Global Context for the United States forest sector in 2030

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Abstract

The purpose of this study was to identify markets for, and competitors to, the United States forest industries in the next 30 years. The Global Forest Products Model was used to make predictions of international demand, supply, trade, and prices, conditional on the last RPA Timber Assessment projections for the United States. It was found that the United States, Japan and Europe would remain important markets out to 2030, but China would grow into the world's largest importer of roundwood and manufactured products. Mexico would become an important importer of sawnwood and papers; and the Republic of Korea of wood panels and pulp. The United States' share of exports of industrial roundwood and paper and paperboard would increase, while its exports of sawnwood would decline, replaced by exports from Canada, Finland, Austria, Chile, and New Zealand. Besides Finland and Austria, Indonesia, Malaysia and Thailand would remain the main competitors to U.S. exports of wood based panels.

OBJECTIVES

This study addressed the following questions: What might the global forest sector look like in thirty years time? Who will be important markets for particular forest products? Who will be the major exporters of forest products? And, how competitive will the United States' forest industries be compared with other major forest product exporters?

To that end, the objective of the study was to identify markets for, and competitors to, United States forest products in thirty years time. The aim was to give information to United States forest industries about potential markets for their products, and also identify countries that may directly compete with the United States for a share of these markets.

The prediction of United States markets and competitors was made with the Global Forest Products Model (GFPM, see Buongiorno et al. 2003). These predictions were made based on a particular set of assumptions regarding future development within the United States forest sector. These assumptions were drawn from the findings of the RPA Timber Assessment (Haynes 2003). The study therefore complemented the RPA Timber Assessment by describing in more detail its global context in terms of international trade and foreign market growth.

This paper will first summarize briefly the RPA Timber Assessment, what it is, and what information it provides. It will then describe enough of the GFPM to understand how it was used to predict global forest product markets. This will be followed by results regarding the trends in United States forest product consumption, production and trade, predicted with the GFPM. These trends will be compared with those in other countries to detect the main markets for the United States industries, and their main competitors.

THE RPA TIMBER ASSESSMENT

A thorough analysis of the future of the United States forest sector is contained in the most recent RPA Timber Assessment performed by the USDA Forest Service. The purpose of this assessment was to predict the wood resource situation in the United States out to 2050 and to provide an indication of the suitability of these resources to meet the United States' demand for forest products.

The RPA Timber Assessment makes a number of assumptions that influence supply, demand and trade of forest products. Assumptions influencing United States demand include macroeconomic activity, such as economic growth, employment, and exchange rates. Supply assumptions include area of forestland, investment in land management, and harvest from National Forests.

Assumptions were also made regarding trends in United States export and import shares of forest products. Essentially the RPA Timber Assessment exogenously set United States forest product imports and exports with the rest of the world.

So the focus of the RPA Timber Assessment was on the United States, and on its trade with Canada. This study complemented the RPA Timber Assessment by describing in more detail its global context by allowing developments in overseas markets, linked to the United States through international trade, to influence developments in the United States' forest sector. This was done with the Global Forest Products Model.

THE GLOBAL FOREST PRODUCTS MODEL

The GFPM captures the global context of the United States by taking into account the numerous and complex links between countries and industries.

The GFPM forecasts forest product trade, demand, supply and prices for 14 forest product groups. These forecasts are the solution of a competitive equilibrium in each year. In the GFPM a competitive equilibrium is when prices for each product in each country are such that the supply is equal to the demand for each commodity.

The 14 forest products in the GFPM are linked as inputs and outputs, so that changes in demand for one product affect supply, demand and prices for other products. For example, production of printing and writing paper requires wood pulp, other fiber pulp and waste paper, while production of wood pulp uses industrial roundwood and production of waste paper comes from the recycling of paper products. So, the demand for industrial roundwood is influenced by the demand for printing and writing paper via the demand for pulp for paper production. The availability of waste paper also influences the demand for industrial roundwood as it partly determines the amount of pulp needed to produce paper products.

The GFPM predicts the changes in markets for these 14 forest products for 180 countries, all linked through trade. From year-to-year the supply and demand for products change due to assumptions about the evolution of technology, for example the amount of industrial roundwood needed to produce 1 cubic meter of particleboard, and changes in government policies, for example the United States harvests from National Forests.

Elasticities, which represent the responsiveness of demand and supply of forest products to changes in prices, and in the case of demand, economic growth, are also important assumptions in the GFPM. These assumptions were adjusted to make the projections of United States and Canadian demand and supply comparable to the RPA Timber Assessment projections. The most important of these assumptions is growth in United States gross domestic product, as this influences the growth in United States demand for forest products.

Additional assumptions were the shifts in wood supply (for constant prices) for Canada and the United States, the rate of waste paper recovery, and the income elasticities of demand for newsprint, plywood and fiberboard. Shifts in wood supply were estimated from the RPA Timber Assessment projections of United States and Canadian timber harvests. The United States waste paper recovery rate was set to 50% throughout the projections from 2000 to 2030. That is, the United States is assumed to recover 50% of its total paper and paperboard consumed each year. The elasticities of demand with respect to country income for plywood, fiberboard and newsprint were set lower to capture the RPA assumption that oriented strand board is substituting for the use of plywood and fiberboard in construction, and electronic media are substituting for newspaper.

PROJECTIONS TO 2030

With these assumptions, the GFPM was used to make projections of each country's supply, demand, trade and prices of forest products, for each year to 2030.

Predicted United States consumption, production and trade

Fig. 1 shows the trend in United States industrial roundwood consumption, production and trade from 1961 to 2030. Trends from 1961 to 2001 are historical data from the Food and Agriculture Organization. Those from 1999 to 2030 are projections made using the Global Forest Products Model. Fig. 1 shows that United States exports of industrial roundwood are projected to grow above historical export levels. This occurs as United States roundwood harvests exceed the consumption of roundwood in the production of forest products.
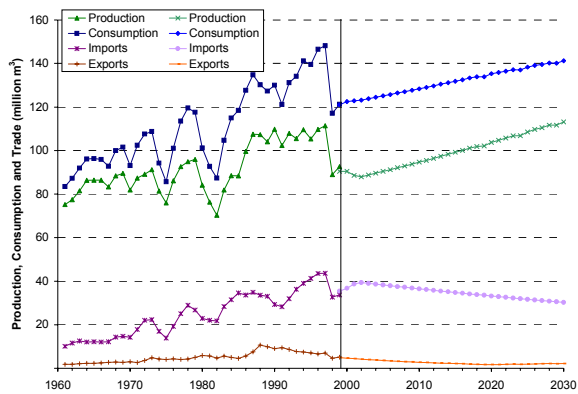

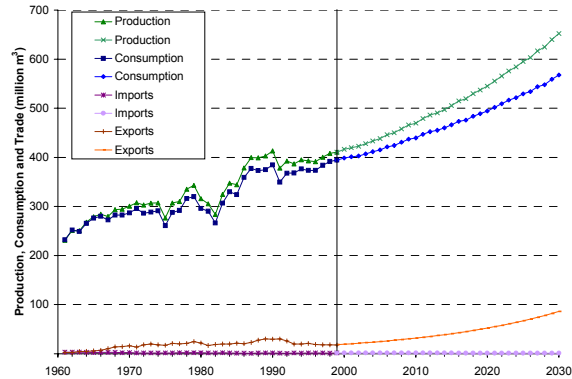
Fig. 1 U.S. industrial roundwood.

Fig. 2 U.S. sawnwood.

Fig. 2 shows that the growth in United States sawnwood production exceeds the growth in consumption, resulting in a decline in United States sawnwood imports. The GFPM also forecasts that United States exports of sawnwood will decline, continuing the trend that began in the late 1980s.

For United States wood based panels (plywood, particleboard and fiberboard), the GFPM forecasts show lower growth in United States production and consumption than during the 1990s (Fig. 3). As such the growth in imports of wood based panels is slower. United States exports of wood based panels are predicted to remain roughly at their 2000 level.
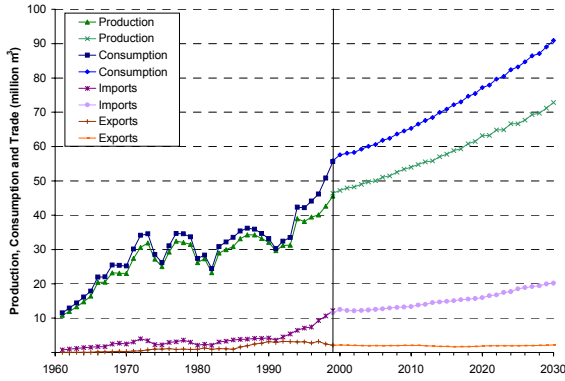
Fig. 3   U.S. wood panels

For wood pulp (mechanical and chemical pulp), the GFPM projections show slightly stronger growth in U.S. wood pulp production and consumption than during the 1990s (Fig. 4). Imports and exports of wood pulp would remain unchanged from 2000 to 2030.
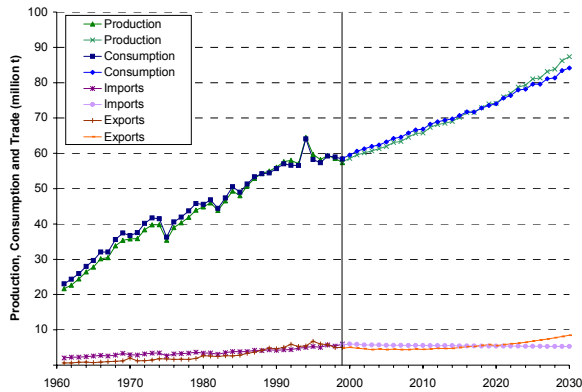

Fig. 4 U.S. pulp

Fig. 5 shows the U.S. trends for paper and paperboard (newsprint, printing and writing paper, and other paper and paperboard). The projections largely continue the historical trends, though more rapid growth in production compared with consumption leads to growth in United States paper and paperboard exports.
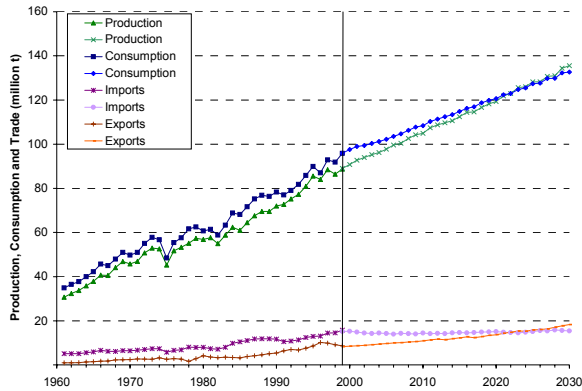
Fig. 5 U.S. paper and paperboard

Projected United States exports and main competitors

Table 1 shows the value of United States forest product exports in real million US dollars in 1999 and 2030. These values were calculated based on GFPM projections of global commodity prices. For example, the U.S. exported $772 million worth of wood based panels in 1999. The rank refers to how valuable United States' exports are relative to other countries. For example the United States was the second largest exporter of industrial roundwood in 1999, in value.

The main result to take from this table is that the value of United States exports of all commodities, except sawnwood, would increase. This growth in the value of exports is a combination of price increases, and growth in export volume. The especially large growth in the value of paper exports is most likely due to strong growth in real paper prices predicted by the GFPM, driven by rapid growth in China's demand for paper.

The decline in the value of United States sawnwood exports, and little change in the value of woodbased panel exports, raises the question of which countries are taking the United States' share of global exports of these commodities. Table 2 shows that among the current major exporters of sawnwood that strongly increase their exports out to 2030 Finland's exports increase 300% between 1999 and 2030, and those of Austria increase 350%. Emerging competitors to the United States are Chile and New Zealand, both increasing the value of their sawnwood exports by nearly 400%.

The export value and rank of competitors to United States in wood based panel exports are in Table 3. Current major exporters of wood based panels that increase their exports out to 2030 are Indonesia, Malaysia and Austria. Emerging competitors to United States wood based panel exports are Finland and Thailand. Finland increases the value of its exports by nearly 150%, and Thailand by over 400%.

Emerging world markets

The GFPM projections also indicate where the major markets for the different products will develop. Here they are measured by the value of imports. In particular, Table 4 shows the value of China's forest product imports in real million US dollars in 1999 and 2030. These values were calculated based on GFPM projections of China's imports and global commodity prices.

The value of China's imports of industrial roundwood in 1999 was just over $1 billion, and the GFPM predictions suggest that this could grow more than 15 times by 2030, in real dollars, net of inflation. The strong growth in Chinese GDP, which is part of the GFPM scenario, leads China to experience extraordinary growth in its imports of all product categories. By 2030, China would rank first as importer of all products.

The GFPM projections also reveal smaller, but still significant emerging markets, countries with low forest product imports in 1999, but larger imports in 2030. In particular, Table 5 shows that the value of Mexican imports of sawnwood increase 350% from 1999 to 2030, while Mexican imports of paper increase by over 500%. South Korea's imports of wood based panels and wood pulp are also projected to increase substantially in value, with imports of wood based panels increasing by over 400%, and imports of wood pulp increasing over 550%.

Table 1. Value and rank of U.S. exports.

Commodity[1]	1999		2030	
	Value[2]	Rank	Value	Rank
Roundwood	$1,497	2	$11,857	2
Sawnwood	$1,210	6	$666	12
Wood panels	$772	7	$851	12
Wood pulp	$1,966	2	$5,529	3
Paper	$6,345	4	$24,656	4

[1] Wood based panels - plywood, particleboard and fiberboard. Wood pulp - mechanical and chemical pulp. Paper - newsprint, printing and writing paper and other paper and paperboard. Roundwood refers to industrial roundwood only. [2] Millions of 1997 U.S. dollars.

Table 2. Value and rank of sawnwood exporters competing with the U.S.

Country	1999		2030	
	Value[1]	Rank	Value	Rank
Canada	$9,469	1	$11,005	1
Finland	$1,963	3	$7,902	2

Austria	$1,532	4	$6,849	3
Chile	$387	11	$1,637	7
New Zealand	$357	12	$1,740	6

[1] Millions of 1997 U.S. dollars.

Table 3. Value and rank of wood panel exporters competing with the U.S.

Country	1999 Value[1]	1999 Rank	2030 Value	2030 Rank
Indonesia	$2,531	2	$4,684	5
Malaysia	$2,129	3	$6,038	2
Austria	$608	8	$3,088	7
Finland	$497	10	$1,215	11
Thailand	$257	12	$1,373	9

[1] Millions of 1997 U.S. dollars.

Table 4. Value and rank of China's imports.

Commodity	1999 Value[1]	1999 Rank	2030 Value	2030 Rank
Roundwood	$1,049	2	$17,443	1
Sawnwood	$822	8	$10,612	1
Wood panels	$1,946	3	$11,641	1
Wood pulp	$1,462	3	$23,413	1
Paper	$8,813	2	$67,567	1

[1] Millions of 1997 U.S. dollars.

Table 5. Emerging importers of forest products.

Country	Commodity	1999 Value[1]	1999 Rank	2030 Value	2030 Rank
Mexico	Sawnwood	$258	12	$1,183	9
	Paper	$1,272	11	$7,712	7
S Korea	Wood panels	$539	9	$2,848	3
	Wood pulp	$896	6	$5,931	2

[1] Millions of 1997 U.S. dollars.

CONCLUSION

The United States, Japan, and Europe are projected to remain important importers of forest products out to 2030. Rapid economic growth in China will result in its becoming the world's largest importer. Important emerging markets for forest product imports are Mexico, for solid wood and paper products; and the Republic of Korea for industrial roundwood, plywood, wood pulp, and recovered paper. The predicted growth in Mexican imports of forest products presents an opportunity for expanding U.S. exports, which may be strengthened by the North American Free Trade Agreement.

The GFPM projections show the U.S. will increase the value and its share of exports of industrial roundwood and other paper and paperboard by 2030. At the same time there would be a decline in the value of U.S. exports of sawnwood, and printing and writing paper. Finland, Austria, Chile and New Zealand are projected to gain some of the U.S. share of sawnwood exports. Finland and Thailand are emerging exporters of wood based panels that would increase their share of world exports at the expense of the U.S. These projections could be affected by future policies, for example if the U.S. government decided to prevent a large growth of raw wood exports.

A shortcoming of this study is that it was done after the RPA Timber Assessment. A better approach might be to combine the RPA Assessment models and the GFPM, through an exchange of information as the RPA scenarios are being developed. The GFPM would provide the RPA models with data on the international context, while the RPA models would feed the GFPM with information on U.S. trends likely to affect its competitiveness worldwide. This would then increase the likelihood that the RPA projections fully reflect the complex links of the U.S. forest sector with the rest of the world through trade.

ACKNOWLEDGMENTS

LITERATURE CITED

Buongiorno, J., S. Zhu, D. Zhang, J. Turner, and D. Tomberlin. 2003. The Global Forest Products Model: Structure, Estimation and Applications. Academic Press, San Diego, CA. 301 pp.

Haynes, R.W., Technical Coordinator. 2003. An Analysis of the Timber Situation in the United States: 1952 to 2050. A Technical Document Supporting the 2000 USDA Forest Service RPA Assessment. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR. 254 pp.