009, was enabled to rise to power in 1967 through strong support from France, and subsequently installed a political system where "the Franco-Gabonese elite […] exploited the natural resources of Gabon for their personal enrichment" (Yates, 2008:213). Based on available trade data, we estimate that up to 75% of total tropical log imports to France were provided by Gabon[5]. In turn, France used to be the dominant export market for tropical logs exploited in Gabon. Gabon's annual log production volumes moved more or less in line with France's annual log imports until the mid-1990s (Figure 3).

Figure 3 Tropical log production, imports and exports - Gabon and France (1,000 m^3)



Source: Calculated from ForesSTAT and Forestry Trade Flows by the Food and Agriculture Organization of the United Nations, both accessed November 2009, http://www.fao.org/, and trade flow data extracted from Collomb et al. (2000)

Drawing from its former colony, French domestic timber industries perfected the processing of Okoumé[6] into plywood. Subsequently, Gabon's forestry sector limited its major logging activities to a handful of selected species. The applied forest management system, adequately named Méthode Okoumé, was specifically designed to cater to the needs of French processing industries. In fact, given these highly specialised (and exclusive) linkages between Gabon and France, it was the understanding that "creating markets for species other than Okoumé is difficult because it would require heavy investments from French processing industries" (Collomb et al., 2000:20). It was also argued that due to selective logging practices and sufficient lengths of rotation cycles (based on Okoumé) this silviculture method effectively resulted in a sustainable system of production, which could rely

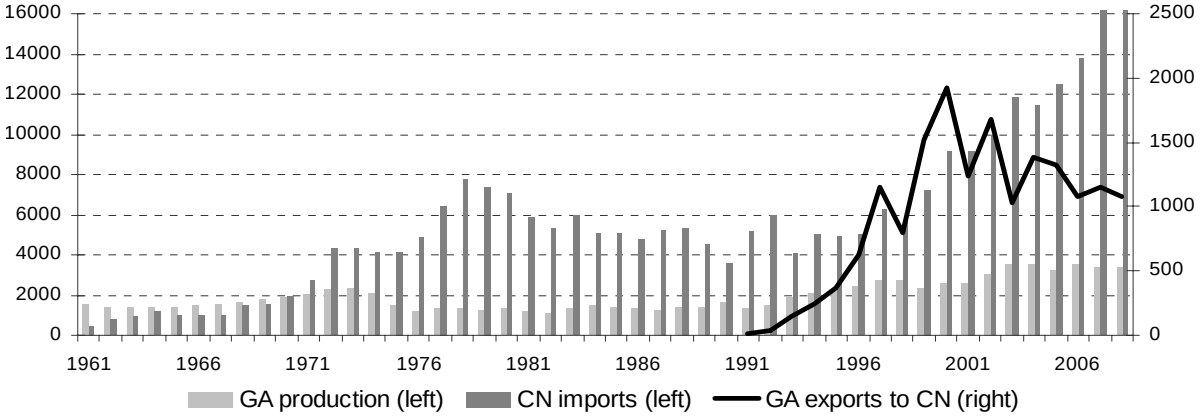
[5] Calculated from Eurostat by the European Commission (http://epp.eurostat.ec.europa.eu) and UN Comtrade by the United Nations Statistics Division (http://comtrade.un.org/db), both accessed November 2009

[6] Between 70-80% of Gabon's forest contain Okoumé. This species only exists in comparatively smaller volumes in parts of Equatorial Guinea, and the Republic of the Congo (ITTO, 2006). There are no perfect substitutes for Okoumé.

on natural regeneration to secure future timber supplies (ITTO, 2006; Wunder, 2003).

China began to import significant volumes of Gabon's total log productions in 1995/1996. Export volumes to China grew exponentially from a very small base of around 12,300 cubic meters in 1991 to almost 2,000,000 cubic meters at its peak in the year 2000 (Figure 4). The average volume of China's imports from Gabon over the period 1997-2006 is around 1.3 million cubic meters[7]. The increase in export volumes from the earliest trade relationships in 1991 to its average volume in the following years (1997-2006) amounts to a staggering 10,568%.

Figure 4 Tropical log production, imports and exports - Gabon and China (1,000 m^3)



Source: Calculated from ForesSTAT and Forestry Trade Flows by the Food and Agriculture Organization of the United Nations, China Customs data (extracted from http://www.globaltimber.org.uk), all accessed November 2009, and trade flow data extracted from Collomb et al. (2000)

Total export volumes to China (up to 65% of Gabon's total exports) chiefly present an additional demand, whose absolute level had never been matched before by its traditional key partners in Europe, particularly France. An immediate consequence of the entrance of China onto the tropical log market and the size of its resource demand was the increase of extractive activities in Gabon. Log productions increased above 2.5 million cubic meters in 1997 for the first time in history (Figures 3 & 4).

Due to the global recession, the European market for tropical timber collapsed as overseas demand for logs dropped sharply. Orders from China stayed relatively more stable, though at the cost of decreasing prices, i.e. a fall of around 30-40% (in 2008 to early 2009)[8].

[7] According to available trade data, Chinese imports from Gabon seem to be falling in recent years. At the moment there is no satisfactory explanation for this (except for price), leaving the possibility of a future upswing given sustained Chinese resource demands.

[8] Data retrieved from producers and industry experts during fieldwork in Gabon (Nov. 2008 – Feb. 2009).

The composition of log exports to China differs from the traditional pattern of exports to France. Next to Okoumé an increasing number of other hardwoods are now being exploited and exported. When France was the dominant trading partner the number of species exported in annual volumes of 20,000 cubic meters or more was between four or five. Applying the same threshold to a more recent dataset (2007), the number of extensively traded species climbs to at least fourteen. As a result, the intensive margin of production in Gabon increased from around one tree per hectare to between three to four trees per hectare. This change questions the continuation of Gabon's traditional management system (Méthode Okoumé).
The share of Okoumé in exports decreased from 70% (1987-1996) to 49% in the year 2009. However, while China was the key driving force for the introduction of a wider range of species to international trade, it seems that these species are now also bought be European markets. In 2008, the EU on average imported 41% of Okoumé and 59% of other hardwoods compared to a distribution of 53% and 47% respectively of Chinese imports[9].

3. Standards of Key Global Buyers

Producer and processors in Gabon are price takers and Gabon's timber sector is characterised by a buyer-driven chain governance system. Dominant markets, represented through key global buyers, have at any one time shaped the prevailing silviculture methods, determined the type of output of Gabon's timber industry, dictated the quantity of production, and specified the tree species that were extracted from the forest. Gabon's tropical timber industry thus fulfils the prerequisite of "the question of governance [that] arises when some firms in the chain work according to parameters set by others" (Humphrey & Schmitz, 2004:97). The idea of buyer-defined production and processing standards is not unique to the GVC literature, as it can also be found in the field of management (Anthony et al., 1972; Rockart, 1979) and manufacturing strategy (Berry et al., 1995; Hayes & Pisano, 1994; Skinner, 1969). Applied to firm management, performance objectives aligned to customer requirements are generally referred to as 'critical success factors' (CSFs).

The tropical timber industry does not operate in a vacuum, as there are a number of regulations and private standards, which are outside of buyers' decision-making realm. It is common understanding that due to low average tariff levels in most tropical importing countries (tariff escalation exists), non-tariff barriers to trade are greater obstacles for market access (Choon & Ginnings, 1999; UNCTAD, 2009). For instance, with the 'globalisation' of trade government concerns for consumer health and safety spurred the introduction of phytosanitary measures. Moreover,

[9] Calculated from export data retrieved from Société d'Exploitation des Parcs à Bois du Gabon (SEPBG) during fieldwork in Gabon (Nov. 2008 – Feb. 2009) and data extracted from Collomb et al. (2000).

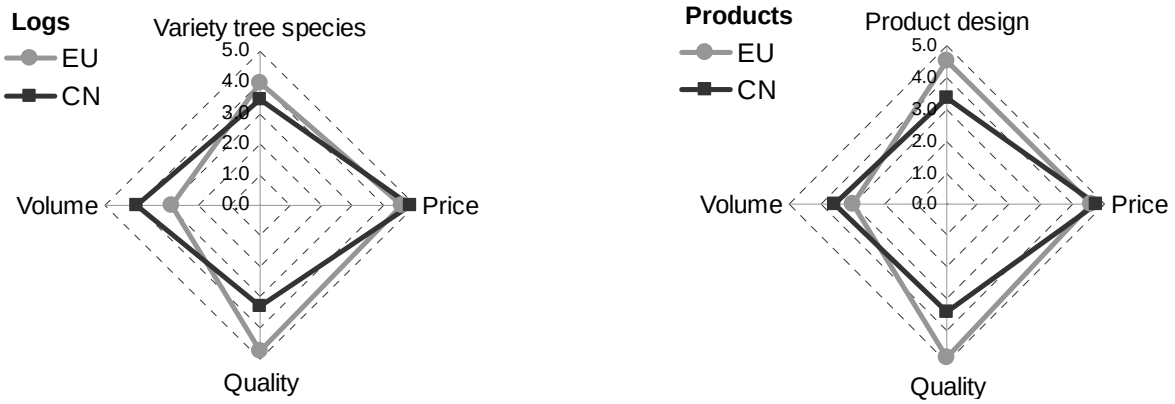
product demands are often intertwined with ideas about the environment and sustainable resource usage, which resulted in the introduction of forest management standards by independent private bodies such as the Forest Stewardship Council (FSC).

3.1. Buyers' critical success factors

One can observe a relegation of traditional EU-buyer defined product and processing standards through the entrance of China as the new dominant buyer. The sharpest contrast in buyer preferences is the stage of processing of wood and wood products before exportation. While European buyers increasingly demand processed wood products, particularly veneer and plywood, Chinese buyers demand raw materials or logs. One respondent expressed the difference in buyer demands as follows: "Chinese customers have a clear preference for logs over processed wood".

The differences in buyer requirements continue to exist for those critical success factors measured on a Likert scale (Figure 5). Chinese buyers' requirements largely concentrate on price (at competitive levels) and quantity (large volumes of both logs). In contrast, European buyers' CSFs were identified as price (at competitive levels, but at different absolute levels relative to prices destined for China) and quality (high degree applied to each logs and wood products). In other words, Chinese buyers prefer to purchase large volumes of logs and will thus favour those producers who can provide these required quantities. Contrastingly, sales volume was least important to European buyers who usually purchase relatively smaller quantities per transaction. Comparing European and Chinese buyers, interviewees said: "Chinese industries demand quantity not quality as the EU markets".

Figure 5 European and Chinese buyers' CSFs for logs and wood products (1 = not important, 5 = critically important)



The purchased quantities for the EU market should be of high quality and made according to buyers' specifications in the case of wood products (i.e. product

design in Figure 5). Gabonese products can only compete on the EU market through high quality standards and a continuous improvement thereof. The same standards are not demanded from the Chinese market where an average quality of logs and wood products are widely accepted. Respondents perceive buyer preferences with respect to quality to be as follows: "Chinese buyers accept some faults [of logs], whereas EU buyers have stronger quality requirements", or "the Chinese demand wood in log form of medium quality [but] European buyers require highest quality levels".

It should be noted that the importance of the 'variety tree species' variable of Figure 5 received almost similar rankings on the 'log'-Likert scale. Yet, the previous section already noted that applied to traditional European buyers, it means that producers should be able to meet exact species qualifications, whereas for Chinese buyers, it translates as producers' abilities to deliver a wide range of species. Indeed, representatives of logging companies in Gabon described Chinese buyer preferences in general as absent, as "they purchase everything they can get their hands on", or as "(…) Chinese take logs of all species, also hardwoods not requested by EU markets in the past". To give an example: "We did not trade with Okan internationally some four years ago as it was an unknown commercial tree species (…) however, Chinese markets started to purchase large volumes over the past three years".

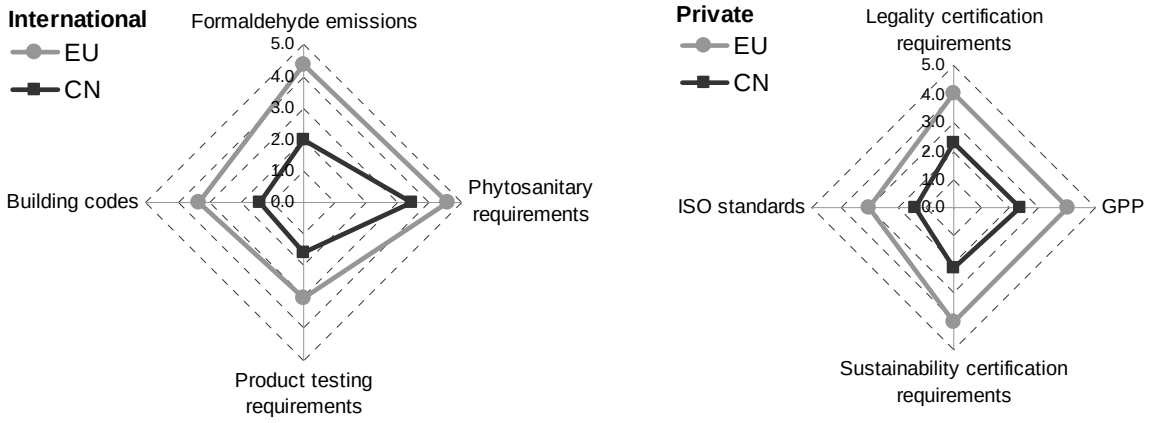
3.2. International regulations and private standards

Chinese buyers apply fewer international regulations, and these to a lower degree than currently practiced by European producers (Figure 6). The only technical requirement of significance to Chinese buyers is the phytosanitary certificate, which is an indispensable document at customs in China. The relatively high weight of phytosanitary standards is enforced by qualitative data extracted from interviews with processors in Gabon. One interviewee reported: "The phytosanitary requirements are the most important international regulations [for access to China] but there is no problem executing these on the ground". In reference to public standards (see below), a representative of a large Chinese company in Gabon said: "Our Chinese middlemen don't ask for certification other than the phytosanitary papers".

For entrance into the EU market, both phytosanitary requirements and formaldehyde emissions, e.g. emissions released by some adhesives used to produce plywood, and pollution from paint, were rated as (critically) important. Other technical regulations, i.e. building codes and product testing requirements, were generally of moderate to minor importance to both groups of buyers. This outcome might in fact be related to the nature of Gabon's export products, with

logs and primary processed wood products simply requiring less technical information to be communicated to buyers compared to secondary processed wood products (mouldings, furniture, etc).

Figure 6 European and Chinese buyers' requirements concerning international regulations and private standards (1 = not important, 5 = critically important)



Note: GPP=Green public procurement; ISO standards=ISO 14001

Private standards concerning production methods (legality and sustainability certification requirements, and GPPs[10]), as well as compliance with national legislation and regulations (ISO 14001) show large differences between groups of buyers (Figure 6). In particular, criteria related to sustainability and legality are considered as increasingly important with respect to market entrance into the EU. The prevailing certification schemes are the Forest Stewardship Council (FSC) for sustainability and the Origine et Légalité des Bois (OLB, Origin and Legality of Timber) for legality. This is because "The OLB certificate is important to enter the EU market (…); FSC is important, too, but to us the legality verification [OLB] is currently more important as this is what is required by FLEGT and government policies [GPP]". Furthermore, there exists an uncertainty among producers and processors in Gabon whether FSC-certified products receive a price premium and thus justifying the relatively costly certification process. The general agreement is, however, that "The EU market is the driving force for sustainable forest management and legality and FSC certification".

Based on interview notes with producers in Gabon (though not captured in Figure 6), qualitative data suggest an almost indifference of Chinese buyers towards certification: "There are no requests for certified wood from Chinese customers", or "The Chinese have no interest in certification and mainly concentrate on logs",

[10] Private standards might also be accepted as proof of meeting governments' green public procurement (GPP) criteria: "Several national governments in European markets (…) have communicated public procurement policies that include criteria favouring the purchase of certified forest products (…)" (UNCTAD, 2010).

and "The Chinese market does not ask or care about certification". A manager of a processing company further elaborated: "The Chinese are known to import illegal timber and pay no price premium for certified wood". Due to these differences in buyer standards, companies in Gabon have started to separate their production (methods) according to standards that exist in the two exports markets, e.g. "We plan to obtain an OLB certification for EU products *only*" (emphasis added).

4. Patterns of Consumption and Nature of Demand

Buyers' critical success factors (and the degree to which they apply international regulations and private standards in their purchasing decision) do not only represent market demands but are ultimately a reflection of the nature of markets. In general, wood consumption rises as populations grow and/or as more disposable income is available to the given population. Over time, not only the volume but also the quality of wood products is likely to increase as consumer tastes develop. For example, in China paper production based on non-wood fibres such as rice straws, was replaced by high-quality paper made of plantation pulpwood (White et al., 2006). Lastly, wood raw materials need to be processed for further consumption, thus the structure and activities of domestic processing industries can be an indicator of countries' import compositions.

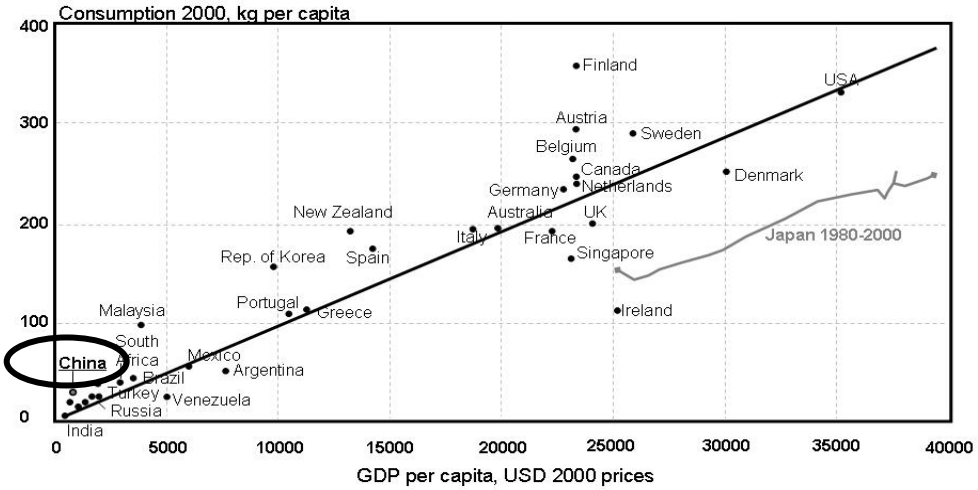
4.1. China's wood consumption, domestic processing and nature of demand

China is a relative wood-resource poor country with a forest per capita rate of 0.13 hectare relative to a world average of 0.65. Furthermore, the Chinese government imposed logging restrictions in an attempt to stop further deforestation and environmental degradation (Bowyer et al., 2004; Zhang & Gan, 2007). China's domestic tropical forest areas are limited to two southern provinces, whose log output of around four million cubic meters, is insufficient to satisfy total demand (ITTO, 2009a). As a result, Chinese wood processing industries cannot fall back on domestic resources to cater to their raw material needs. China's wood consumption almost doubled within just ten years from around 145 million cubic meters in 1993 to 283 million in 2003 (Démurger et al., 2007).

Current per capita consumption of wood in China is still relatively low at an estimated 0.12 cubic meters compared to a world average of 0.68 (Démurger et al.). As incomes continue to rise, wood product consumption is predicted to increase, too. Trinh, Voss & Dyck (2006) project an increase of average annual imports by ten percent until 2020, based on other countries' consumption over time, whose economic growth pattern China is likely to imitate (e.g. South Korea, Japan, Spain). Using a similar method, i.e. correlating countries' incomes and consumption, Midgley (2005) exemplifies a possible 'consumption' path of China for paper and boards (Figure 7). Predictions are also given based on expected domestic timber consumption by Chunquan, Taylor & Guoqiang (2004) stating a necessary increase

of at least 33% in roundwood imports to meet commercial needs in 2010, and White et al. (2006) forecasting a doubling of imports of forest products. In general, experts agree that the only direction of China's wood consumption (and thus imports) is upwards.

Figure 7 Paper and board consumption (kg per capita) and GDP per capita for selected countries



Source: Midgley (2005:54)

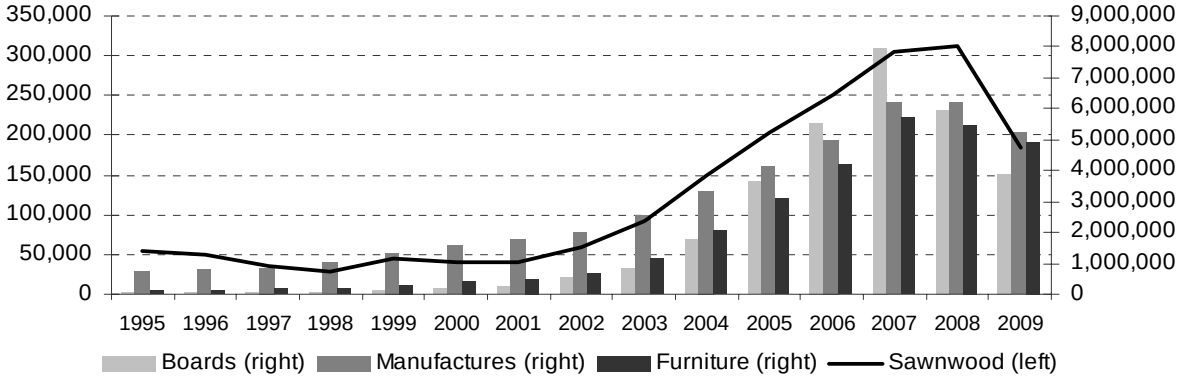
There are two main drivers of consumption: i) overseas demands for 'Made in China' wood products and ii) domestic consumption. Rising private consumption is particularly related to the high growth of the construction and housing sectors[11]. The Chinese housing program aims to construct new houses (5bn square meter) and renovate existing housing units (2bn square meter). With respect to the former, this will translate into the construction of about ten million new housing units annually. For each square meter of floor area roughly 0.025 – 0.045 cubic meters (urban rate) of wood will be used in the construction process (Bowyer et al., 2004). While tropical wood was not commonly used in constructions in the past, increasing numbers of mouldings, doors, and partitions are constructed from wood, including tropical timber. Moreover, the occupation of new housing units plus the refurbishment of existing ones directly translates into higher consumer demand of timber products, such as wooden furniture and decorative items (Castaño, 2002; Chunquan et al., 2004).

The second engine of growth is overseas demand from OECD countries for relatively cheap wood products. For example, (re-)exports of wood products in aggregate to the USA have increased by 1,000% and to the EU by 800% between 1997 and 2005 (White et al., 2006). Disaggregated processed wood product trade

[11] The boom in China's housing sector was enabled by the National Housing Reform Program, which allowed for private ownership of domestic residences coupled with an easier access to capital (Castaño, 2002).

data for the EU-15 market and China display an almost exponential surge of EU import quantities starting in the early 2000s until 2007 (after which the effects of the global crisis become visible) (Figure 8). Over a period of ten years (1997-2007), import quantities of boards increased by over 16,000% (60% p.a.), of manufacturers by more than 600% (19% p.a.), of furniture by over 3,000% (40% p.a.), and of sawnwood by around 700% (19% p.a.); average percentage increases per annum are stated in brackets. It is understandable why many scholars and industry experts refer to Chinese wood processing industries as the 'wood workshop of the world'.

Figure 8 EU-15 imports of selected secondary wood products from China (100 kg)



Source: Constructed from Eurostat (External Trade) by the European Commission, accessed May 2010, http://epp.eurostat.ec.europa.eu

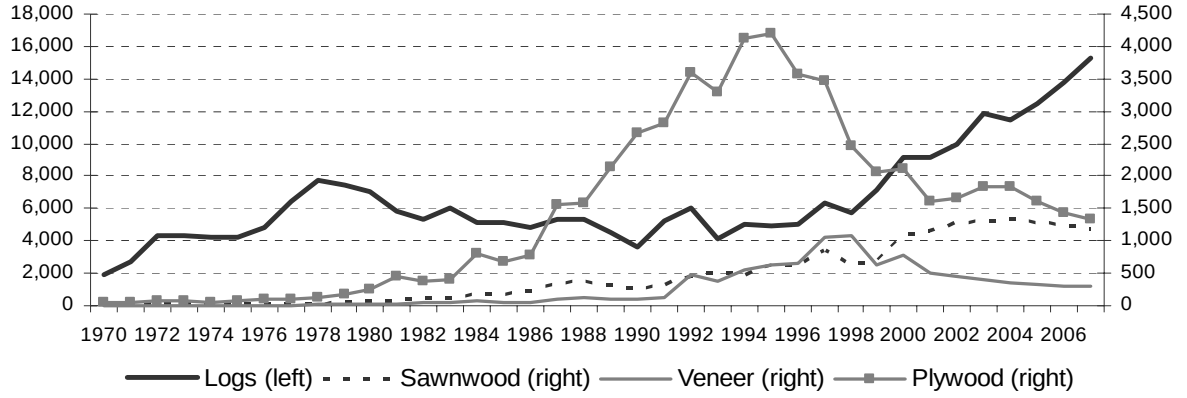
Note: Boards include veneers, plywood, and particleboards; Manufactures include builders' joinery and carpentry, items of domestic or decorative use, packings and cable-drums, and casks, barrels, vats, tubs and other coopers' products

Chinese processing industries have undergone tremendous changes over the past 20 years, taking advantage of trade liberalisations and a general orientation towards more capitalistic industry structures. Private industries emerged and began to flourish in favourable business environments, also attracting foreign investors first from other Asian countries and now increasingly from the North. All Chinese tropical wood processing industries have reported annual double-digit growth rates for at least a decade, and are now leading global exporters (Sun et al., 2004, 2008). Chinese wood products succeed through competitive prices that reflect strong domestic competition between processors, relative efficiencies in production, low production costs, and low qualities of its products. Furthermore, because of wood processing sectors' high growth rates and the industries' high labour-intensity, they are estimated to generate between 12-15 million jobs per year

thus lending itself to active state support, e.g. value-added tax rebates, in light of employment creation and hence social policy (Kozak & Canby, 2007)[12].

Some industries, such as export-orientated plywood manufacturers, are thought to almost completely depend on imported wood, such as Okoumé logs, which are processed into face veneers for plywood exports (EIA, 2005). As Sun et al. (2008) summarised: "[…] no other country has ever, in human history, developed a re-export-orientated forest industry based primarily on imported wood, and certainly not at this scale". The increasing preference by China towards logs thus relates to processing industries' improving abilities (and capacities) to undertake activities further downstream in the value chain, requiring raw material inputs to replace imported processed wood products.

Figure 9 China's imports of logs and selected wood products (1,000 m^3)



Source: Calculated from ForesSTAT by the Food and Agriculture Organization of the United Nations, accessed November 2009, http://www.fao.org

Over the period 1970 to 2007 tropical log imports by China grew by around 7% annually; although this number increases to over 10% per annum since 1994. Contrastingly, sawnwood, veneer and plywood imports all show negative trends since various points in time throughout the 1990s and early 2000s (Figure 9).
A similar pattern of consumption can be seen regarding Chinese imports from Gabon. These imports are almost completely made up of logs as only insignificant volumes of both sawnwood and veneer are bought; plywood is not imported by China from Gabon. Chinese market requirements, as reflected in standards of buyers effectively resulted in changes in the division of labour along the tropical timber chain. From Gabon's perspective, this means an intensification of domestic extractive industries, but a possible decline of wood processing activities (see

[12] Processors in the US (and Canada) have voiced concerns that Chinese state subsidies are partly responsible for the massive influx of e.g. furniture and flooring into the US (Canadian) markets. As a result, anti-dumping tariffs were temporarily imposed on Chinese manufacturers.

below) as these are the nodes of production where Chinese industries have a stronger competitive advantage.

Existing purchasing policies in China do not discriminate production methods (including those in supplier countries) but rather focus on safety issues, such as technical regulations of chemical usage (Pro Forest, 2009). Conversely, Chinese processing industries are thought to be struggling to meet stringent technical regulations set by European buyers. While technical issues are slowly being addressed there are only sporadic initiatives with respect to environmental issues, and those seem to be often driven by international NGOs and increasingly by end-consumers in the North. Official government statements and actions appear to portray an acknowledgment and effort to control illegal log trade to China for further processing, yet industry experts often claim that only insignificant progress is being made, for example as necessary changes are not given a high priority status, and as commitments are not followed by practical actions (Chunquan et al., 2004; EIA, 2005; Fripp, 2006; Pro Forest, 2009;).

Some of the wider implications of Chinese traders' and processors' sourcing decisions, such as deforestation and loss of government revenues due to illegal logging activities are rarely discussed in the public domain in China (Fripp, 2006). Media coverage of the impact of unsustainable harvesting methods and illegal trade is low, and thus exerts less pressure on buyers and Chinese consumers alike. In principle, consumers are thought to pay more attention to health and safety issues of finished wood products (Pro Forest, 2009). Likewise, processors and traders have limited managerial knowledge to document product flows, and they act in a fiercely competitive environment with eroding profit margins. Consequently, the degree of awareness is marginal, and processors stay in business by accepting lower-priced logs from illegal sources, as well as by taking advantage of few given environmental restrictions, including an absence of legality and sustainability certification schemes.

4.2. Function of forests and the nature of demand of Europe

According to the 'forest transition' literature (Mather, 1992; Mather et al., 1999), countries in the North have reached a post-industrial phase of forest usage. This means that forests are no longer exclusively used for the production of timber as commonly seen in countries' industrial phase. Instead, societal perspective on the functions of forests began to change, with increasing number of affluent people living in cities exerting pressure on forest management to cater to their needs for recreation and regeneration in forestlands, and through pressures from environmental advocacy groups denouncing the loss of biodiversity (Bazett, 2000; Nilsson, 1996, Mather & Needle, 2000). At the same time, urban migration created

a labour scarcity in rural areas that, combined with technology-induced yield increases in agriculture and forestry led to an abandoning of land, thus made available for forest expansion (Rudel et al., 2005; Victor & Ausubel, 2000; Kauppi et al., 2006).

Today, it is accepted that forests have multiple functions complementing the fuelwood- and industrial wood production for processing industries. These functions include the forests' role in biodiversity and watershed protection, climate change (i.e. carbon sequestration), non-wood forest products production, social and cultural purposes (e.g. recreation), and eco-tourism. Changes in the perceived function of forests are mirrored in policies and management practices especially in the North. There is a clear trend away from old-growth (sustainable-yield) exploitation, towards sustainable forest management (SFM) of (planted) forests in developed countries (Sohngen et al., 1997; Bazett, 2000). As a result, forest management moved away from the extensive margin towards intensively managed semi-natural and planted forests. Some forest areas are completely taken out of production, where mostly non-monetary rewards to the public override the interests of industries (Nilsson & Bull, 2005).

During the industrial phase, colonies were often treated as so-called resource taps (Jorgenson, 2008), with export-orientated logging activities explaining much of the tropical deforestation of the late 19th and early 20th century. The modus operandi of the forestry industry had been adopted in tropical countries also, i.e. the overwhelming majority of logging took place through an expansion of the extensive margin. Additionally, property right regimes and forest management systems had been transferred. However, as industries in the North passed into the post-industrial phase, so have consumers, industry actors, states, and lobbying groups begun to propagate for a transfer of current forest management systems (sustainable forest management) and 'believes' to the South.

In the case of Gabon, the growing pressure for economic diversification in light of falling oil production let to a renewed interested in the forestry sector, which was manifested in major reforms of the forestry sector. The latter included the abolishment of the state-owned export monopoly (SNBG) and the introduction of a new legislative framework, known as the Forestry Code (Law No 016/01, 31st December 2001). The overall focus shifted towards sustainable production methods, as well as from raw material extraction towards the industrialisation of the forestry sector through domestic processing before exports (i.e. minimum firm processing requirement of 75% of total production by January 2012)[13].

[13] In November 2009, the government of Gabon announced a log export ban as of January 1, 2010 to stimulate domestic processing activities and employment. An interim period, during which remaining stocks of logs

However, it is believed that these recent reforms were equally a result of external pressures exerted by i) the IMF and the World Bank, the most important creditors to Gabon, as well as ii) European governments and organisations (Forests Monitor, 2001; ITTO, 2005; Wunder, 2003). For example, one interviewee explained that "EU companies are driven by the market, increasing buyer demand for certification, and by the EU-FLEGT programme, which seems to be heavily pushed in Central Africa through the European Commission" (Brainforest, pers. comm., 2008).

Another notable change of Northern timber industries is that they began to outsource labour-intensive processing activities to the South. The relocation of processing activities is due to rising domestic wage levels and the associated loss of competitiveness globally. As discussed earlier, Chinese processing industries contribute significantly to the erosion of Northern processing primacies, as they began to challenge leading wood product exporters. In 1992, Chinese furniture exports were only 14% of Italian and 19% of German exports. In 2008, Chinese furniture exports were 2.3 times those of Italy and 2.6 times those of Germany[14].
At the same time as the North outsourced timber processing sectors to the South, primary and secondary processing capacities in some tropical-rich developing countries had risen, too. To give an example, in Latin America (Asia-Pacific) the majority of tropical logs are utilised by domestic processing industries, i.e. 99% (90%) of all logs are converted at least into primary products that are either consumed domestically, exported, or further processed (ITTO, 2009a).

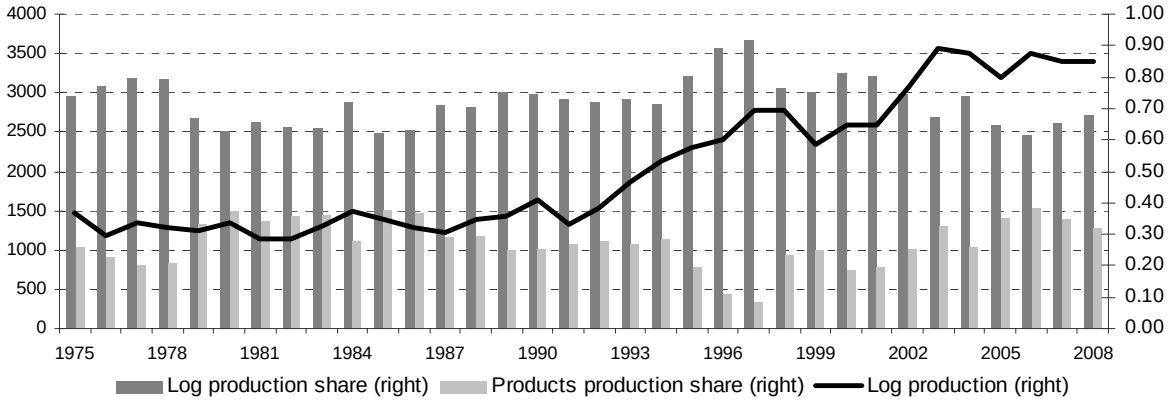
Contrastingly to global trends, Gabon's' industry activities have largely focused on the extraction of logs for export markets. Over a period of 40 years (1961-2001) no more than a quarter of total forest product exports were in the form of processed wood relative to an average share of 76% of logs (Figure 10). To be precise, gains in processing capacities in the early 1980s were largely lost again throughout the following years, particularly at the end of the 1990s. These developments coincide with rising domestic log production volumes, as well as with a period where processing activities started to be transferred from the North to the South as discussed above. Hence, Gabon's processing sectors were not able to take advantage of these positive stimuli.

---

could still be exported, lasted until the end of April 2010. At the time of writing, news spread about the introduction of a revised quota system instead of an export ban for logs (EUWID, 2010; ITTO, 2009b, 2010). While the fundamentals of this analysis and its outcomes have not changed, it is yet unclear how log production and processing will be affected.

[14] Calculated from UN Comtrade by the United Nations Statistics Division, accessed December 2009, http://comtrade.un.org

Figure 10 Gabon's distribution of production of logs and processed wood products (percentages) and total log production levels (1,000 m^3)



Source: Calculated from ForesSTAT by the Food and Agriculture Organization of the United Nations, accessed May 2010, http://www.fao.org

Note: Production figures based on roundwood equivalents (RWE) using wood utilisation rates retrieved during fieldwork in Gabon: sawnwood aggregate 2.04:1, veneer 1.96:1, and plywood 2.33:1; Numbers corrected for missing values from original datasets

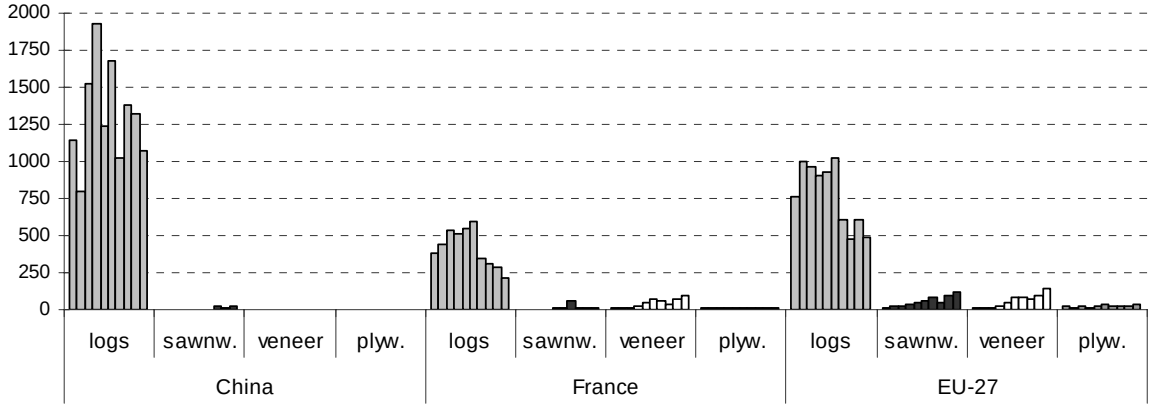
Rising shares of wood products (relative to logs) around the turn of the century coincide with increasing demand for wood products from Europe, including France (Figure 10). Yet, absolute shares in these years never recovered to those levels reached in the past. In fact, we believe that Chinese market requirements, especially its influence on the division of labour within the timber value chain, override demand for processed wood products (and tropical logs) from European markets (Figure 11). In other words, the dominance of Chinese demand for Gabon's tropical timber in its raw state, deprive domestic processing industries of resource supplies. As one processor said during our interview "(…) it was very difficult to get Azobé as most logs were exported to China". To give another example: "The acquisition of Leroy Gabon, Pogab and Plysorol by an affiliate [of Chinese-owned Honest Timber] has reduced the ability of the veneer industry in Gabon and the plywood industry in France to compete against supplies made in China by severely reducing the availability of logs (…)"[15].

Domestic processing activities in Gabon (especially in recent years) are a direct reaction to the Forestry Code. In more detail, most of the increase takes place through an expansion of the sawmilling sector, and to some degree in veneer processing. Still, the producer margins in these sectors are negative, i.e. -28 index points and -23 index points respectively. Although plywood processors reported

[15] Cited in English from http://www.globaltimber.org.uk/gabon.htm, originally published by Robin des Bois (www.robindesbois.org) 9 September 2009. Quote in reference to the takeover of previously French-owned producer and processor companies in Gabon by a Chinese company with questionable forest management standards; e.g. Leroy Gabon's OLB certification was suspended on March 19, 2010 (pending further inspections within a year) as the monitoring audit failed to take place

an average positive producer margin (23 index points) the barriers to entry with respect to economies of scale, skills, and capital investments are the highest among all processing sectors, limiting theses to a handful of mostly foreign-owned companies. Conversely, the highest producer margins apply to the logging sector (107 index points). Simulation exercises (Kaplinsky et al., 2010; Terheggen, 2010) with respect to processing industries' contributions to factors of production (capital, labour) and foreign exchange earnings lead to the conclusion that processing activities are not only a result of national processing requirements (Forestry Code), but that these concentrate in areas where the barriers of entry are the lowest (thus dissipating rents) in particular, and where resources are used inefficiently in general.

Figure 11 Log and wood product demand distribution for China, France, and the EU-27 countries, 1997-2006 (1,000 m^3)



Source: Calculated from Forestry Trade Flows by the Food and Agriculture Organization of the United Nations, accessed November 2009

5. Implications for Gabon's Industry and Development Policy

Tropical forestry sectors were often regarded as an important tool for industrialisation and economic growth for developing countries, given their (natural) comparative advantage in growing wood for commercial purposes, as well as due to their contribution to employment, revenues, and linkages to related industries. Descriptions of the Chinese processing industries resonate the notion that the development of timber industries tends to be one of the primary stages of industrial growth, partly because its products (such as furniture and housing) have high-income elasticities of demand at low levels of income, partly because the timber related sectors are labour intensive, which hence encourage production at low wage levels (Kaplinsky et al., 2010).

In reference to the GVC framework, it is believed that industrialisation can be achieved by domestic industries inserting themselves into GVC first, and by an expansion of their activities into higher stages of processing over time., e.g. moving from the production of timber (exploitation) towards primary processing activities

(sawnwood, veneer, plywood), and continuing in the direction of secondary processing activities (mouldings, floor boards, etc). In other words, it is thought that an expansion of value-added activities will have positive effects on employment and possibly foreign exchange earnings.

Based on these 'frameworks' of development, the introduction of the Forestry Code in 2001 by the Gabonese government, seems to have been a sound decision to transform the sector's landscape. Yet, in the past, Gabon's timber industry continuously failed to establish itself globally as a producer (of at least primary processed wood products) due to its small size and domestic barriers. Current processing activities are not likely to brake with previous experiences given the persistence of industry barriers, rising log production costs, and associated losses (producer margins) in 'starter' activities like sawmilling and veneer production. In fact, the logging sector itself is undergoing significant changes regarding forest management systems and production intensities though faced with significant deficits in public infrastructure and rent-seeking behaviour.

This study has shown that the very foundations of traditional development paths have changed. The nature of Chinese market demands differ significantly from those of traditional export markets. These differences are a disruption to the traditional organisation of GVCs as they translate into an intensification of extractive activities and the exportation of raw materials instead of higher value-added products. Still, in light of the difficulties that many developing countries' industries face to capture Schumpeterian rents in manufacturing (or primary processing in Gabon's case), the disruptive nature of China's resource demand allows for an appropriation of Ricardian resource rents.
The outcome of this research should encourage a discussion about the assumption that GVCs are directed towards the North with its related market requirements and buyer standards, as it no longer applies to the increasing number of cases, where GVCs are now directed towards China. It is thus insufficient to differentiate between domestic and export-directed chains (and respective governance systems) but to careful discuss the ownership of final markets. Similarly, the implicit assumption about an increase of producer margins as more value is added to a product has been shown not to apply to Gabon. Lastly, GVC governance literature would profit from a discussion on rents, especially those derived from natural resources as primary product exports have not only significantly increased due to China's resource demand, but most importantly because of the disruption this demand has on the net barter terms of trade.

Bibliography

Anthony, R. N., Dearden, J., & Vancil, R. F. (1972). Key economic variables. In R. D. Irwin (Ed.), *Management Control Systems* (pp. 138-143). Homewood.

Bazett, M. (2000). *Long-Term Changes in the Location and Structure of Forest Industries*. Washington, DC; Gland: The World Bank and WWF International.

Berry, W. L., Hill, T. J., & Klompmaker, J. E. (1995). Customer-driven manufacturing. *International Journal of Operations & Production Management, 15*(3), 4-15.

Bowyer, J., Howe, J., Guillery, P., & Fernholz, K. (2004). *Trends in the Global Forest Sector and Implications for Forest Certification*. Minneapolis: Dovetail Partners, Inc.

Cashin, P., & McDermott, J. C. (2002). The Long-Run Behavior of Commodity Prices: Small Trends and Big Variability. *IMF Staff Papers, 49*(2), 175-199.

Castaño, J. (2002). The booming furniture industry in China. *Bois et Forêts des Tropiques, N° 277 (3), 277*(3), 85-87.

Choon, T. S. D. W. K., & Ginnings, J. M. (1999). *Impediments to market access for tropical timber*. Yokohama: International Tropical Timber Organization.

Chunquan, Z., Taylor, R., & Guoqiang, F. (2004). *China's Wood Market, Trade and the Environment*. Gland: WWF International.

Collomb, J.-G., Mikissa, J.-B., & Minnemeyer, S. (2000). *A first look at logging in Gabon*. Washington, DC: World Resources Institute.

Démurger, S., Yuanzhao, H., & Weiyong, Y. (2007). *Forest management policies and resource balance in China: an assessment of the current situation*. Ecully Cedex: Groupe d'Analyse et de Théorie Économique (GATE), CNRS.

EIA. (2005). *Chinese Involvement in African Illegal Logging and Timber Trade*. Washington, DC: Environmental Investigation Agency reporting to the US House of Representatives, Committee on International Relations, Subcommittee on Africa, Global Human Rights and International Operations.

EUWID. (2010). Gabon: No final ban on log exports after all. Retrieved April 2010, from www.euwid-wood-products.com

Farooki, M. (2010). China's Structural Demand and Commodity Prices: Implications for Africa. In C. M. Dent (Ed.), *China-Africa Development Relations*. London: Routledge.

Forests Monitor. (2001). *Sold down the river - The need to control transnational forestry corporations: a European case study*. Cambridge: Forests Monitor.

Fripp, E. (2006). *Illegal Logging and Related Trade: The Global Response and Indicators of Change*. London: Chatham House, Energy, Environment & Development Programme.

Gereffi, G., Humphrey, J., & Sturgeon, T. J. (2005). The Governance of Global Value Chains. *Review of International Political Economy, 12*(1), 78-104.

Goldstein, A., Pinaud, N., Reisen, H., & Chen, X. (2006). *The Rise of China and India - What's in it for Africa?* Paris: Development Centre of the Organisation for Economic Co-operation and Development (OECD).

Hache, E. (2008). Commodities Markets: New paradigm or new fashion? *Les cahiers de l'économie, No 69*.

Hayes, R. H., & Pisano, G. P. (1994). Beyond World-Class: The New Manufacturing Strategy. *Harvard Business Review*(January-February), 77-86.

Humphrey, J., & Schmitz, H. (2004). Governance in Global Value Chains. In H. Schmitz (Ed.), *Local Enterprises in the Global Economy - Issues of Governance and Upgrading* (pp. 95-109). Cheltenham: Edward Elgar.

ITTO. (2005). *ITTO Mission in support of the efforts by the Government of the Gabonese Republic to achieve the ITTO 2000 Objective and Sustainable Forest Management [Decision 2(XXIX)]*. Yokohama: International Tropical Timber Organization.

ITTO. (2006). *Status of Tropical Forest Management 2005: Gabon country profile*. Yokohama: International Tropical Timber Organization.
ITTO. (2009a). *Annual Review and Assessment of the World Timber Situation 2008*. Yokohama: International Tropical Timber Organization.
ITTO. (2009b). Trade startled by Gabon announcement. *Tropical Timber Market Report, 14*(22), 2.
ITTO. (2010). Clarification on Gabon log ban. *Tropical Timber Market Report, 15*(3), 2.
Jorgenson, A. K. (2008). Structural Integration and the Trees: An Analysis of Deforestation in Less-Developed Countries, 1990–2005. *The Sociological Quarterly, 49*, 503–527.
Kaplinsky, R. (2006a). China and the Global Terms of Trade. *IDS Bulletin, 37*(1), 43-53.
Kaplinsky, R. (2006b). Revisiting the revisited terms of trade: Will China make a difference? *World Development, 34*(6), 981-995.
Kaplinsky, R. M., Terheggen, A., & Tijaja, J. (2010). What Happens When the Market Shifts to China? The Gabon Timber and Thai Cassava Value Chains. *Policy Research Working Paper*(No 5206).
Kauppi, P. E., Ausubel, J. H., Fang, J., Mather, A. S., Sedjo, R., & Waggoner, P. E. (2006). Returning forests analyzed with the forest identity. *PNAS, 103*(46), 17574–17579.
Kozak, R., & Canby, K. (2007). *Why China Prefers Logs - Explaining the Prevalence of Unprocessed Wood in China's Timber Imports*. Washington, DC: Forest Trends.
Mather, A. S. (1992). The forest transition. *Area, 24*(4), 367-379.
Mather, A. S., Fairbairn, J., & Needle, C. S. (1999). TIhe Course and Drivers of the Forest Transition: the case of France. *Journal of Rural Studies, 15*(1), 65-90.
Mather, A. S., & Needle, C. S. (2000). The relationships of population and forest trends. *The Geographical Journal, 166*(1), 2-13.
Midgley, S. (2005). *Meeting China's Demands for Imported Wood and Wood Fibre*. Paper presented at the Forests, Wood and Livelihoods - Finding a Future for All.
Nilsson, S. (1996). "Do We Have Enough Forests?" *IUFRO Occasional Paper* (No. 5).
Nilsson, S., & Bull, G. (2005). *Global Wood Supply Analysis*. Paper presented at the FAO Advisory Committee.
Ocampo, J. A., & Parra, M. A. (2003). *Returning to an eternal debate: the terms of trade for commodities in the twentieth century*. Santiago: ECLAC Office of the Executive Secretary.
Prebisch, R. (1950). *The economic development of Latin America and its principal problems*. Lake Success: United Nations Department of Economic Affairs.
ProForest. (2009). *Guidance on effective ways to work with Chinese officials and suppliers*. Oxford: ProForest.
Rockart, J. F. (1979). Chief executives define their own data needs. *Harvard Business Review*(March-April), 81-92.
Rudel, T. K., Coomes, O. T., Moran, E., Achard, F., Angelsen, A., Xu, J., et al. (2005). Forest transitions: towards a global understanding of land use change. *Global Environmental Change Part A, 15*(1), 23-31.
Singer, H. W. (1950). The distribution of gains between investing and borrowing countries. *American Economic Review, 15*, 473-485.
Singer, H. W. (1975). The distribution of gains from trade and investment-revisited. *Journal of Development Studies, 11*(4), 376 - 382.
Skinner, W. (1969). Manufacturing - missing link in corporate strategy. *Harvard Business Review*(May-June), 136-145.
Sohngen, B., Mendelsohn, R., Sedjo, R., & Lyon, K. (1997). *An Analysis of Global Timber Markets*. Washington, DC: Resources for the Future.
Sturgeon, T. J. (2000). *How Do We Define Value Chains and Production Networks?* Paper presented at the Bellagio Value Chains Workshop.

Sun, C., Chen, L., Chen, L., Han, L., & Bass, S. (2008). *Global Forest Product Chains - Identifying challenges and opportunities for China through a global commodity chain sustainability analysis*. Manitoba: International Institute for Sustainable Development.

Sun, X., Katsigris, E., & White, A. (2004). Meeting China's demand for forest products: an overview of import trends, ports of entry, and supplying countries, with emphasis on the Asia-Pacific region. *International Forestry Review, 6*(3-4), 227-236.

Terheggen, A. (forthcoming). *The New Kid in the Forest: The Impact of China's Resource Demand on Gabon's Tropical Timber Value Chain.* The Open University, Milton Keynes.

Trinh, T., Voss, S., & Dyck, S. (2006). *China's commodity hunger: Implications for Africa and Latin America*. Frankfurt am Main: Deutsche Bank Research.

UNCTAD. (2009). Trade policy and tariff and non-tariff barriers, including phytosanitary measures. Retrieved November 2009, from http://www.unctad.org/infocomm/anglais/timbertrop/ecopolicies.htm#TNTB

Victor, D. G., & Ausubel, J. H. (2000). Restoring the Forests. *Foreign Affairs, 79*(6), 127-144.

White, A., Sun, X., Canby, K., Xu, J., Barr, C., Katsigris, E., et al. (2006). *China and the Global Market for Forest Products; Transforming Trade to Benefit Forests and Livelihoods*. Washington, DC: Forest Trends.

Wunder, S. (2003). *When the Dutch Disease met the French Connection: Oil, Macroeconomics and Forests in Gabon*. Bogor: Center for International Forestry Research.

Yates, D. (2008). French Puppet, Chinese Strings - Sino-Gabonese Relations. In K. Ampiah & S. Naidu (Eds.), *Crouching Tiger, Hidden Dragen? Africa and China*. Scottsville: University of KwaZulu-Natal Press.

Zhang, J., & Gan, J. (2007). Who will Meet China's Import Demand for Forest Products? *World Development, 35*(12), 2150–2160.

Zhu, Y. (2010). Trade, capital flows and external balance: is China unique in two hundred years of globalisation? *Journal of Chinese Economic and Business Studies, 8*(1), 1-22.