The Role of Lumber Futures Markets for Forest products Firms

Do Forest Products Firms Take Positions in Lumber Futures Market

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In this essay, I have taken an investigative approach in exploring the usage of lumber futures market by forest products firms. First I will cover the overview of forest products firms and the type of market they trade in. Then three lumber futures markets (Lumber, Pulp and Plywood) will be briefly described. The role of lumber futures will then be described in more details. The essay concludes with research in regard to the question: "Do forest products companies use lumber futures?"

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Abstract

The theory of the firm under price uncertainty and the role of futures market have been the subject of numerous studies. According to Feder, Just and Schmitz, firms are under price uncertainty and futures contracts are playing an increasingly important role in the commodity markets (Feder et al. 317). In 1969, large forest products firms began engaging in hedge practices in order to mitigate their exposures to change in supply and change in inventory price. Forest products firms acquire their input from forest operation and sell their output to lumber product manufacturers. The output prices vary depending mainly on the spot price of lumber in the commodity markets. Assuming that the forest products firms are risk-adverse, these firms will benefit from writing lumber futures contracts in order to reduce their exposures to output price fluctuations due to variation in market players' objectives and expectations.

This paper investigates how large forest products firms use the lumber futures market to achieve their business objectives. Comparison and analysis of academic research from economists and industry professionals have demonstrated that futures markets aim the forest products producers facilitate risk management, discover future prices, and make decisions under uncertainty. With these benefits, it is reasonable to assume that the use of lumber futures is a common practice in the forest product industries. To determine the extent of use of lumber futures contracts, I analyze the financial statements of five public North America forest product companies. My research has shown that only one out of the five forest product companies participate in the lumber futures market. Therefore, this paper also aims to examine the reasons for this lack of participation.

Keywords:

Forest Products, Lumber, Plywood, Lumber Futures Markets, Chicago Mercantile Exchange

Overview of the Forest Products Industry

The forest industry is an important sector that has a significant influence to the Canadian economy. According to Natural Resource Canada, the forest industry contributes 1.7% of total Canada Gross Domestic Production in 2009 along with revenue from goods manufactured totaled at above 60 billion Canadian dollars (Canada 2010). This lucrative number included revenue generated from 1) Forestry and logging industry, 2) Pulp and Paper product manufacturing industry, 3) Wood product manufacturing industry: the three different sub-sectors that represent the majority of the forest industry. Collectively, pulp, paper and wood product are considered as forest products derived from harvested timber. As illustrated in the table below, the forest products industry contribute 82% of total forest sector's GDP (Canada 2010).

Contribution to GDP 2009 (Constant 2002)	$Billions (CAN)
Forestry and logging industry	3.571
Pulp and paper product manufacturing industry	8.217
Wood product manufacturing industry	8.099
Total	19.88

Table 1: (Canada 2010)

Firms that operate in all the three industries are commonly known as forest products firms. These firms operate in forestry and logging within the forest to pulp, paper and wood products manufacturing. Depending on the size and business model of firms, the level of specialized product produced can vary.

Each year, Canadian forest products are being produced for both domestic consumption and export. However, our domestic market only account for a fraction of the total global consumption. The total amount of export in 2009 represented in Canadian dollars was over 23

billion dollars. With major markets like United States, China, Europe and Japan accounting for more than 90% of total forest products export, Canada is considered as one of the world's largest exporters of forest products. The list below shows the top five forest products in terms of value that are being exported internationally. The entire list is also available in Appendix.

Domestic exports—Value (dollars)	2005	2006	2007
Wood pulp	7 112 706 000	6 986 241 000	5 073 869 000
Lumber – softwood	7 081 787 000	5 096 124 000	3 761 191 000
Newsprint	3 991 491 000	4 263 602 000	2 802 534 000
Converted paper	906 385 000	850 306 000	884 559 000
Oriented Strand Board	1 272 242 000	709 151 000	549 798 000

Table 2: (Canada 2010)

There are major forest products firms located across Canada. Some examples of the major players are Canfor, Western Forest Products, West Fraser and Interfor. They are all publicly owned companies with the general public being part of shareholders. Such firms represent most of Annual allowance Cut within BC's crown land. They all produce constructional material like structural lumber, plywood, Oriented strand board (OSB) and other engineered wood product, as well as pulp and paper products.

BC's Forest Product Companies	Annual Allowable Cut (AAC) in %, 2010
Canfor	12.1
Western Forest product	8.7
West Fraser	7.7
Interfor	4.5

Table 3: Current Annual Allowable Cut (AAC) by firms (B.C 2010)

These public forest products firms have different types of tenures that allow them to harvest timber. This harvesting operation will also include the extraction of timber to different locations, log yard or sawmills. Log yards are usually for specific buyers or mid-size firms where they can pick out logs. The transfer of logs to sawmill directly is usually done by larger firms. Logs are

processed and created their pre-determine product. In British Columbia, these public forest product firms operate throughout the crown land where tenures are granted.

Just like any businesses, there are challenges for all forest products firms. Challenges are usually competition between firms or associated in some form of risk that firms must bear in order to generate profit. Firms must acknowledge the risk involved with their business and develop strategies to perform proper mitigation. In the management's discussion and analysis section of the annual financial report, management of the forest product company identifies the risk within the firm and suggests strategies to be made to mitigate those risks. Some common risk evolved in these forest products firms like Canfor or Weyerhaeuser are foreign exchange risk, interest rate risk, credit risk and commodity pricing risk. In order for firms to secure their earnings, financial instruments are often used to offset the risk they bear. Lumber futures contract is one of the financial instruments that the forest product companies can use to hedge credit risk and commodity pricing risk.

General Overview of Trading Market

There are three main types of commodity trading markets: spot market, forward market and future market. A spot market is where buyers and sellers trade a certain amount of goods at a current negotiated price. A forward market is where buyers and sellers trade a certain amount of goods at a pre-determined price and the delivery of products occurs at a pre-determined later day (Bodie and Rosansky 1980). A future market is where buyers and sellers agree to trade standardized contract that have a constant quality, quantity and point of delivery (Bodie and Rosansky 1980). A hypothetical example is used to illustrate the features of these markets. Assume at the beginning of 2011, a forest product company decides to sell 110,000 board feet of

lumber to a construction company on June 30, 2012. Below is a table of spot price and forward price of 110,000 board feet of lumber:

	January 1, 2011	June 30, 2012
Spot Price (Current Price)	$1,000	$1,200
Forward price / Futures price to June 30, 2011	$1,400	$1,200

Table 4

Spot Market

In a spot market, the forest product company would sell the 110,000 board feet of lumber for $1,200 on June 30, 2012. Without knowing the prices of goods before harvesting, buyers and sellers could only trade according to the current market price (i.e. $1,200 on June 30, 2012). If a certain type of goods over supplied a market, the price would eventually be driven down. This sudden change in price would cause unexpected loss for producers. However, if that type of goods was more scarce than usual, then the price would be driven up. Such cash market setting was inefficient for both sellers and buyers as prices became unpredictable prior to harvesting. In order to improve the efficiency within a cash market, forward market was introduced.

Forward Market

In a forward market, the forest product company would negotiate with the construction company on January 1, 2011. On that date, they would privately determine the settlement date to be June 30, 2012 and the settlement price to be $1,400. The settlement price may or may not be the same as the market forward price because individual may have different expectation about the future price of lumber. On June 30, 2012, the forest product company will deliver the 110,000 board feet of lumber to the construction company and the construction company will pay $1,400 for the lumber. Forward market allows buyers and sellers to communicate prior to the production of

goods. The buyers and sellers could negotiate a price for the product and deliver the product at a later time. This way, both the buyers and sellers are able to eliminate the risk involved with price uncertainty. However, no clearing house is involved with the forward contracts, so either side of the party might default and cannot honor the contract. Such inefficiency leaded to a new concept of trading. Future markets were discovered, as an extension for cash markets (Leuthold, Junkus and Cordier 1989) .

Futures Market

In a futures market, the forest product company will sell a futures contract of 110,000 board feet of lumber for $1,400 on January 1, 2011. On that day, the clearing house will impose a 10% margin requirement on the buyer, the construction company, in order to ensure that the construction company will honour the contract. On June 30, 2012, the construction company will pay the forest product company $1,400 and the lumber will change hands. If the purchase is a speculator, the speculator can choose to pay $200 (i.e. the difference between the spot price and forward price on June 30, 2012) to the forest product company in order close the position without purchasing the lumber.

Futures Market In-Dept

Definition

Futures contracts are agreements where parties of interest have agree to trade a set quantity of goods and pay at a later time. Futures contract enables the buyers and sellers to secure their assets and reduce their level of exposure to risks within the spot markets, hence the term hedge. Those who rely on futures market for their businesses are known as hedgers, others who look for profit opportunities within this market are known as speculators. In many ways, futures markets can be described as a close approximation of the perfectly competitive market in the classical

economic concept (Leuthold, Junkus and Cordier 1989). First of all, there are many independent buyers and sellers that no one is able to influences prices. Secondly, traded futures contracts are standardized homogenous products excluding the changes in prices and maturity date. Lastly, futures markets allow free flow of information where every individual are able to obtain such information. These features enable price transparency to all market participants. If producers, wholesalers, traders and other agents better understand the market prevailing price of the products that they are of interest, they can "make more informed production and marketing decisions", and better decision making leads to "an optimal allocation of scarce resources" (Manfredo and Sanders 2006). Ultimately, these factors contribute to an efficient market where economics surplus is maximized.

Before the expansion of the futures market in the early 1970's, the period when many financial instruments, currency and stock were introduced and traded in the Chicago Mercantile Exchange and the New York Mercantile Exchange (Schwager 1984), the futures markets was already widely used by producers and users to trade commodity such as grains, corn, oils and cotton. However, traditionally, commodity products were traded in a form of forward contracts rather than future contracts. Although conceptually they are very similar, the two contracts do have very distinct differences.

Margin Requirement

Forward contracts require no cash flow until the delivery date; whereas, futures contracts require buyers to maintain a margin as a commitment to the contracts. Clearing houses, separate entities or corporations of future exchanges such as Chicago Mercantile Exchange and New York Mercantile Exchange that are responsible for clearing trades and facilitating the trade process, impose margin requirement on the buyers to ensure that they will have sufficient fund to close

the position on the expiration date. Thus, futures contracts mitigate credit risk by allowing a third party, in this case the clearing-house, to ensure the commitment of contract buyers by requesting a periodic margin call for any losses associated with the decrease in commodity price.

Private Agreement

Another fundamental difference is that forward contracts are traded in a form of private agreement between two parties, and therefore there is a probability that one side of the party may default and breach the contract's agreement (Menkhaus, et al. 2003). A default occurs when one side of the party cannot fulfill the agreement by the time of the delivery date. A common example of default would be insufficient cash to fulfill the obligation by the end of the expiration date. On the other hand, futures contracts are traded in an exchange where information is shown to everyone and can change hands before the expiration date. This feature allows speculators to capture profit opportunities as they believe the commodity prices are either trading at a price higher or lower than expectation. Forward contracts would not attract the participation of speculators since it is a private exchange where cash flow only occurs on expiration dates. Furthermore, the transparency of price would motivate speculators to be more engaged and take positions. Subsequently, such activities would lead to an effective liquid market where sufficient amount of trading volume allows hedgers to buy or sell future contracts with little to no concession.

Futures Markets

Lumber Future Contracts

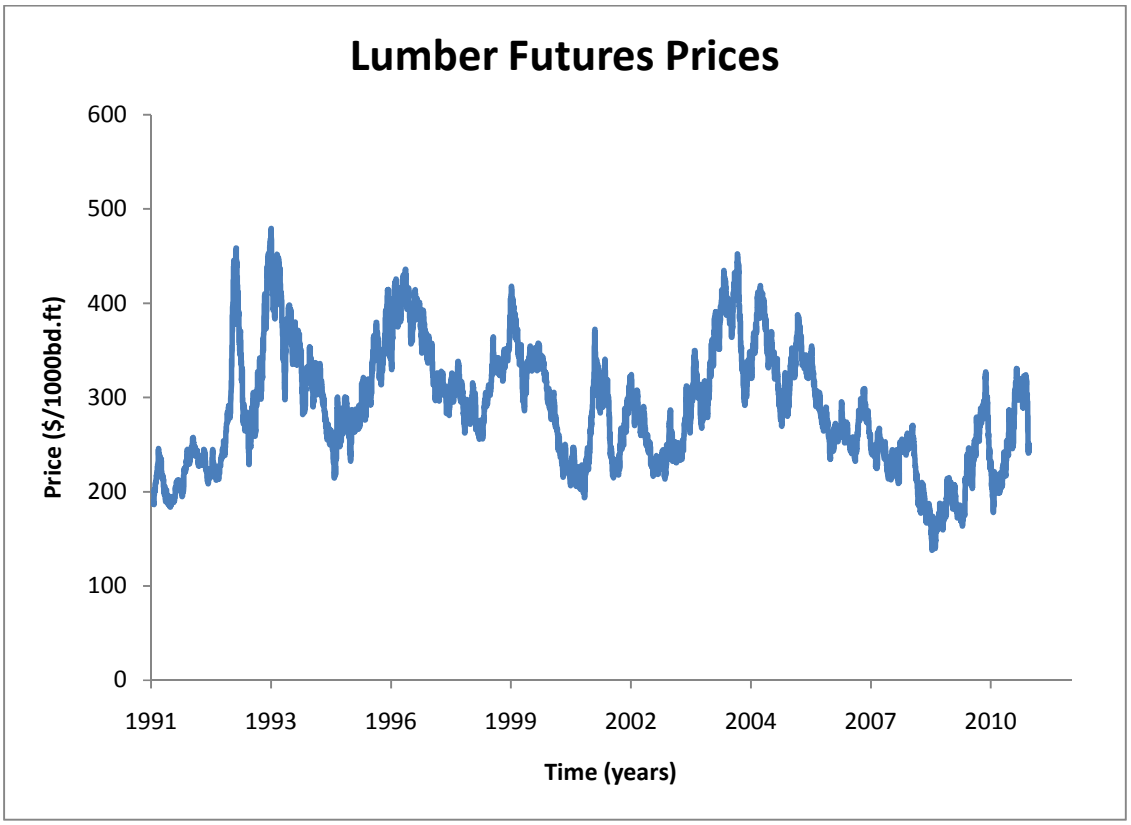

Figure 1: The trend of lumber futures prices from 1991 to 2011

In 1969, lumber future contracts were introduced to North America, trading at the Chicago Mercantile Exchange. It became the first contract to offer price protection for the forest product industry. Since then, billions of contracts have been traded by all firms that involve producing, processing, marketing, utilizing of lumber and lumber products all around North America for hedging against risk exposure. Like all commodity future contracts, lumber production is under

constant influence by related news and market's supply and demand, this attract many speculators to trade and seek profits. This is advantageous to the market as it generates trading volume and improves market liquidity.

Each contract represents a standardized product where the quantity quality and point of delivery are the same. The trade unit for lumber future contracts is in board feet and the price is expressed in dollar per thousand board feet. The quantity of each contract is set as 110,000 board feet of random length (8' to 20') 2" x 4"s dimensional lumber. The quality of each contract is set as grades #1 and #2 of structural light framing category (CME Group 2009). The deliverable species is often western spruce-pine-fir (SPF). Furthermore, the wood must be kiln-dried to a moisture level of 19%. The contracts are free to trade between buyers and sellers until the expiry dates, which are the business days prior to 16th of the seven listing months: January, March, May, July, September, November and the following January. After the contracts matures and expired, the settlement method is done by delivery. The mills must be located in the states of Oregon, Washington, Idaho, Wyoming, Montana, Nevada, California, or province of British Columbia and Alberta (CME Group 2009).

Every contract is an agreement for the sellers to deliver the product and for the buyers to accept. However, this is rarely the case as many traders would offset the contracts prior to the expiration date and receive the premium from the transaction. In order to offset the obligated action, traders who have gone short (selling of contracts) must buy back the contracts of the same delivery month. On the other hand, traders who have gone long (buying of contracts) must perform the opposite. Such trading system is advantageous for hedgers and speculators as:

1. Any contracts can be bought or sold at any given time within the trading hours prior to expiry date
2. Future contracts is interchangeable between every buyers and sellers, allowing contracts to be sold and bought back at a later time
3. Since price is the only variable left for negotiation, futures quotes available at real time can be a forecast of where the lumber market may be from 2 to 12 months ahead.

The combinations of the three factors allow traders to be more confident and comfortable in taking positions within the lumber futures market.

Plywood Future Contracts

Plywood futures contracts had been introduced in the 1969, 1994 and 1996 by three of the largest commodity exchange of the time as shown in table 1. Furthermore about the table, the plywood contract introduced by Chicago Board of trade on December 1st, 1969 did exceptionally well immediately after the launch, in comparison to the contract introduced by New York Mercantile Exchange (Sandor 1973). One of the major contributing factors in the success of CBOT plywood contract was that it was built to appeal to the hedgers, which subsequently, attracted speculators due to the trading volume created (Sandor 1973). However, despite the contract was successful and traded heavily for a number of years, all futures contracts were eventually eliminated due to the lack of plywood futures market's liquidity.

Year of Introduced	Commodity Exchanges	Volume of First year	Volume of Second year
1969	New York Mercantile Exchange	5,299	792
1969	Chicago Board of Trade	394	47,426
1994	Chicago Board of Trade	N/A	N/A
1996	Chicago Mercantile Exchange	N/A	N/A

Table 5: (Sandor 1973), (ITTO 2004)

Case Study: Plywood and Lumber Future Contracts: Failure and Success

In 1969, both plywood and lumber began trading in the futures market. A lumber future was introduced by the Chicago Mercantile Exchange, and plywood futures was introduced by New York Mercantile Exchange and Chicago Board of Trade. For CME and CBOT, both contracts were launched successfully and generated a healthy amount of trading volume (Sandor 1973). However, a plywood future was eventually removed from the trading floor due to lack of activity, whereas, lumber futures, remains in the trading floor to this day. Although the study of why plywood futures failed multiple times were never fully researched, speculation of reasons why it failed was due to the introduction of Oriented Strand Board in the late 1970's, which further reduce the trading volume. Another possibility is that prices from cash and futures plywood markets did not converge (Sandor 1973).

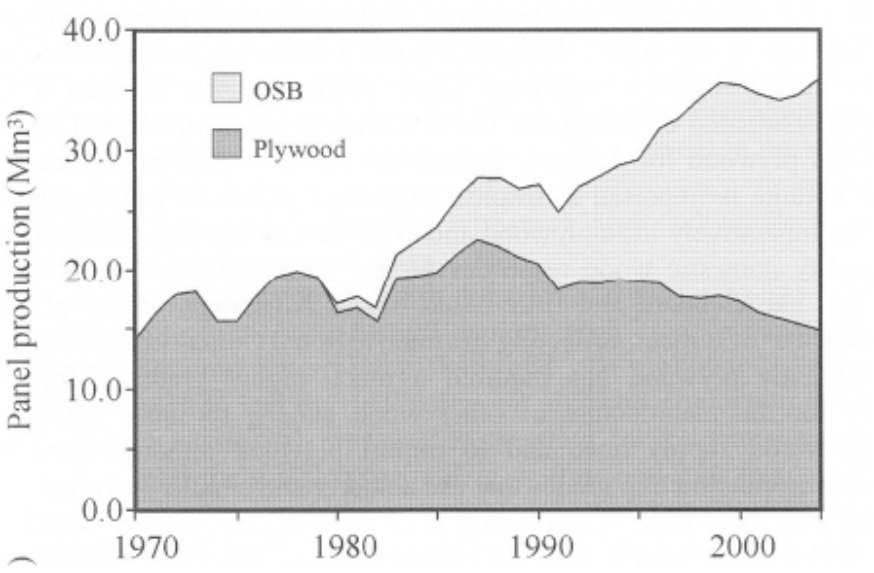

Figure 2: Production of structural panels in North American (Ellis 2010)

Following the debut of Oriented Strand Board in 1978, OSB had been widely accepted as construction material and it served as a direct substitute to plywood. Since then, the production of plywood had trended downward. OSB had lower production cost compare to Plywood, at the same time, higher recovery rate. Furthermore, the structural properties between the two products were very similar. Therefore, OSB was vastly favored by builders. As a result of this direct substitute, consumers of plywood had less incentive in hedging against the future price. Eventually, the speculators acknowledge the reduction of hedgers and began to withdraw from the plywood futures market.

Domestic exports—Value (dollars)	**2005**	**2006**	**2007**
Oriented Strand Board (OSB)	1 272 242 000	709 151 000	549 798 000
Plywood	433 840 000	317 174 000	220 654 000

Table 6: Comparison between exports between OSB and Plywood

The Role of Lumber Futures in the Forest Product Industry

Price Risk Management:

To mitigate the risk involved in commodity trading, futures markets are established as a platform for producers and consumers to trade with less vulnerability to the price fluctuation of the spot market (Leuthold, Junkus and Cordier 1989). Risk management is essential to forest products firms because of the volatility nature of the spot market price for lumber. Such volatility is caused by unexpected news feed into the market, and the lumber spot price would response in a form of upward or downward movement, depending on the nature of the news. For example, news such as low housing starts, higher interest rate can cause the lumber spot market price to fall. This can have a negative affect for lumber producing firms as their lumber can only be sold at a lower price. On the other hand, poor weather condition or natural disturbance can cause lumber prices to rise which can be bad news for consumers who demand lumber. Furthermore, many other factors like environmental policies, climate change, global economy, foreign

exchange, operational cost and forest industry employment level can also play a significant role in price movement. Low profit margins due to such volatility of lumber spot prices can be countered through the use of futures contracts (Rutten 2003). In 1986, Deneckere, Buongiorno and Bark investigated the effectiveness of lumber futures market in hedging unexpected price variation. Their research demonstrated that an optimum hedge could "reduce the variance in gain or loss with respect to an unhedge position by 50 to 90 percent" (Deneckere, Buongiorno and Bark 1986). Therefore, risk management can act as a form of insurance or security mechanism for the forest product companies. Writing futures contracts allow forest product companies to stabilize their earnings by fixing the sales price of lumber before the sales occur.

Source of Information

Manfredo and Sanders note that futures markets are the "primary centre of price discovery for the underlying commodity" (Manfredo and Sanders 2008). That is, the futures market can be considered as a transparent price discovery mechanism for both hedgers and speculators. The durations of different future contracts give individuals a spatial view of the performance for current and future markets. Since the transactions within futures markets are made public for everyone to see, the economical information generated by the markets can greatly help management to make important decisions such as pricing forest products, planning and managing long-term investment and determining production level.

Competitive Pricing:

Price risk exposure is a key concern in terms of the major variables that affect forest product companies' performance. International Tropical Timber Organization (ITTO) notes that forest products firms consider price risk exposure a more important concern than sales volume, changes in capital costs or labour costs (ITTO 2004). To stay competitive in the industry, forest companies must know the current price and expected future price of their lumber products in

order to optimally price their products. The futures market aids the companies in knowing the expected selling prices of their products. With this knowledge, the forest companies can price their products accordingly and be able to stabilize their earnings through selling the lumbers at a pre-determined price. For example, quantitative techniques such as hedge ratio, correlation and time-series forecasting models can be applied to data from the lumber futures market in order to predict future lumber price. Buongiorno et al. illustrated that the autoregressive-integrated-moving average (ARIMA) forecasting model for lumber futures prices can forecast moderately accurate short-run lumber prices (Oliveira, Buongiorno and Kmiotek 1977). Accurate forecast of future lumber price is important because the forest sector is traditionally not very transparent and pricing can be considered as "proprietary company information" that would give the information holder the upper hand in contract negotiations (Rutten 2003). Unlike large public forest product companies, smaller companies do not have analysts who bring them up-to-date lumber price trends. Thus, having access to the price information from the futures market can especially benefit the smaller forest product companies in pricing their contracts and lumber.

Capital Budgeting and Strategic Planning:

Ideally, a firm should pursue all investment projects that generate positive cash inflows and enhance shareholder value. However, the amount of capital available is limited, firms need to use capital budgeting to determine the project that generate the most returns and decide whether or not to proceed such project. According to Ross et al, capital budgetting is the process of planning and managing a firm's investment in long-term assets and long-term projects. In capital budgeting, a firm assesses the profitability of prospective projects' lifetime cash inflows and outflows, taking into consideration of the size, timing, and risk of future cash flows (Ross 2009). Indicators from the futures market such as the volatility correlation between the spot and futures

prices, the number of contracts bought and sold and the trading volume and liquidity of different futures markets can all contribute to capital budgeting and strategic planning (Williams 1982). Volumes and price of futures contracts aim forest products firms in determining the futures cash inflows from a certain project. The prices of futures contracts that settle in different periods assist firm to estimate the timing of the cash inflows, and the volume of futures contracts that settle in different period allows the firms to estimate risks of a given project (Schwager 1984).

With additional information of the input future price, a firm can more accurately estimate the future input cost and more efficiently allocate the money needed for the input. According to "Theory & Practice of Futures Markets", Leuthold states that lenders should be more willing to lend money to companies that show lower probabilities of financial loss and bankruptcy (Leuthold, Junkus and Cordier 1989). The use of future contracts allows forest companies to better manage their risks and resources by providing a better future price information. In theory, since the forest product companies have better risk management, they should have a higher probability of making a profit. Hence, they have a higher chance of clearance in requesting additional operating capital. The lenders should also acknowledge the fact that firms have shown their ability to lower risk, and lending money to these companies can be a lucrative investment for lending institutions.

Production Level

Lumber futures market improves the production logistics of the forest product companies (Rutten 2003). Given the trend of a future market over years of trading, lumber production companies can utilize the futures market to project the future outlook of the lumber market.For instance, the trading volume of the lumber future market can evidentally show the supply and demand of a certain future delivery date. In a situation where the trading volume of the lumber future is lower

than expected, this can serve as indicators where less users are buying contracts to hedge their risk as they see a potential drop of price or the lack of development in the future. With the information provided above, forest products firms can then adjust their level of production over the time where trading volume is low. Hence, the forest products firms are able to reduce the risks associated with inventory accumulation or shortage (Sandor 1973). Furthermore, if this type of situation arise systematically over years like during the winter season where the number of estate development is relatively lower than the summer season, this can be analysed as a trend of the lumber market. In an event of a epidemic forest fire in BC, many forest operations have to pause due to this incident. This accident can potentially cause the forest products future prices to move up because of the loss of lumber that potentially reduce the future lumber supply. This news would trigger more users to buy future contracts to secure their future purchausing prices. As the demand for lumber is higher than usual, firms that are not affected by the disturbance can make use of this opportunity to increase the level of production and set a higher futures contract price.

For forest products firms that sell futures contracts as part of the primary business, knowing the future price also helps determine the amount of contract they should sell and allows the firms to focus on their core business. With a lumber futures market, firms are able to optimize the use of technical facilities of lumber plants without undue worry about the marketing and sales sale of the lumber produced (Rutten 2003). However, it is important to note that forest product firm will not likely to sell the same amount of contract as they are able to produce because disruption of production or any natural disturbance can reduce the amount of yield that they can harvest. The forest product firm will be legally liable to such breach of contract if pre-determined amount of lumber cannot be delivered on the settlement date.

For instance, if they know the future price is going be lower, then they can reduce their production. Reduction of output will avoid flooding the market with extra supply of lumber and further reduce the lumber price. Assuming that the forest product market is efficient, the forest companies are able to maximize their profits by reacting to the forward prices and eliminating the extra supplies. The reduction in production will restore the supply and demand once again at the equilibrium level.

Do Forest Products Companies Take Positions in Lumber Futures Market?

Given the definition of forest product companies and the types of markets they operate in, it is interesting to know if firms do in fact use the lumber futures market to hedge against risk. Since the creation of lumber futures market is for the cash lumber market to run more efficiently, firms should be utilizing the futures market for their risk mitigation. To determine if firms do use financial derivatives like lumber futures contracts to hedge the commodity risk, I conducted research on forest product companies' financial statements and futures market trading volume. First was to look at financial statements provided by publicly owned forest product companies. The second research carried out was to observe the actual volume of lumber production and the volume of trading lumber futures contracts. A low level of commitment to lumber futures market for forest products firms were clearly shown in the two researches as the volume of lumber traded in futures market is only a fraction of the total volume of lumber production.

Financial Statements Research

The first research is based on the financial statements from forest product companies. Six firms were chosen for the research because they all fulfilled two requirements. Firstly, the company must have audited financial reports that are available for investors because the usage of financial derivatives to hedge against different types of risks is shown in the reports. Since public

companies are required by Securities and Exchanges Commission to publish annual audited financial reports, only public companies are chosen for this research.

Secondly, they must operate within the region of North America. Since we are looking at the production of lumber in North America compared to the number of contracts exercised in the lumber futures market, we can only observe firms that are located in this region. The selected firms included Canfor, Western Forest Products, West Fraser, Interfor, Tembec and Weyerhaeuser. The first four of the firms are all located in BC, and Tembec is located in Quebec and Weyerhaeuser is located in the Washington state in United States. The focus of this research is on firms' risk management strategies with respect to commodity price risk.

Despite the main purpose of lumber futures is for lumber producers to protect themselves against the risk of community price volatility, the firms selected by this research rarely take positions in the lumber futures market. The table below summarizes the information extracted from the annual 2010 audited financial statements of the six forest products firms. The table shows the firms' use of financial derivatives to mitigate different risks involved within their businesses. Five of the six forest products firms do not take positions in the lumber futures markets, but rather they use foreign exchange futures extensively. Since many products they produced are being exported, it is understandable that firms relies on derivative instruments that hedge against foreign exchange risk. The research indicates that only Canfor has used lumber contracts on the Chicago Mercantile Exchange to hedge against the commodity price risk. Even then, only 15% of Canfor's lumber sales were made from exercising the future contracts.

Canfor: The Company uses a variety of derivative financial instruments as partial economic hedges against unfavorable changes in natural gas and diesel costs, foreign exchange rates and lumber prices. For the fourth quarter of 2010, the Company recorded a net gain of $1.8 million related to all it derivative instruments, with gains attributable to the stronger Canadian dollar

and, to a lesser extent, higher market diesel prices partially offset by losses on lumber futures. Canfor is exposed to commodity price risk related to sale of lumber, pulp, paper, and oriented strand board. From time to time, Canfor enters into futures contracts on the Chicago Mercantile Exchange for lumber and forward contracts direct with customers for pulp. Under the Price Risk Management Controls Policy, up to 15% of lumber sales and 5% of pulp sales may be sold in this way. (Canfor 2010)
Western Forest Product: The Company utilizes derivative financial instruments in the normal course of its operations as a means to manage its foreign exchange risk. Therefore, Western may purchase foreign exchange forward contracts or similar instruments to hedge anticipated sales to customers in the United States and Japan. (Western Forest Product 2010)
West Fraser: From time to time, the Company uses derivatives to manage its exposure to US dollar exchange fluctuations and commodity prices. The Company does not utilize derivative financial instruments for trading or speculative purposes and it does not apply hedge accounting. (West Fraser Timber Co. Ltd 2010)
Interfor: From time to time, the Company employs financial instruments, such as interest rate swaps and foreign currency forward and option contracts, to manage exposure to fluctuations in interest rates and foreign exchange rates. The Company's policy is not to use derivatives for trading or speculative purposes. The risk management strategies and relationships are formally documented and assessed on a regular, ongoing basis to ensure derivatives are effective in offsetting changes in fair values or cash flows of hedged items. (Interfor 2010)
Tembec: The company manages, from time to time, its foreign exchange exposure on anticipated net cash inflows, principally US dollars and Euros, through the use of options and forward contracts. The Company may periodically purchase lumber, pulp and newsprint price hedges to mitigate the impact of price volatility. The Company did not hold any significant product price hedges at September 25, 2010 and September 26, 2009. (Tembec 2010)
Weyerhaesuer: Swaps and other derivative instruments generally are comprised of swaps, futures, forwards or options. In accordance with our investment risk and return objectives, some of these instruments are utilized to achieve target equity and bond asset exposure or to reduce exposure to certain market risks. Others, mainly total return swaps with limited exchange of principal, are designed to gain exposure to the return characteristics of specific financial strategies. (Weyerhaeuser 2010)

Table 7: Firms strategies in hedging against risk

There are limitations to the findings. Firstly, the six firms chosen do not reflect the entire population of forest products firms that are operating in North America. Secondly, those firms are publicly owned firms that have stock quota trading in stock indexes. Thirdly, financial statements of privately owned forest products firms are not examined because no annual

financial statements are available to the public. Lastly, the size of the firm dictates how business is run. There is a lack of representation from mid-size firms.

Despite forest products companies do not use lumber futures to hedge their exposure to price uncertainty, large Canadian forest companies do purchase foreign exchange futures to reduce their exposure to foreign exchange rate risk. Large Canadian forest companies often sell lumber to other countries in return for a pre-determined amount of foreign currencies or Canadian dollars. The receipt of payment usually does not happen until a few months after the delivery. The exchange rates are affected by factors such as relative inflation rates, interest rates and traded surpluses and deficits of the two countries involved. If the payment is in foreign currencies, there is always a risk that the foreign exchange rate may have change significantly at the settlement date. Thus, the forest companies will expose themselves into foreign exchange rate risk. To hedge their exposures to the exchange rate risk, forest companies enter into futures sales contract to sell a fixed quantity of foreign currency.

Lumber Production and Lumber Futures Trading Volume Research

Years	CME Trading Volume (Million board feet)	U.S. and Canada Softwood Lumber Production (Million Board Feet)	%
1997	28635	62295	46%
1998	27483	61827	44%
1999	31664	67407	47%
2000	24328	67762	36%
2001	22752	64631	35%
2002	18087	69060	26%
2003	24628	68589	36%
2004	26716	73236	36%
2005	25987	74686	35%
2006	29813	76037	39%

Table 8: CME trade volume and North America softwood lumber production (Canada 2010), (Commodity Research Bureau 2007)

In order to address the problem of the small sample size, the overall production volume and the futures trading volume can be used to compare the level of commitment in lumber futures market of the forest products firms. According to Natural Resources Canada and the U.S. Census Bureau, in 2006, the total lumber production from Canada and United states are 79 million cubic meters and 90 million cubic meters respectively. The total traded volume in the Chicago Mercantile Exchange in 2006 was 70 million cubic meters with approximation of 271,000 contracts. When comparing between the total production and total traded numbers, lumber traded in CME account for 40% of the total lumber production. The results from reviewing forest company publications and comparing the trading volume with the number of lumber produced per year indicate that there is low participation from forest products firms in the futures market. Based on research, four possible reasons are suggested.

1. First, there is a high potential of dramatic volatility within the lumber futures market. Volatility are usually generated from news or events that relate to lumber market or any associated market like housing market and home renovation market. News such as environmental policy, trade policies between Canada and United States, political issues, changes in interest rate and natural disturbance can all affect the price as well. Furthermore, Rucker R. R. suggests that the rate at which news affects the market price vary (Rucker, Thurman and Yoder 2001). In event where housing starts, for example, is lower than expected, the lumber futures market will react strongly to the news and create large volatility. However, for environmental issues like Species at risk act, this news is harder to be digested by the market and the effect may remain for more than a week. Also, because lumber is a commodity, the basis of many specialized product, any news related to the rest of the product chain can alter the price.

2. Secondly, there is a lack of incentive as to be engage in the lumber futures market because the forest product companies traditionally use forward contracts to hedge their price uncertainty, many of the industry professional are content with the current method and do not have sufficient knowledge in the futures markets. It would require personnel that are experienced in futures markets and forestry. Furthermore, forest products firms have established relationship with clients where credit records are kept for review. Since every customer is checked with credit records, the credit risk is hedged against (West Fraser Timber Co. Ltd 2010). Also, credit insurance is often used as an additional assurance mechanism (Canfor 2010). In addition, customers are not familiar with lumber futures market where confusion may occur between supplier and consumer. Therefore, forest products firms are hesitant in taking positions in the lumber futures market (Rutten 2003).
3. Although speculation appears to be advantageous to futures markets as it creates price movement and generate market liquidity, it is also important to note that over speculation can create many hidden problem and eventually lead to the crash of markets. A classic example would be the *tulipmania*. During the 1600's, Dutch's tulip became very valuable to a point that *Viceroy, a* certain species of tulip's bulb cost more than a single house in Dutch (Garber 1989). Eventually, the bubble of tulip burst and the price of tulip's bulb dropped significantly causing many to lose thousands of florins, currency of the time.

Conclusion

The introduction of futures market significantly improves the efficiency of a cash market. With information such as the forecasted future price and the trading volume provided by the lumber futures market, firms are more confident and comfortable in making decisions that involve

estimation of future inventory price. More importantly, firms are able to mitigate their risks exposed in the market by hedging against the futures price and are able to better allocate their resources.

Although participation in the lumber futures market provides many immediate benefits to the forest products firms, there has not been a significant increase in trading volume of lumber futures in comparison to the total lumber production in the forty years since the lumber futures market has established. My research on forest product companies' financial statements and examination of trading volume indicate that approximately 40% of forest products firms take positions in the lumber futures. Most forest products firms only use the lumber futures market as a way to gather information about the trend (Leuthold, Junkus and Cordier 1989). Dramatic volatility, unhealthy speculation and effort needed to learn the new skills are among the reasons for such lack of participation in taking position in the lumber futures market.

As a young forest resources management professional, I hope that more integration can happen between the futures market and the forest product industries. With the integration, Canadian Forest Industry can potential function a lot more efficiently due to better risk management through trading in the forest product futures markets.

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Appendix:

Year	2005	2006	2007
Domestic exports—Value (dollars)	**33 574 979 000**	**30 093 986 000**	**23 566 673 000**
Primary wood products	**828 217 000**	**729 650 000**	**681 964 000**
Logs and bolts	406 830 000	300 201 000	266 174 000
Pulpwood	12 859 000	11 946 000	8 729 000
Wood chips	56 450 000	48 718 000	35 971 000
Other primary wood products (includes Christmas trees)	352 078 000	368 785 000	371 090 000
Pulp and paper products	**20 122 773 000**	**20 300 295 000**	**16 155 242 000**
Converted paper	906 385 000	850 306 000	884 559 000
Newsprint	3 991 491 000	4 263 602 000	2 802 534 000
Other paper and paperboard	6 077 939 000	6 130 202 000	5 324 795 000
Other paper products	1 833 168 000	1 854 238 000	1 863 064 000
Other pulp	1 641 000	1 254 000	348 000
Recovered paper	199 443 000	214 452 000	206 073 000
Wood pulp	7 112 706 000	6 986 241 000	5 073 869 000
Wood-fabricated materials	**12 623 989 000**	**9 064 041 000**	**6 729 467 000**
Lumber – hardwood	390 398 000	267 858 000	175 710 000
Lumber – softwood	7 081 787 000	5 096 124 000	3 761 191 000
Oriented Strand Board	1 272 242 000	709 151 000	549 798 000
Particleboard	203 217 000	185 195 000	162 916 000
Plywood	433 840 000	317 174 000	220 654 000
Shingles and Shakes	336 192 000	259 663 000	176 451 000
Veneer	342 925 000	258 281 000	196 490 000
Other wood-fabricated materials	279 853 000	200 619 000	128 221 000
Other wood-fabricated materials (non classified)	1 845 577 000	1 411 344 000	1 044 839 000

Table 9: (Canada 2010)