

Can Montana Participate in the Lumber Export Market to China?

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Abstract

The severe recession and the housing and lumber market collapse in the 2007 to 2011 period has led to increased interest in market diversification in an attempt to cushion the impact of market swings in the United States. An international market diversification strategy has been implemented by several lumber manufacturers in Oregon and Washington that allowed them to be well positioned to shift sales to the Asian market during this domestic lumber market collapse. By diversifying a portion of sales into new international markets, Montana sawmills may be able to stabilize demand for their products instead of being subject to domestic market demand swings. To determine if Montana sawmills can participate in the Chinese export market and to identify the best export opportunities, a strategic assessment was conducted through the use of a SWOT (strengths, weaknesses, opportunities, threats) analysis. For this process, Montana's lumber industry core competencies were identified and aligned with Chinese wood product demand to highlight potential export opportunities for the Montana sawmill industry. It was found that the optimal export opportunity consisted of dimension lumber from Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), and ponderosa pine (*Pinus ponderosa*) species with nominal 2 by 4 dimensions and with No. 3 utility and No. 4 economy product grades. This product mix provided the best fit with Montana's timber supply, manufacturing capabilities, and Chinese product demand. By incorporating this strategy with the help of international lumber brokers and experienced exporters, Montana sawmills will be well positioned to respond to domestic market fluctuations and future Chinese product demand opportunities.

With the global economy becoming more integrated through improvements in shipping and communication technology, opportunities for global trade have continued to rise. Over the past 3 to 5 years, Asian markets have shown a large increase in their wood product imports, with the most striking increase taking place in China (Softwood Export Council [SEC] 2012). In 2012, China imported approximately 636.7 million cubic feet (MMCF) of lumber (International Wood Markets Group [IWMG] 2013). Diversifying into the Chinese market has become an especially strong interest for US wood product manufacturers trying to hedge against the low lumber demands caused by the Great Recession housing crash of 2007 to 2011.

An international sales diversification strategy allows manufacturers to shift sales volumes toward markets that can provide the best price at that time in order to improve long-term production stability and profitability. Pacific Northwest mills that have implemented this strategy note that a key component is the long-term maintenance of business relationships with foreign buyers because it allows for a quicker sales volume transition to exports rather than having to initiate new international business relationships (Stallcop 2013). Lumber mills in Oregon and Washington

that had utilized this strategy were well positioned to maintain their production and sales levels during the housing and wood market collapse, while other US wood product manufacturers experienced significant downturns. Between 2009 and 2011, the value of wood product exports from western states increased by 87 percent, with the majority of increase being attributed to Chinese imports (Keegan et al. 2011). Lumber market prices for China and the northern inland United States (Montana, Idaho, eastern Oregon, and eastern Washington) during this time period are presented in Figure 1.

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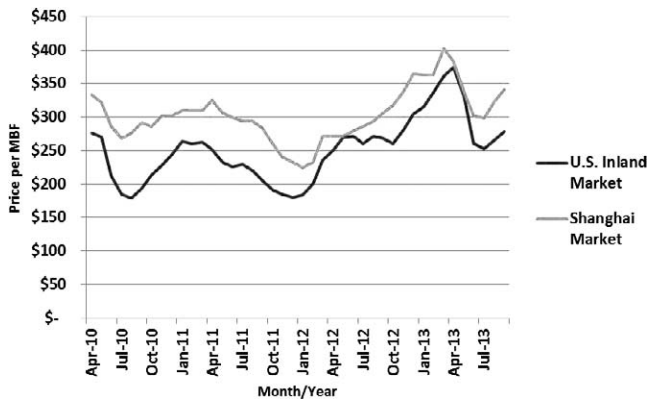


Figure 1.—Market price per thousand board feet (MBF) comparison of 2 by 4 lumber No. 3 grade (Random Lengths 2012b, 2013b). Chinese market prices were available only back to April 2010.

Montana’s forest products industry has been experiencing numerous challenges during the last two decades. The annual production of wood products in Montana has steadily declined since 1988, even while markets for these products were strong and increasing (Morgan et al. 2012). Since 1990, approximately 30 Montana lumber mills have closed their doors, resulting in over 3,300 layoffs of lumber mill employees (Morgan et al. 2012). Of the remaining mills in Montana, the estimated 2012 lumber production was approximately 35 million cubic feet, which is about half of the amount produced in 2000 (Morgan et al. 2013). The primary reason stated for the decline of Montana’s forest industry is reductions in National Forest timber harvest levels, which is attributed to appeals, litigation, endangered species, effects of past harvesting, and federal budget cuts (Spoelma et al. 2008). These harvest declines began to occur in 1988 and have existed to the present time. Total annual timber harvests for Montana from 2009 to 2012 are at their lowest levels since 1945 (Morgan et al. 2012).

In addition to decreased harvest levels, the Great Recession was also problematic for Montana wood product manufacturers (Morgan et al. 2011, Keegan et al. 2011). The collapse of the US housing market resulted in annual housing starts between 2008 and 2012 being at their lowest levels since the US Census Bureau began monitoring housing starts in 1959 (US Census Bureau [USCB] 2013a). In 2011, Montana’s primary wood and paper product sales had declined by 71 percent from 2006 levels (Bureau of Business and Economic Research [BBER] 2011–2012). A visual presentation of this decline can be seen in Figure 2.

There has been a growing interest among several of Montana’s wood product manufacturers to identify opportunities to diversify their product sales into new markets to provide a hedge against low domestic demand that remains below pre-Recession levels. This growing interest brings up several questions, such as the following: What are the strongest opportunities for Montana products in China? Can Montana manufacturers compete with mills in Washington, Oregon, and British Columbia as well as Latin America, Russia, New Zealand, and other Asian wood product manufacturers? Furthermore, what would be the best implementation strategy for Montana mills to enter the Chinese market?

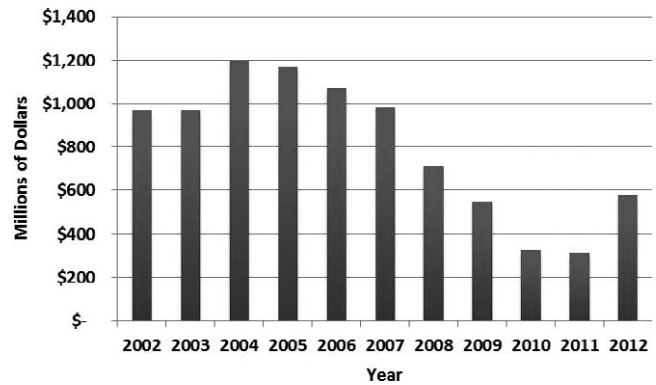


Figure 2.—Montana’s primary wood and paper product sales. (Forest Products Outlook 2003–2013, Bureau of Business and Economic Research 2011–2012).

Goals and Objectives

The goal of this research was to determine the wood products produced in Montana that have the best export potential to China, perform a SWOT (strengths, weaknesses, opportunities, threats) analysis, and determine if Montana wood product manufacturers could effectively participate in Chinese export markets. Specifically, the objectives were as follows:

1. Ascertain Montana’s wood product export strengths by identifying the potentially harvestable timber supply and the products produced by primary manufacturers that could potentially be exported
2. Determine Montana’s wood product import weaknesses by conducting an internal industry situation assessment
3. Identify the wood product export opportunities to the Chinese market
4. Recognize potential threats for Montana wood product manufacturers participating in this market
5. Define the export opportunities that provide the best fit between Chinese demand and Montana’s manufacturing capabilities
6. Develop a financial analysis that presents a sales revenue comparison for each product export opportunity
7. Determine the best method to enter the Chinese lumber market

Methodology

Business strategy is about identifying the position of a group or organization that best achieves long-term profitability by matching core competencies with market opportunities (De Kluyver 2012). One of the primary tools of strategy development is the SWOT analysis, which is a method that identifies an organization’s strengths and weaknesses and the opportunities and threats that exist for a particular environment in an industry. This tool provides information to support recommendation of the position that provides the best opportunity for success.

The SWOT analysis method outlined by De Kluyver (2012) is developed from the findings of three research processes: (1) resource analysis, (2) a market opportunity analysis, and (3) a competitive rivalry assessment. The resource analysis was undertaken to identify the volume, size, and species of timber potentially available in Montana; the products that could potentially be produced from that

timber; the products that are currently produced by the timber processors in the state; and the unutilized manufacturing capacity that could be used for developing products for export. The Chinese market opportunity analysis identified past product demand trends, future demand expectations, and sociocultural preferences in order to identify potential matches with products produced in Montana. The competitive rivalry assessment was then used to identify the primary threats faced by a Montana organization choosing to participate in the Chinese wood product export market.

Montana resource analysis (strengths and weaknesses)

In order to estimate net harvestable volume and annual growth rates of timber that could feasibly be harvested based on current logging constraints, forest inventory information was retrieved from the Interior West Forest Inventory and Analysis (FIA) Program of the US Department of Agriculture (USDA) Forest Service (Miles 2012). It was assumed that feasibly harvestable timber had to be located on nonreserved timberland, have a minimum of 7.0 inches of diameter at breast height (DBH), be within half a mile of an existing road, and occur in tree stands younger than 100 years of age and on a slope of 40 percent or less. The FIA tool that was utilized for the data extraction was the EVALIDator Version 1.5.1.2a using 2009 data (Miles 2012).

The major source of information used to analyze Montana’s wood products industry was the 2009 Montana Forest Industries Data Collection System (FIDACS) report. FIDACS reports are a series of censuses of the timber using industry in the western states, performed on a regular basis by the BBER at the University of Montana in cooperation with the Interior West and Pacific Northwest FIA programs of the USDA Forest Service. The most recent report on Montana was for 2009 and was produced by McIver et al. (2012). Additional Montana sawmill capacity information was retrieved from Keegan et al. (2005).

To gain an understanding of Montana’s wood product manufacturers’ internal capabilities in regard to exporting, a situation analysis was conducted through personal communications with representatives of the largest Montana sawmills, board members of the Montana Wood Products Association Round-table, Research Foresters at the BBER, and private forestry consultants based in western Montana. The objectives of the situation analysis were to determine export knowledge, export experience, and challenges preventing companies from exporting.

Chinese market opportunity analysis (opportunities)

To identify past Chinese wood product demand trends and determine future expectations, import and export data were collected from US government and private industry trade statistics and reports (Cao et al. 2006, US Commercial Service [USCS] 2011, SEC 2012, IWMG 2013). In addition, multiple interviews were conducted with forest product export consultants (R. Braden, personal communication, 2012; Brindley 2012; Fang 2013), and information was sought from representatives of wood product companies that are already exporting wood products to Asia (Owen 2012, Stallcop 2013).

Competitive rivalry assessment (threats)

A Porter’s five forces analysis conducted by Scudder (2012) was used to assess industry competitive rivalry in order to identify the potential threats that may exist to Montana companies that participate in this export industry (Porter 2008). The five forces model assesses the threat of new entrants to an industry, the power of raw material suppliers for an industry, the power of buyers an industry participant would be selling to, the threat of substitute products or services, and the existing rivalry among participants. Each of these forces had a series of subcomponent threats that can be scored in order to determine the threat strength of each force (Porter 2008). The scale of the scoring was between 1 and 10, with 10 being perceived as a high potential threat, a 5 indicating a moderate threat, and a 1 being perceived as a low potential threat. This assessment was conducted with the procedures outlined by Porter (2008), with the subcomponent scoring based on a literature review of relevant trade and scientific journals as well as interviews with industry professionals. Once completed, the scores of each force category were summed in order to determine the strongest perceived export industry threats.

SWOT analysis (summary and position)

The information collected from the resource analysis, the Chinese market opportunity analysis, and the five forces analysis was compiled in order to create a summary of the strengths, weaknesses, opportunities, and threats that exist for Montana’s wood product manufacturers when participating in the Chinese wood product export industry. By combining this information with the SWOT analysis model presented by De Kluyver (2012) and illustrated in Figure 3, a determination of the appropriate strategic position for Montana wood product manufacturers was attained.

The SWOT model recommends that an export focus be placed on the products where manufacturing strengths and foreign market opportunities align. Where there are manufacturing weaknesses and industry threats, it is suggested that a turnaround and defensive strategy be designed to mitigate these concerns. Finally, where manufacturing strengths and industry threats align, the

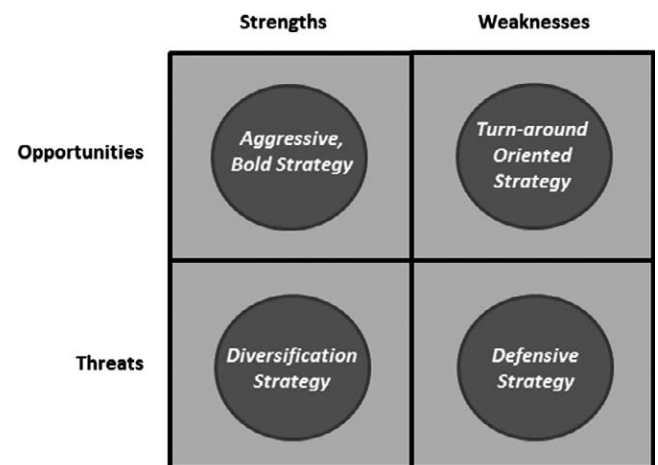


Figure 3.—SWOT (strengths, weaknesses, opportunities, threats) and strategic posture analysis (De Kluyver 2012).

SWOT model recommends that various product diversifications be made.

Financial analysis (sales revenue comparison by market)

To compare sales revenues of the products identified during the SWOT analysis with competitor mills on the west coast of Washington, Oregon, and British Columbia, a financial analysis was conducted. This analysis was developed by gathering domestic lumber market prices for various grades and specific geographic locations from Random Lengths (2012b) publications. Chinese market prices of these same products were gathered from US forest product export consultants (R. Braden, personal communication, 2012). In addition, shipping expenses were collected from freight forwarders and rail carrier companies (J. Lewis, personal communication, 2012; L. Stewart, personal communication, 2012). From these prices and expenses, a residual cash flow analysis was performed that compared gross sales revenues of product-species types by geographic region.

Results and Discussion

The following sections present the results for the four segments of the SWOT analysis, which are Montana's strengths and weaknesses identified in the resource analysis, the Chinese market opportunities, and the industry threats. This is followed by the results of the SWOT analysis model.

Montana strengths

Based on the resource analysis, the total net standing timber inventory that could feasibly be harvested in Montana is approximately 3,214.6 MMCF (Miles 2012). The greatest potential net harvestable volume is from Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), and ponderosa pine (*Pinus ponderosa*) tree species, which represented 73 percent of the total, followed by western larch (*Larix occidentalis*) and Engelmann spruce (*Picea engelmannii*). The majority of this supply is in the small-diameter-size classes (7.0 to 14.9 in.), which represent approximately 70 percent of the total net harvestable volume. The net annual growth rate of these five primary species is approximately 153.7 MMCF, which accounts for average annual timber mortality (Miles 2012). The net annual growth rate of these five primary species minus annual timber harvests is approximately 76.9 MMCF (Miles 2012).

Historically, 70 percent of Montana's timber harvest has been utilized to produce lumber (McIver et al. 2012). Of the total lumber production in Montana, it is estimated that 77 percent is for dimension lumber (Spoelma et al. 2008). There are approximately 41 existing sawmills in Montana, and the 11 largest are responsible for 98 percent of the total production (McIver et al. 2012). The majority of large mills are located in northwestern and western Montana near the log supply. In addition, the majority are located on or near major rail lines. The timber processing capacity of Montana's mills is approximately 127.9 MMCF (McIver et al. 2012). In 2012, sawmills were operating at approximately 66 percent of this capacity (McIver et al. 2012, Morgan et al. 2013). The timber processing capacity in Montana has a large focus on small-diameter logs. Studies indicate that 18 percent of Montana's processing

capacity was between 7 and 9.9 inches DBH, compared with 5 percent in Idaho and 3 percent in eastern Washington (Keegan et al. 2005).

Based on these findings, it was determined that the strengths of Montana's forest products industry is sawn lumber produced by the 11 largest sawmills. The species of timber available to supply these mills is primarily Douglas-fir, lodgepole pine, and ponderosa pine, with the majority of the timber volume consisting of trees with diameters of less than 15 inches DBH. In addition, Montana mills are better suited to process smaller-size-diameter timber than nearby mills in Idaho and eastern Washington.

Montana weaknesses

Historically, very little of Montana's lumber output has been marketed in Asia. According to data collected by the Department of Transportation, approximately 94 percent of Montana's wood product exports are shipped to Canada, 4 percent is shipped to Mexico, and less than 1 percent is shipped to Asia and other countries (Freight Analysis Framework 2011). Personal communications conducted during this situational analysis revealed that the primary reason that wood product manufacturers are not exporting to Asia is that they do not know what types of products are in demand and do not understand the export process or how to establish international business relationships. Respondents expressed concerns of nonpayment by foreign buyers and damaging existing domestic customer relationships if fulfilling large international orders reduces capacity to meet domestic orders. This puts Montana manufacturers at a disadvantage because competitive manufacturers in Oregon, Washington, and British Columbia have been exporting substantial volumes of wood products to Asia for the last few decades (Owen 2012). An additional challenge faced by Montana manufacturers is the 500-mile distance from ocean ports in Seattle and Tacoma, which represents an additional shipping cost.

Chinese market opportunities

In 2012, China was the leading country in Asia for lumber imports (SEC 2012). Data presented by the International Wood Markets Group suggest that China's total lumber import volumes in 2012 were 636.7 MMCF. The leading suppliers of softwood lumber to China in 2012 were Canada and Russia, which supplied 35 and 34 percent of China's imports, respectively. Lumber exports from the United States represented just 12 percent of the total. This was followed by Thailand at 8 percent, Indonesia at 4 percent, Chile at 3 percent, and New Zealand at 3 percent (IWMG 2013). Compared with 2011, China's lumber imports from Canada and the United States declined by 6 and 17 percent, respectively. This is largely due to an improvement in the US housing market during the first quarter of 2013. While representing much smaller volumes, Chile and New Zealand's 2012 exports to China grew by 17 percent and 19 percent, respectively. China's lumber imports experienced a decline toward the end of 2012 and in the beginning of 2013. However, in the second quarter of 2013, total log and lumber import values increased by 30 percent year over year, which was primarily the result of a rebound in Chinese housing development (Ekstrom 2013).

Industry analysts have determined that approximately 85 to 90 percent of China's softwood imports are dimension

lumber being utilized for multifamily housing construction (Brindley 2012). China has the world's largest construction market and is expected to build over 50 percent of the world's buildings during the next decade (USCS 2011), with 3 to 5 million new housing starts occurring annually (Owen 2012). In 2009, there was approximately 44 billion square meters of buildings in existence in China. The country is constructing an average of 2 billion square meters of floor space on an annual basis (USCS 2011). It is estimated that there will be an additional 30 billion square meters of new construction by 2020 (Cao 2009). By comparison, just over 129 million square meters of housing was constructed in the United States in 2012 (Random Lengths 2013a, USCB 2013b).

The majority of China's housing is concrete multiunit apartments or condos. Wood frame construction was popular with traditional Chinese architecture but now is primarily used only for luxury housing. Softwood lumber products are used primarily for the concrete forms utilized in constructing large apartment/condo buildings and for attaching drywall to the interior concrete walls (R. Braden, personal communication, 2012; Cao et al. 2006; Owen 2012; Fang 2013). The type of softwood lumber that is utilized for the construction of concrete forms is low-grade 2 by 4s or 2 by 6s. Metric cuts and high-grade quality are not needed because the concrete forms are temporary structures (Owen 2012, Fang 2013). The desired lengths of these 2 by 4s or studs is dependent on the construction project, but softwood export specialists have noticed that there is an increased desire for 10-foot lengths (R. Braden, personal communication, 2012). A photo representation of concrete forms is presented in Figure 4.

The attachment of drywall to the interior walls is also performed with small-size dimensional lumber. These pieces of lumber are ripped lengthwise into furring strips that have a thickness and width of 18 and 38 mm (Owen 2012, Fang 2013). Despite the fact that the end furring strip product is metric, according to industry specialists it is not required that metric studs be imported (R. Braden, personal communication, 2012; Owen 2012; Fang 2013). The actual English dimension of a nominal 2 by 4 or stud is 1½ by 3½ inches. The metric dimension of a nominal 2 by 4 is 38 by

89 mm. By ripping a 2 by 4 or stud lengthwise, four furring strips can be created with a dimension of 18 by 38 mm while allowing for three kerf cuts of 5.6 mm. These furring strips are attached to the interior concrete floors, ceilings, and walls in a lattice framework that can be utilized to attach the drywall and flooring pieces and to ensure that the flooring is level (Owen 2012, Fang 2013). A photo representation of this lattice framework is presented in Figure 5. Originally, Chinese softwood lumber importers were utilizing low-grade 2 by 4s for the construction of these furring strips. However, it has been realized that total construction costs can be lowered by purchasing higher grades of lumber, such as structural light framing No. 2 and No. 3 grades (R. Braden, personal communication, 2012). This combination of 2 by 4s or studs for assembling concrete forms and constructing 18 by 38-mm furring strips is the largest use of softwood lumber imports into China. The growing imports of these products are being driven by China's growing real estate market.

Based on these findings, it was determined that the largest softwood lumber opportunity existing in China is for small-size dimensional lumber, with a focus toward lower-quality grades due to the price sensitivity of Chinese customers.

Threat analysis

The primary threat for mills participating in the export industry is the limited log supply due to declining harvest levels on National Forest lands (Spoelma et al. 2008). Personal communications with sawmill representatives revealed that mills are having trouble meeting the increasing domestic demand for lumber due to limited log availability. The secondary threat for Montana mills participating in the export industry is the high number of manufacturers offering the same commodity products. Based on the Random Lengths 2012 mill directory, which contains information for British Columbia, Washington, Oregon, Idaho, and Montana, the 13 listed sawmills in Montana represent just 7 percent of the total sawmills for these five states or provinces (Random Lengths 2012a). Furthermore, there are numerous competitors in Russia, Thailand, Indonesia, New Zealand, and Latin America. It was also found that there are low-switching costs for Chinese buyers that are driven by low



Figure 4.—Concrete form construction in China (Fang 2013).



Figure 5.—Furring strip flooring lattice framework (Owen 2012).

product differentiation, large purchase orders by first-tier distributors, and the high price sensitivity of buyers.

SWOT analysis

An analysis of the SWOT analysis model determined that Montana manufacturers should assume a strategic posture that pursues primarily exports of small-size dimensional lumber. This posture compliments Montana's capabilities for sawn lumber products manufactured from trees with diameters generally less than 15 inches and meets the Chinese demand for 2 by 4 dimension lumber for concrete form construction.

To determine the grades of the above products that provided the largest potential sales revenue, a financial analysis was performed for No. 2 grade, No. 3 utility grade, and No. 4 economy grade of the 2 by 4 lumber. The analysis compared lumber market prices and shipping costs between US inland mills, US west coast mills, and Canadian west coast mills to identify which product grades would provide the largest sales revenues for Montana manufacturers. This is shown in Table 1. It should be noted that these market prices are the 2012 average for the specified regions and will vary between mills. The market prices represent what mills could receive for their products F.O.B. (Free On Board) with the mill as the shipping point in their region.

As can be seen in Table 1, Montana lumber mills can participate in the Chinese export market when exporting No. 3 utility and No. 4 economy grade 2 by 4s, even with the addition of the rail cost to west coast ports. Assuming that the market prices and shipping expense ratios remain the same, exporting No. 3 and economy grade 2 by 4 lumber to China would provide higher sales revenues than the domestic market. While it was found that some Chinese construction contractors are beginning to move toward No. 2 grade lumber, Montana mills will receive larger sales revenues when selling these products in the US inland market over Shanghai. This financial analysis suggests that the largest sales revenues for Montana mills will occur with exporting No. 3 and No. 4 lumber. While coastal lumber mills in Oregon, Washington, and British Columbia can

obtain larger sales revenues per thousand board feet (MBF) when exporting at these price and expense ratios, Montana lumber mills can still participate in this market and earn larger revenues than would be received in the US inland market.

The restraining factors identified in the SWOT analysis for Montana wood product manufacturers to participating in the export market to China are limited export experience and the high degree of competitive rivalry in this industry. To overcome this limited amount of experience, it is recommended that Montana lumber manufacturers seek out opportunities to work with international lumber brokers or larger manufacturers that have an established track record of export success. These companies are typically well experienced in international price trends and export logistics. For a commission fee, they can include additional lumber volumes into their export shipments. This strategy would allow Montana manufacturers to access Chinese markets with minimal costs incurred. In addition, working with experienced American lumber brokers and exporters would reduce the perceived level of threat from other international competitors.

Personal communications with sawmill representatives revealed that approximately 15 percent of the total mill-produced lumber is graded as No. 3 or No. 4. Previously, it was stated that Chinese lumber importers generally prefer to make large purchase orders. While 15 percent or less of total production for a typical sized mill in Montana does not constitute a large order by Chinese standards, it would be large enough for international lumber brokers or other large manufacturers that are trying to put a large export shipment together. This is a strategy that has been implemented by several smaller manufacturers in Oregon during the last 5 years (Stallcop 2013).

In addition to working with brokers and other manufacturers experienced in exporting, Montana lumber manufacturers have the option of increasing their knowledge of international wood product markets by participating in trade missions sponsored by US organizations. The SEC, located in Portland, Oregon, helps US primary and secondary wood

Table 1.—Sales revenue analysis for various 2 by 4 product grade exports to China.

Item	Revenues, costs, and profits per thousand board feet (MBF) by product grade (\$)								
	US inland mills ^a			US west coast mills ^b			Canada west coast mills ^c		
	No. 2	No. 3	Economy	No. 2	No. 3	Economy	No. 2	No. 3	Economy
Chinese market price (approximate Dec 2012 market price, cost, insurance, and freight) ^d	441.75	364.25	356.50	441.75	364.25	356.50	441.75	364.25	356.50
Shipping expenses									
Average rail shipping cost to west coast port ^e	30.50	30.50	30.50	1.83	1.83	1.83	1.83	1.83	1.83
Average ocean carrier cost from Seattle–Tacoma to Shanghai ^f	55.20	55.20	55.20	55.20	55.20	55.20	55.20	55.20	55.20
Other shipping expenses ^g	3.54	2.56	1.88	3.09	2.60	1.88	3.00	2.51	1.67
Total shipping expenses	89.24	88.26	87.58	60.12	59.63	58.91	60.03	59.54	58.70
Sales revenue realized after shipping to Shanghai	352.51	275.99	268.92	381.63	304.62	297.59	381.72	304.71	297.80
Sales revenue realized in domestic market ^h	353.00	255.00	187.00	308.00	259.00	187.00	299.00	250.00	166.00
Difference in recognized sales revenue by exporting to Shanghai	(0.49)	20.99	81.92	73.63	45.62	110.59	82.72	54.71	131.80

^a US inland refers to eastern Oregon, eastern Washington, Idaho, Montana, and Wyoming.

^b US coast refers to western Oregon and western Washington.

^c Canada coast refers to British Columbia.

^d R. Braden (personal communication, 2012).

^e J. Lewis (personal communication, 2012). US inland cost is based on Missoula to Seattle transport; US and Canada west coast transport assumes same cost per mile as inland transport but with a distance of 30 miles.

^f L. Stewart (personal communication, 2012).

^g These are flat-rate fees required for each shipment. According to Weiss (2008), the average cost for each freight forwarder fee and each customs clearance fee is \$200. For this cash flow analysis, it was assumed that the order size was 3.62 million board feet (MMBF), which was the average monthly import volume for 30 Chinese companies surveyed in 2011 (SEC 2011).

^h Random Lengths (2012c). Refers to average 2012 mill F.O.B. (Free On Board Shipping Point) price.

product companies access new international markets through the attendance of sales missions and wood product trade shows. Another group that provides similar services and often works with the SEC is the US China Build Group, located in Tacoma, Washington. Both of these groups receive funding from the US Foreign Agriculture Service, which is used to support overseas marketing activities and assist participating companies with travel costs (SEC 2013). By participating in these reasonably affordable programs, Montana wood product manufacturers would have the ability to learn more about Chinese customer product preferences and become more informed on international market trends. This knowledge would help Montana companies anticipate changing wood product export opportunities so that they will know which products and market diversifications will provide them with the largest sales revenue opportunities.

Conclusions

The goal of this research was to determine if Montana could participate in the lumber export market to China and identify the optimal approach by utilizing the strategic formulation process presented by De Kluyver (2012). This process identified the primary resource competencies possessed by Montana's forest industry and linked them to Chinese wood product demand opportunities that provided the best fit. The motivation for this research came about from the severe recession and housing and wood market collapse in the 2007 to 2011 period that led to increased interest in broadening market sales in an attempt to lessen the impact of domestic market swings. By identifying new markets to diversify product sales, wood product manufac-

turers would have a chance to protect themselves from market swings typical of many wood products like lumber.

Using the strategic formulation process, it was determined that Montana can effectively participate in this lumber export market to China. The Montana wood products that provided the best fit with Chinese import demands were dimension lumber (2 by 4s and 2 by 6s) of Douglas-fir, ponderosa pine, and lodgepole pine. It was determined that a focus on No. 3 utility and No. 4 economy grade products should take place due to higher sales revenues that could be achieved when compared with sales revenues in the US inland market.

It is further recommended that Montana companies seeking to participate in the Chinese export market begin by working with international brokers and large manufacturers experienced in exporting wood products to China. By working with experienced exporters, this approach allows for reduced risk and minimal costs. Furthermore, the relatively small production volumes typical of Montana mills would not be a hindrance for entering this market. If Montana companies take advantage of trade mission opportunities sponsored by organizations like the SEC and the US China Build Group, they will be well positioned to identify market diversification opportunities and more able to respond to price fluctuations in the domestic market, which will stabilize long-term production and sales.

In conclusion, it should be stated that these recommendations should not be taken on by Montana lumber mills as their sole export strategy. The goal of this research and its recommendations is to present that it is feasible for Montana wood product manufacturers to participate in this market and earn higher sales revenues for specific products. The above recommendations were specific to the Chinese market during recent years. The takeaway point should be that

manufacturers located in inland locations are not confined to participating only in domestic markets. If inland mills seek to expand to new international markets, it is always recommended that they base their sales decisions on current market data and incorporate the assistance of brokers, other manufacturers, and consultants experienced in international trade.

The primary limitation of this research was the delay between real-time market changes and lumber industry report publications. It should be noted that this recommendation was determined to be viable during the years 2011 and 2012 and the first 6 months of 2013 before this research was submitted for review. International lumber prices are highly dynamic, resulting in sales opportunities and potential revenues to be in a constant state of flux. As can be seen in Figure 1, for the majority of elapsed time since April 2010, Montana mills could likely have received higher sales revenues for exporting low-grade lumber to China over selling it domestically. However, there are several periods during the presented time series that would have resulted in a loss. An additional limitation was the lack of available market and sales information on competitor lumber mills in other countries. Because of this factor, it was not possible to provide the level of detailed information that was presented on competitor mills in Washington, Oregon, and British Columbia.

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