

**EXHIBIT 8**  
Selected Financial  
Market Data (end  
of month)

A. Interest Rates							
1993 Eurodollar Interest Rates (percentage)							
	One Month	Three Months	Six Months	One Year			
January .....	3.1250	3.2500	3.3750	3.6875			
February .....	3.1250	3.1250	3.2500	3.5000			
March.....	3.1250	3.1875	3.3125	3.5625			
April.....	3.0625	3.1250	3.2500	3.5000			
May.....	3.1875	3.3125	3.4375	3.8125			
June.....	3.1250	3.2500	3.5000	3.6875			
1993 Euroyen Interest Rates (percentage)							
January .....	3.5000	3.4375	3.3750	3.3125			
February .....	3.2188	3.2813	3.2188	3.2188			
March.....	3.5313	3.4063	3.4063	3.4063			
April.....	3.2188	3.2188	3.2813	3.3125			
May.....	3.2500	3.2500	3.3438	3.4375			
June.....	3.1875	3.1875	3.1876	3.2501			
B. 1993 Yen/Dollar Exchange Rates (yen per dollar)							
	Spot	Forward					
		One Month	Three Months				
January .....	124.800	124.845	124.865				
February .....	118.000	118.015	118.025				
March.....	116.650	116.665	116.675				
April.....	111.600	111.605	111.605				
May.....	107.250	107.255	107.230				
June.....	106.350	106.355	106.330				
C. June 1993 Yen/Dollar Foreign Currency Option Prices (100ths of a cent per yen; each option contract is for ¥6,250,000)							
Strike Price	Month of Maturity			Strike Price	Month of Maturity		
	July	August	September		July	August	September
<i>Calls</i>				<i>Puts</i>			
87.0				87.0			0.36
89.0				89.0			0.54
90.0				90.0	0.25	0.50	0.92
91.0			3.32	91.0			1.04
91.5				91.5		0.85	
92.0	1.54		2.52	92.0	0.57	1.07	1.44
92.5				92.5	0.94	1.12	1.63
93.0	1.02			93.0	1.16		
93.5			2.22	93.5	1.22		2.06
94.0	0.94	1.46	1.99	94.0	1.26		
94.5	0.66	1.15		94.5			
95.0	0.59	1.21	1.33	95.0			
96.0		0.70	0.93	96.0			
97.0		0.55	0.78	97.0			
98.0			0.59	98.0			

## United Grain Growers Limited (A)

*"Everybody talks about the weather, but nobody does anything about it."*

In late 1998, Brian Hayward, Peter Cox, George Prosk, and Mike McAndless pored over a colorful PowerPoint presentation that outlined the risks faced by their firm, United Grain Growers Limited (UGG). The graphs and numbers in the consulting report quantified a point they knew well: that the agriculture business was risky. The four men were the CEO, CFO, Treasurer, and Risk Manager, respectively, of Winnipeg-based UGG, one of the oldest grain distributors in Canada. A grain distributor helped farmers sell their grain by providing storage and sorting facilities, and transportation services.

UGG management had commissioned a study of the firm's risks because, as Hayward put it, his first responsibility was to "make sure we're in business tomorrow." The small Canadian firm had embarked on a modernization program to position itself in the deregulating Canadian agricultural industry. Its grain distribution revenues were largely determined by the amount of grain it handled, so anything that affected the quantity of grain shipped had a material impact on the firm's revenues, profits, and cash flow. Events of the prior two years showed how the firm's future could be threatened by unexpected risks, and UGG's management and Board of Directors were keen to understand these risks in light of their strategic importance. A recent Canadian regulatory guideline also recommended that Boards be held responsible for the "identification of the principal risks of the corporation's business and ensuring the implementation of appropriate systems to manage these risks."

Working with senior line managers, the risk consulting division of Willis Corroon, a leading insurance broker, had quantified the potential likelihood and severity of the six most material risks to UGG. The greatest risk was the impact of weather on the size of the harvest. The report suggested that, on average, once every ten years, UGG might face adverse weather that could reduce after-tax profits by as much as 11 million dollars,<sup>1</sup> or about 70% of its 1998 earnings. UGG's management needed to figure out the implications of this analysis, and what—if anything—should or could be done about the weather.

### Grain Distribution

Agriculture—and in particular the grain industry—was one of civilization's oldest industries. Despite advances that had doubled yields per acre in the last 40 years, the industry had always been quite volatile, characterized by boom and bust cycles. This volatility had its roots in the forces of supply and demand in the global market. Grain supplies were variable due to natural forces such as pests, disease, and weather. While farmers could apply a variety of treatments to control insects or protect against disease,

<sup>1</sup>All dollar figures represent Canadian dollars. UGG's 1999 fiscal year began August 1, 1998.

Professors Peter Tufano and Stuart Gilson and Research Associate Joshua Musher prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

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they could do little to affect the weather. A late season frost or extremes in rainfall would affect the amount and/or quality of the crop harvested. As a result, grain supply was subject to large fluctuations. In conjunction with fluctuations in demand, this led to erratic grain prices and revenues. (See Exhibit 1.)

To assure supplies of agricultural products, reduce price fluctuations, and support the agricultural industry, many governments regulated the farming sector to some degree. In Canada, regulation varied by type of grain. Farmers sold wheat, barley, and oats ("Board grains") to the Canadian Wheat Board<sup>2</sup> (CWB), a government-mandated monopsony that essentially guaranteed a floor price that farmers received. Farmers sold other (non-board) grains at market prices. Grain distributors like UGG were important intermediaries between the farmer and the end market. Farmers typically hauled their grain to local or regional distribution centers called grain elevators. At these elevators, grain was stored by grade, then aggregated into larger lots going to specific buyers or export facilities, providing for logistical economies of scale. These services were also provided at export terminals. Approximately two-thirds of the grain that UGG shipped out of its country elevators was sent to its own export terminals. On average, about 70% of Canadian grain was exported, although this fell to only about 60% of the 1999 harvest.

Distributors charged farmers a handling fee for these services. Annually each distributor filed maximum tariffs, which may subsequently be discounted, but not exceeded. For UGG, average revenue for Board grains, including the local grain elevators and terminal handling, fell from around \$23 per tonne<sup>3</sup> in 1998, to \$19 per tonne in 1999. (See Exhibit 2.) The CWB also allocated the railcars which moved the grain from the elevators to the customer.<sup>4</sup> This system tended to stabilize (but also limit) distributors' market shares. In 1998, the three largest distributors were Saskatchewan Wheat Pool, Agricore, and UGG, with 30%, 25%, and 15% market shares, respectively. For non-regulated (non-Board) grains, UGG performed similar services and received an average gross margin of \$17 and \$19 per tonne in 1998 and 1999, respectively.

In legal terms, distributors served as the CWB's agent in handling board grains, but as principal for transactions with farmers on non-Board grains. As the CWB's agent, UGG did not have exposure to price fluctuations while the grain was in its custody. For non-board grains, however, UGG was the legal owner who assumed price risk for grains it held.<sup>5</sup> Distributors like UGG could and often did use commodity futures markets to hedge themselves against short-term fluctuations in non-Board grain prices.

The Canadian agriculture industry was under pressure from several directions. Many farmers disagreed with CWB policies and its monopsony power, and there was open debate about its future. The government, while trying to remove global trade barriers,<sup>6</sup> was deregulating at home. In 1995, it repealed legislation that kept grain transportation costs fixed (and low) for many years, and was currently reviewing other details of the grain transportation and distribution systems. Meanwhile, the market was demanding more specialized products such as malting barley, which required more specific contracting in advance of planting.

<sup>2</sup>The CWB was initially formed in 1919 to transition the grain industry to peacetime production at the end of World War I. Following a period of dormancy, it was revived in 1935 when the Great Depression threatened the financial stability of the industry.

<sup>3</sup>A metric tonne, 1000 kilograms or about 2200 pounds, was equivalent to approximately 36.7 bushels of wheat or durum, 45.9 bushels of barley, or 64.8 bushels of oats.

<sup>4</sup>Allocations had typically been driven by historical market share. Annual adjustments of two percentage points were based on service factors such as reliability and quality control. These policies have since evolved periodically and one was currently under review.

<sup>5</sup>Other risks, for both Board and non-Board grains, included quality risk (e.g., the protein content of the grain might be lower than anticipated) and spoilage.

<sup>6</sup>Government subsidies, estimated at \$540 billion worldwide in 1998, provided a significant cushion to farmers.

## United Grain Growers

UGG was established in 1906 by special legislation passed by the Canadian Parliament—the United Grain Growers Act. For the first 87 years of its existence, it was a cooperative, owned and operated by farmers for their mutual benefit. In 1993, UGG restructured itself as a public corporation and issued limited voting common shares on the Toronto Stock Exchange, in part to raise capital for strategic initiatives that would broaden the firm beyond its initial function as a grain distributor. Despite this change in legal form, UGG retained its strategic goal of "Meeting Farmers' Business Needs." Twelve of its 15 Board members were selected by farmer customers, with three elected by the common shareholders.

Recognition of two trends in the Canadian agricultural industry formed the basis for UGG's strategic vision. As described in its 1998 Annual Report, "The first is the shift towards a business environment driven more by commercial forces and less by government intervention. The second major trend is the rapid integration of technology—and biotechnology in particular—into mainstream agriculture." UGG designed a two-pronged strategy to respond to these trends: to modernize its grain handling business and to provide farmers with services beyond grain handling.

Grain Handling and Merchandising was the core division within UGG. The most tangible sign of modernization was the replacement of many small grain elevators that had dotted the Canadian landscape for a century. Between 1994 and 1999, UGG consolidated 224 scenic wooden elevators into 128 larger facilities. Older vintage wooden elevators could hold from 3000 to 8000 tonnes of grain and load perhaps 10 to 15 railcars at once, while upgraded wooden elevators could load between 18 and 25 railcars. Newer concrete high throughput (HTP) elevators had 15,000 to 40,000 tonnes of capacity and could load 25 to 100 or more railcars with grain at one time. This could cut UGG's operating costs by 8% and decrease its average shipping costs.<sup>7</sup> By 1998, 13 HTP elevators had been built at an average cost of \$9 million each, with annual operating expenses of \$1.25 million (of which approximately 75% were fixed costs) over their anticipated 50-year life. Another seven or eight were needed to complete the network, which was expected within three years. Another 15 elevators would be upgraded at an average cost of \$3 million each and a further 48 of the old elevators closed. The initiative also included upgrading the logistics systems to reduce the frequency of imperfect deliveries by half, further reducing handling costs.

The second major initiative was to diversify UGG's operations by expanding its three other divisions: Crop Production Services, Livestock Services, and Farm Business Communications. Crop Production Services, which sold farm supplies such as fertilizer, proprietary seed, and consulting advice, was the largest of these three divisions. The business was highly seasonal, with most of the sales and profit coming in the spring during planting season. An aggressive acquisition program, including eight purchases of local retail distributors in fiscal 1998 alone, supplemented internal growth. Livestock Services manufactured and sold feed and animal breeding stock with superior production economics. Nutritionists also helped formulate custom feed diets to maximize animal growth rates. The Crop Production Services and Livestock Services divisions both offered financing programs for farmers who were trying to expand their own operations. The Farm Business Communications division provided one-stop shopping for information that farmers needed, such as farm magazines and a Web-site with updated market and weather information, as well as grain marketing tips. Recognizing the growing importance of technology (biotechnology in particular) in agriculture, UGG modified its

<sup>7</sup>For comparison, a fully loaded tractor-trailer could carry about 40 tonnes of grain, while one railcar could carry between 85 and 100 tonnes of grain. Loading a unit train of 100 railcars at one time could reduce shipping costs by as much as 20%.



strategic direction somewhat in 1995. The company began to seek out alliances and partnerships with “upstream” research companies, as well as “downstream” food processors—in effect, forming a *de facto* vertical integration through alliance. Since 1993, when it derived about 70% of its income from grain operations, UGG spent about \$65 million on acquiring and building its non-grain handling businesses. By 1998, these divisions accounted for about half of operating income.

UGG could carry out its strategic plan if it had internal resources and access to external funds sufficient to fund its growth strategy. These initiatives had already cost \$175 million, and Cox expected to spend another \$150 million in the next two years to build the new HTP elevators, upgrade the existing elevators, and fund the expansion of the Crop Production Services and Livestock Services divisions. The expansion included acquiring retail outlets, building new seed treatment and feed mill facilities, as well as funding working capital needs.<sup>8</sup>

These large investments required more capital than the UGG could internally generate as a cooperative, and were the primary motivation for UGG’s Initial Public Offering of 1.22 million shares at \$8.00 each, which raised \$9.8 million in 1993.<sup>9</sup> Two subsequent public equity offerings raised another \$39 million in total, but total equity market capitalization remained small. Only one equity analyst followed the company, and management felt that the firm’s volatile earnings and lack of a dedicated investor base contributed to what they believed was a relatively high cost of equity (or conversely, undervalued stock).

UGG’s management determined that cash flows could support a debt to asset leverage ratio of 55%, and decided to raise funds through debt. UGG turned to banks for approximately half of its long term fixed asset financing, and in 1996 arranged for a ten-year loan of \$100 million at an effective interest rate of 8.87%. In addition to using short-term bank financing for approximately 60% of its residual working capital requirements, in 1995 UGG began raising cash by a method called “securitizing.” Essentially, UGG sold amounts receivable due from the CWB (for the grain UGG had bought on the CWB’s behalf) and receivables due from farmers (for crop-input purchases). In 1998, UGG securitized a total of \$173 million (\$204 million in 1996) under two different \$150 million facilities.<sup>10</sup> The securitization program reduced the amount of inventory and receivables that UGG had to finance, both on an absolute basis, and as a percentage of sales.

## The Industry Climate

Events in the mid-1990s challenged UGG’s strategic initiatives. In 1995, the government began reviewing the industry regulations. When it partially deregulated the transportation system, the railroads began consolidating routes. UGG had to take a \$12.5 million

<sup>8</sup>The Crop Production Services division required significant working capital due to the seasonal nature of the business. Inventory was generally sold on credit during a six-week period in the spring. Farmers would generally pay in the fall when the crops were sold.

<sup>9</sup>The IPO raised \$8.8 million net of fees and issue costs. This amount excluded \$20.5 million of equity (6.85 million shares) issued in exchange for patronage interest owed to co-op members. Patronage interest was the distribution of profits paid to cooperative members. These distributions had been retained for several years to provide another source of financing to the company.

<sup>10</sup>UGG remained responsible for delivering the grain and collecting the funds. However, it was responsible for only a very limited proportion of any outstanding balance that a customer failed to pay. Securitization was a means of off-balance sheet funding. The description was due to the accounting treatment, where neither the assets (e.g., inventory subject to the sales) nor the corresponding liability (e.g., the accounts payable used to purchase the inventory) appeared on the balance sheet. In most cases, this lowered the ratio of debt to assets, financing costs and, in Canada, the capital taxes that were based on the amount of the firm’s equity and debt.

charge for a three-year program to close 93 country elevators on routes that were going to be abandoned. The government commission also recommended major changes to the CWB. One of the reforms allowed distributors to set their own tariffs within limits. Later that year, a poor harvest contributed to low inventories and sales volume, and four out of the five major distributors lost money in the handling business. Low inventories contributed to higher grain prices, and farmers planted seven million more acres of cereals to compensate. Acreage in non-cereal grains such as canola, UGG’s main proprietary seed product, fell by four million acres.<sup>11</sup> As a consequence, operating income from the Crop Production Services division fell about 50%.

These industry-wide economic strains, coupled with the attraction of UGG’s modernized grain handling assets, prompted two of UGG’s competitors, Alberta Pool and Manitoba Pool Elevators, to initiate a joint hostile takeover bid for UGG in January 1997. The bidders first purchased 1.6 million shares in the open market to acquire a 13% stake in the firm. They then offered to purchase the remaining shares at \$13.75 per share, valuing the firm at \$169 million, a 34% premium over the average stock price immediately before they began to acquire shares. They then bought another 1.98% of the stock on the open market, and entered into a “lock-up” agreement with one of UGG’s other shareholders, which gave the Pools control over approximately 22% of UGG’s common shares. UGG’s investment advisors characterized the bid as “inadequate,” as it failed to reflect the investments made by UGG in the past few years. UGG’s board threatened to trigger a recently adopted “shareholder rights plan” (commonly known as a “poison pill”) in defense. Under this plan, if a party acquired 15% or more of the company’s stock, each shareholder (other than the would-be acquirer) would be able to purchase, at a 50% discount to market price, approximately 8.5 additional common shares for every share held, unless the acquirer complied with the bid provisions of the plan. This would have substantially diluted the share ownership of the non-complying bidder. The public exchange between UGG and the potential acquirers became acrimonious but the takeover attempt was ultimately defeated in March 1997 when a Canadian judge ruled that UGG was free to trigger its poison pill. Rather than suffer substantial dilution of their existing investment, the bidders withdrew their offer.<sup>12</sup> Subsequently, the two bidders merged to form Agricore.

In the aftermath of the takeover attempt, and consistent with its drive to form alliances, UGG formed a strategic alliance with Archer Daniels Midland Company (ADM), one of the largest food processors in the United States and a major customer of UGG. Under the alliance, ADM would gain “a secure grain supply for its processing operations” and UGG could “plan more efficiently for future transportation and grain handling demands, and increase market share.”<sup>13</sup> ADM paid approximately \$113 million to acquire a 42% stake in the outstanding common shares of UGG. After several years of working together, UGG also formalized a partnership with Marubeni Corporation, one of Japan’s leading oilseed-crushing firms, on October 1, 1997. As part of the agreement, Marubeni purchased 750,000 newly issued shares at \$16 per share (the market price for UGG stock was \$14) in a private placement, giving it 4.5% ownership in UGG.<sup>14</sup> (See Exhibits 3 and 4.)

<sup>11</sup>For non-proprietary grains, farmers usually saved some of their harvested grain to use as seed.

<sup>12</sup>The firm spent approximately \$2.2 million to respond to the hostile takeover offer.

<sup>13</sup>UGG Annual Report, 1997, page 8.

<sup>14</sup>UGG issued 4,828,320 shares to ADM in August 1997, after approval by UGG shareholders in a special meeting held on July 17, 1997, when the stock was trading at \$14.55. ADM also converted a debenture it purchased from UGG in May 1997 into an additional 2,207,250 shares. Both of these transactions were executed at \$16 per share, valuing the firm’s equity at \$269 million. In September, UGG repurchased 3,908,650 shares, also at \$16 per share. Including the ADM, Marubeni, and repurchase transactions, UGG netted \$61 million in new capital.

## The Willis Report

While UGG had a long-standing risk management function, this subject received increasing interest in the firm throughout the 1990s. In 1992, shareholders of a U.S. agricultural cooperative successfully sued their directors because the firm did not hedge its grain risk when prices were falling.<sup>15</sup> The Dey Report, a 1994 regulatory recommendation from the Toronto Stock Exchange, charged Canadian Boards of Directors with the responsibility to understand the major risks faced by their firms, and have procedures for managing those risks.<sup>16</sup> Several “derivatives disasters,” including the revelations of trading losses by rogue traders at Orange County in 1994, Barings Bank in 1995, and Sumitomo Corporation in 1996, brought risk management activities into the public focus. This emerging interest in risk management prompted UGG to participate in a benchmarking review of best risk management practices in its Treasury department. The Audit Services department, which reported directly to the Audit Committee of the Board of Directors, also felt a need to establish internal corporate-wide controls and reporting protocols on risk related matters.

Concurrently Cox and McAndless were discussing the concept of a significantly broader application of traditional risk management processes with one of its insurance consultants. Their objective was to better identify and evaluate all of UGG’s risks (business as well as its traditionally insurable risks). Willis welcomed the opportunity to participate in the project. They had specialized resources available to analyze and evaluate the risks faced by businesses, to advise on how best to manage those risks, as well as where to purchase insurance to cover them. Willis was willing and able to provide the rigorous analysis of risks that UGG sought. Moreover they were willing to assist in facilitating the consolidated, corporate-wide risk identification and ranking process which was a necessary precursor to quantitative analysis. This analysis offered UGG a potential opportunity to structure a more comprehensive arrangement of its insurance through a single policy covering multiple risks. It might also enable the firm to adopt a standard approach to risk management, which would help UGG spend time and money where the benefits of risk reduction or opportunity were greatest.

On February 11, 1997, twenty UGG senior managers and other employees met for an onsite risk brainstorming session facilitated by Willis. Their first task was to identify the risks the firm faced. (See Exhibit 5.) The next task was to rank them, by polling the group, in relative importance to the firm. The risks were consolidated into twenty-five categories, and finally prioritized into groups of six for quantitative analysis. Once this process was complete, Willis focused its attention on the first group of six which included commodity price risk, inventory management risk (spoilage and obsolescence), customer and supplier counterparty risk, accounts receivable and credit risk, environmental risks, and weather risk.

Willis assembled a team of specialists from several departments to analyze the various risks. The team included several actuaries,<sup>17</sup> a statistician, and a marketer who understood

insurance markets. The methodology used depended on the amount of information available. Large data sets, such as the weather or commodity prices, were analyzed with statistical methods. Risks where significant data was available, such as credit risk, were analyzed with traditional actuarial data. When hard data was lacking, as was the case for environmental and counterparty risk, the team surveyed experts in the field to get informed estimates of the potential liability. The data collection and analysis was conducted over an 18-month period, punctuated by delays as UGG management focused on other urgent business matters.

For each of the top six risks, the Willis team had to summarize the distribution of the size and severity of UGG’s potential losses. They used a measure called “Earnings at Risk” (EaR), which had been developed by the financial community, to describe aggregate risks. EaR expressed a “worst-case” loss, set against a benchmark of expected profit, within a specified confidence or probability level. For example, a 95% EaR of \$5.6 million implied that, 5% of the time or once every twenty years, the firm would fall short of its earnings target by more than \$5.6 million.<sup>18</sup> The advantage of EaR was the simplicity of aggregating multiple risks into a single number.<sup>19</sup> (See Exhibit 6.)

Analyzing the weather risk presented a challenge to Ken Risko, the statistician, ironically because there was too much data. Risko had 70 years of monthly information on the average temperature, low temperature, and precipitation for approximately 160 weather stations covering UGG’s territory, and data on yields for 5 different relevant crops. Using spreadsheets to analyze the data with regression techniques, he found that the four variables, precipitation in June and July and the average temperature in February and September, explained approximately 85% of the variation in crop yields. These results appeared valid to agriculture experts. The modeled yields, in turn, explained approximately 94% of the variability of UGG’s grain handling earnings. (See Exhibit 7.)

Willis needed to communicate complex information without resorting to tables of numbers and pages of explanations and caveats. It also needed to convey the meaning and limits of the statistical analysis. Willis used this opportunity to test a new tool under development called CHARM (Comprehensive Holistic All Risk Model). CHARM generated graphical output in several formats to highlight the various aspects of each risk. The most general format was a probability distribution showing the probability of incurring a loss as a function of the size of the dollar loss. This was usually implemented either in cumulative form (i.e., to show the probability of losing at least a certain amount) or as a distribution (i.e., to show the probability of a specific outcome), though one could be inferred from the other. (See Exhibit 8.) The presentation concluded with CHARM’s translation of the statistical distribution into a demonstration of how risk management might impact the volatility of UGG’s operating income. The results convinced Cox that he had the information to do something to improve the firm’s risk management performance and potentially reduce UGG’s long term cost of risk. (See Exhibit 9.)

<sup>15</sup>Paul H. Brane et al. v. Porter E. Roth et al., First Court of Appeals, Indiana, February 28, 1992.

<sup>16</sup>Similar guidelines were recommended in both the U.S. (“Report of the National Commission on Fraudulent Financial Reporting,” 1987, also known as the Treadway Report), and the U.K. (“Report of the Committee on the Financial Aspects of Corporate Governance,” 1992, also known as the Cadbury Report).

<sup>17</sup>An actuary applies statistics and financial theory to solve insurance and pension problems such as what premiums to charge, or how much money needs to be invested to cover future liabilities.

<sup>18</sup>The financial community pioneered the concept as Value at Risk. VaR was generally stated as the largest amount that an institution estimated its portfolio might fall in value due to changing market conditions, within a specified probability. It could also be expressed as a probability that the losses would exceed a specific amount. Using the example above, the firm would lose less than \$5.6 million (relative to its benchmark) in 19 out of 20 years. However, there was also a 5% chance in any one year that the firm would lose more than \$5.6 million.

<sup>19</sup>Multiple risks, in general, do not add in a simple manner because the correlation between events must be considered. Events with a negative correlation tend to offset one another, and even positively correlated events that are imperfectly correlated with one another tend to occur at different times.



## What to Do about the Weather?

Five of the six risks that Willis analyzed could be managed through traditional methods. Environmental risk was generally controlled using property and liability insurance and well-defined and executed operating procedures, which also applied to containing inventory risk. Credit and counterparty risks were controlled with credit limits, a diverse customer and supplier base, and aggressive monitoring of the ability and willingness to fulfill their commitments. These credit and other financial risk management programs were all well-established and supervised by Prosk. The Marketing and Transportation Division managed the firm's exposure to grain price fluctuations using financial contracts such as commodity futures and options, and by establishing and monitoring position limits in concert with Cox and Hayward.<sup>20</sup>

One of the largest risks presented in the analysis was the weather, which UGG could not manage because historically there had been no financial products that would effectively mitigate the risk. Several firms were attempting to fill this gap with new products and services. One recent innovation was weather derivatives, a new class of financial instrument offered by a few pioneering firms. Typically custom written, these contracts were structured to pay a specified amount of money as a function of a particular weather characteristic. For example, Boston's Logan Airport purchased an option that paid when winter snowfall exceeded a specific amount. A more common implementation used "degree-days" (defined as the average daily temperature minus 65 degrees Fahrenheit) as the underlying variable. The contract would then pay the difference between the realized number of degree-days and the contracted number of degree-days, multiplied by a predetermined dollar figure. These markets were still emerging, however, and the contracts were illiquid with large bid-ask spreads.

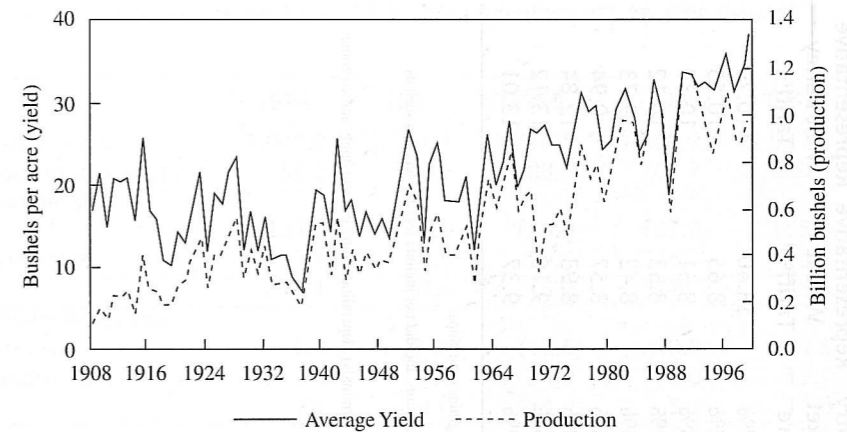
Willis, however, believed they might be able to find an insurer willing to write a contract to protect UGG. Such a contract might bundle UGG's existing risks (property and casualty and environmental) with its risk due to poor weather. Initially, the Willis and UGG team thought that it would be easier to link the contract to verifiable weather conditions, much like weather derivative contracts. UGG would need to pay a premium for this insurance, and negotiations would likely revolve around the extent to which the insurer would provide UGG with coverage.

As Cox and his team were reviewing the alternatives, disaster struck in the form of a poor macroeconomic environment. An Asian currency crisis caused a general weakness in commodity markets. The CWB, faced with low prices and poor demand, was having difficulty marketing the recent crop. Despite a 27% increase in non-board grain shipments, CWB shipments for the first half of fiscal year 1999 were down 45%, costing UGG approximately \$5.0 million in lost after tax profit. This experience prompted the team to realize that it may be better to link the coverage directly to the quantity of grain handled in Canada rather than just the consequences of adverse weather. But, Cox wondered, would the insurers be interested in providing "unconditional volume protection" and at what price?

<sup>20</sup>A futures contract was a commitment to buy (or sell) a commodity at a fixed price in the future, and could be used to lock in prices. An option gave the holder the right to buy (or sell) a commodity at a fixed price in the future.

**EXHIBIT 1**  
Historical Yields  
and Total Production  
of Canadian Wheat,  
1908–1998

Source: Statistics Canada



**EXHIBIT 1B**  
Historical Wheat  
Prices,<sup>a</sup> 1993–1998  
(Canadian dollars  
per tonne)

Source: Datastream



**EXHIBIT 2 Representative Tariffs, CWB Shipments, and UGG Market Share, 1988–1998 (\*000 tonnes unless otherwise noted)**

Sources: UGG, company reports, Canadian Grain Commission, and casewriter estimates.

Fiscal Year	Country Elevator Shipments <sup>a, b</sup>		Terminal Elevator Shipments <sup>b</sup>		Total Number of Country Elevators		Number of High Throughput Elevators		Total Country Elevator Capacity <sup>b</sup>		Average Country Elevator Capacity <sup>b</sup>		Country Elevator Turnover		UGG Country Market Share		Representative Wheat Tariff <sup>c, d</sup>		Representative Malt Barley Tariff <sup>c, e</sup>	
	4,841	5,869	2,163	3,785	276	269	0	1,149	4.16	4.21 x	16.2%	\$8.40	\$10.20							
1990	4,841	5,869	2,163	3,785	276	269	0	1,149	4.16	4.21 x	16.2%	\$8.40	\$10.20							
1991	5,411	5,869	3,861	3,785	266	269	0	1,145	4.26	5.13 x	15.2%	8.65	10.55							
1992	5,333	5,869	3,150	3,861	252	266	3	1,134	4.26	4.77 x	12.8%	8.51	10.30							
1993	5,679	5,869	3,127	3,150	224	252	6	1,125	4.46	4.74 x	13.3%	8.53	10.12							
1994	6,222	5,869	3,599	3,127	220	224	8	1,099	4.91	5.17 x	14.4%	8.42	9.73							
1995	5,164	5,869	2,626	3,599	173	220	10	1,069	4.86	5.82 x	18.3%	8.57	9.94							
1996	5,346	5,869	3,192	2,626	152	173	12	973	5.62	5.31 x	16.8%	8.93	12.84							
1997	4,987	5,869	3,064	3,192	145	152	16	864	5.68	6.19 x	14.6%	9.10	13.12							
1998		4,987		3,064		145		823	5.68	6.06 x	14.9%	9.37	13.01							

<sup>a</sup>Country elevators were located in the provinces and acted as local gathering and storage facilities. Terminal elevators were export facilities, which generally loaded the grains onto ships.  
<sup>b</sup>In thousands of tonnes.

<sup>c</sup>Realized tariffs in dollars per tonne at country elevators. Tariffs were rough weighted averages over the three provinces where UGG operated. They were for country elevation, and did not include fees for services such as cleaning, inspection, or storage, or for any terminal handling. The tariffs for individual provinces could vary as much as +/- 15% from the average.

<sup>d</sup>Wheat, a so-called Board grain, was marketed through the Canadian Wheat Board.

<sup>e</sup>UGG directly marketed malt barley to customers. It was responsible for the marketing; it decided when to buy, when to sell, and where the malt barley went (e.g., UGG terminals), depending on the farmer supply and customer demand. As a consequence, UGG was able to earn higher, but more volatile, net tariffs.

**EXHIBIT 3A Historical Income Statements for UGG, 1993–1998 (in millions of Canadian dollars)**

Source: Company reports.

	1993	1994	1995	1996	1997	1998
Sales and revenue from services	1,049.0	1,217.4	1,736.5	1,969.9	1,921.3	1,887.3
Gross profit and revenue from services <sup>a</sup>	151.8	158.1	188.5	203.2	220.0	229.7
Selling, general, and administrative expenses	123.7	132.6	158.0	163.0	165.3	169.1
Depreciation and amortization	13.0	12.9	15.4	16.1	16.3	17.2
Net operating income	16.1	12.6	15.2	24.1	38.5	43.3
Unusual and extraordinary items and discontinued operations	0.4	(2.0)	(12.5)	0.0	(4.5)	0.0
Interest and securitization expense <sup>b</sup>	6.4	8.8	14.9	16.0	13.7	11.4
Taxes	2.1	1.6	(4.9)	2.2	11.2	15.6
Net income	7.0	0.2	(7.4)	5.9	9.1	16.3

<sup>a</sup>This was the gross value of the total services provided by UGG (e.g., inspection, cleaning, distribution, storage, and logistical arrangements for grain, and distribution for other products). It was calculated as sales minus the direct costs of goods sold. The costs of providing the services (or generating the sales) were not subtracted.

<sup>b</sup>Securitization expense was the interest paid on CWB inventories that were securitized.

**EXHIBIT 3B Historical Balance Sheet for UGG, 1993–1998 (in millions of Canadian dollars)**

Source: Company reports.

	1993	1994	1995	1996	1997	1998
Cash and equivalents	18.1	22.1	42.2	48.1	69.3	46.9
Accounts receivable and prepaid expenses	117.2	175.9	116.4	97.8	93.6	88.3
Inventories (net of securitizations) <sup>a</sup>	175.7	190.0	187.5	181.4	121.7	136.2
Plant, property, and equipment	141.5	158.2	182.1	190.3	193.3	226.3
Other assets	15.9	17.8	16.1	13.9	11.2	17.5
Total assets	468.4	564.0	544.3	531.4	489.2	515.2
Short-term debt	210.4	226.8	218.4	165.7	85.1	46.4
Accounts payable	52.1	81.3	79.3	86.2	93.4	83.5
Dividends payable	1.2	3.7	3.8	3.8	4.3	5.3
Deferred income taxes	49.4	53.1	46.5	41.9	44.8	45.3
Long-term debt	28.7	64.6	65.6	100.1	100.2	100.0
Total liabilities	341.9	423.5	413.7	397.7	327.9	280.6
Total shareholders' equity	126.5	140.5	130.6	133.7	161.3	234.6
Total liabilities and equity	468.4	564.0	544.3	531.4	489.2	515.2
Assets securitized <sup>b</sup>	0	0	110.7	203.7	217.7	173.2

<sup>a</sup>Securitized receivables and inventory held on behalf of the CWB was not included in UGG receivables and inventory as the lender technically held the title to them. Because neither the asset nor the associated financing was recorded on the balance sheet, this type of funding was referred to as "off-balance sheet."

<sup>b</sup>To correct for the distortion of "off-balance sheet" financing, rating agencies typically added back the balance of the securitized assets to both the assets and liabilities of the company when calculating financial ratios and ability to repay debt. Bank covenants typically did not make this adjustment.



**EXHIBIT 3C Historical Statements of Cash Flow for UGG, 1993–1998 (in millions of Canadian dollars)**

Source: Company reports and casewriter adjustments.

	1993	1994	1995	1996	1997	1998
Net income	7.1	0.2	(7.4)	5.9	9.1	16.3
Depreciation and amortization	13.0	12.9	15.4	16.1	16.3	17.2
Net decrease (increase) in working capital before securitization <sup>a</sup>	(94.8)	(42.8)	(43.6)	(62.0)	64.9	29.0
Net decrease (increase) in working capital from securitization <sup>a</sup>	0	0	110.7	93.0	14.0	(44.5)
Cash from operations	(74.7)	(29.7)	75.2	52.9	104.4	18.1
Capital expenditures and business acquisitions	(25.1)	(26.8)	(43.9)	(26.8)	(21.9)	(53.8)
Net proceeds from disposal of capital assets	2.0	(0.4)	1.7	3.0	2.2	1.3
Increase in other assets	(3.3)	(5.3)	(2.9)	(2.2)	(1.4)	(3.3)
Cash from investments	(26.4)	(32.5)	(45.1)	(26.1)	(21.1)	(55.7)
Increase (decrease) in short-term financing	97.5	16.4	(8.4)	(52.7)	(80.6)	(40.8)
Increase (decrease) in long-term debt	(22.0)	36.0	1.0	34.5	0.1	(0.1)
Share capital issued, net <sup>b</sup>	27.1	17.6	1.3	1.0	22.9	61.4
Dividends	(1.2)	(3.7)	(3.8)	(3.8)	(4.3)	(5.3)
Cash from financing	101.4	66.2	(10.0)	(21.0)	(62.0)	15.2
Total cash flow	0.4	4.0	20.1	5.9	21.3	(22.4)

<sup>a</sup>The sale of inventory or receivables by securitization is a source of cash from operations. UGG used most of the incoming cash to reduce short-term financing, which is a use of cash from financing.

<sup>b</sup>Net of issuance and restructuring costs. Not net of debt repayments or other refinancing.

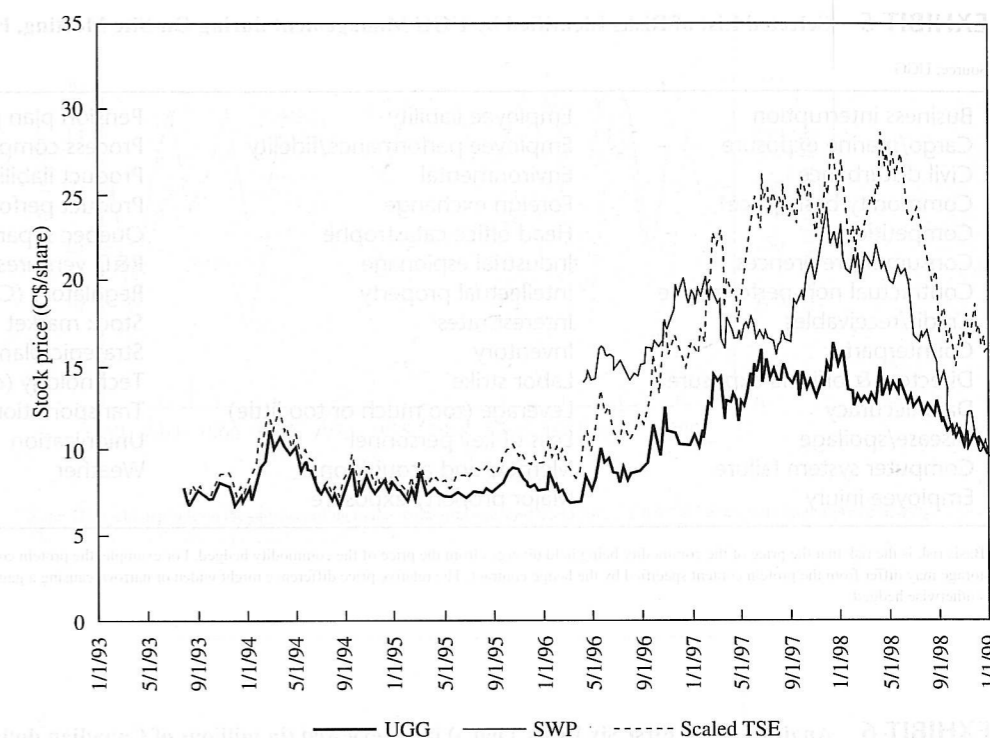
**EXHIBIT 3D Divisional Operating Results before Interest, Taxes, and Allocation of Corporate Expenses 1993–1998 (in millions of Canadian dollars)**

Source: Company reports.

Gross Profit and Revenue from Services	1993	1994	1995	1996	1997	1998	Assets 1998
	Grain Handling	\$97.2	\$95.9	\$107.2	\$119.2	\$115.5	\$115.6
Crop Production Services	25.2	34.5	49.7	52.0	64.4	69.4	175.6
Livestock Services	15.9	15.3	18.5	22.1	27.4	31.3	49.0
Farm Business Communications	10.7	9.8	9.1	8.7	8.7	9.7	0.7
Corporate and Other	3.8	2.6	4.0	1.1	4.2	3.7	60.7
Total	\$152.8	\$158.1	\$188.5	\$203.2	\$220.0	\$229.7	\$515.2
Operating Income	1993	1994	1995	1996	1997	1998	
Grain Handling	\$13.1	\$13.6	\$14.9	\$28.6	\$27.3	\$28.7	
Crop Production Services	9.9	8.0	11.2	5.7	18.9	20.5	
Livestock Services	1.2	2.0	3.3	4.7	5.3	7.2	
Farm Business Communications	(0.4)	0.7	0.4	0.3	1.2	2.0	
Corporate and Other	(8.7)	(11.7)	(14.7)	(15.2)	(14.2)	(15.1)	
Total	\$15.1	\$12.6	\$15.1	\$24.1	\$38.5	\$43.3	

**EXHIBIT 4 Historical Stock Performance of UGG, Saskatchewan Wheat Pool (SWP), and Toronto Stock Exchange (TSE) Index,<sup>a</sup> 1993–1998**

Source: Datastream



Date	Event	UGG Stock Price/Return <sup>b</sup>	Scaled TSE Index/Return <sup>b</sup>
July 28, 1993	Initial Public Offering price	\$7.75	\$7.75
January 21, 1997	Rumor of takeover attempt	11%	-1%
February 6, 1997	Alberta Wheat Pool and Manitoba Elevators announce 13% ownership of UGG common stock	5%	0%
February 20, 1997	Alberta Wheat Pool and Manitoba Pool Elevators make cash offer of \$13.75 for all outstanding common shares	14%	0%
March 19, 1997	Shareholder rights plan approved by judge	-9%	-1%
August 20, 1997	ADM investment announced	4%	0%
January 1, 1999	Most recent price	\$10.25	\$15.71

<sup>a</sup>The TSE, an index of 300 stocks on the Toronto Stock Exchange, was scaled to have the same price as UGG on July 28, 1993.

<sup>b</sup>Return is calculated as the percentage change in closing price from one day before the event to one day after the event.

**EXHIBIT 5 Selected List of Risks Identified by UGG Management during On-Site Meeting, February 11, 1997**

Source: UGG

Business interruption	Employee liability	Pension plan performance
Cargo/marine exposure	Employee performance/fidelity	Process compliance/execution
Civil disturbance	Environmental	Product liability
Commodity basis/price <sup>a</sup>	Foreign exchange	Product performance
Competition	Head office catastrophe	Quebec separates from Canada
Consumer preferences	Industrial espionage	R&D ventures
Contractual non-performance	Intellectual property	Regulatory (CWB, transportation)
Credit/receivables	Interest rates	Stock market crash
Counterparty	Inventory	Strategic planning
Directors & officers exposure	Labor strike	Technology (choice, use of)
Data accuracy	Leverage (too much or too little)	Transportation
Disease/spoilage	Loss of key personnel	Unionization
Computer system failure	Mergers and acquisitions	Weather
Employee injury	Major property exposure	

<sup>a</sup>Basis risk is the risk that the price of the commodity being held diverges from the price of the commodity hedged. For example, the protein content of the grain held in storage may differ from the protein content specified by the hedge contract. The relative price difference might widen or narrow, causing a gain or loss even though the grain is otherwise hedged.

**EXHIBIT 6 Analysis of the First Six Risks That Willis Reviewed (in millions of Canadian dollars)**

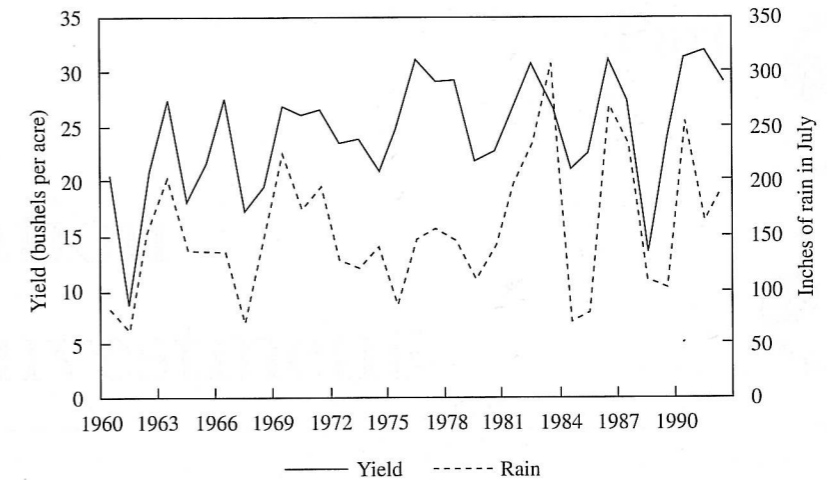
Source: UGG and Willis reports, casewriter estimates.

Risk	Definition	Earnings at Risk <sup>a</sup>	Method to Manage Risk
Weather	Impact on harvested yields	11.5	None
Environmental Liability	Inadvertent release of toxic substances to external environment	2.5	Insurance/control
Counterparty	Failure of another company, such as a supplier, to meet contractual obligations, such as delivery of inventory to sell.	4.3	Diversification/due diligence/contracts
Credit	Failure of another company to pay money owed to UGG	1.6	Diversification/due diligence/contracts
Inventory	Spoilage of inventory	2.2	Operational control, insurance
Commodity	Price falls while holding in inventory	11.9	Futures and options

<sup>a</sup>Figures are at 90% confidence or probability level, except for commodities, which were calculated at the 95% confidence level. The figures represent that there was a 90% (or 95%) probability that the largest loss would be less than the stated number.

**EXHIBIT 7 All-Wheat Yield in Saskatchewan and the July Precipitation for 1960 through 1992**

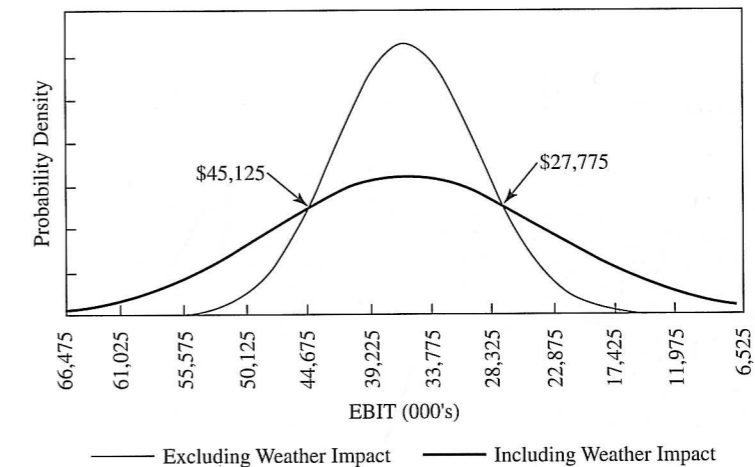
Source: Casewriter estimates based on data from UGG and Willis.



Note: The yield depends on the rain according to the regression equation  $Yield = 15.5 + 0.0577 * Rain$ , with an R-squared of 43%. The t-statistics for the intercept and slope were 7.8 and 4.8, respectively.

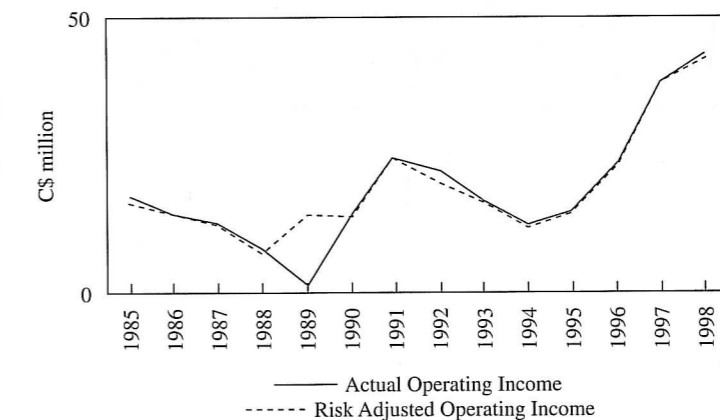
**EXHIBIT 8 CHARM plot showing the probability distribution of earnings with and without the impact of the weather. When the weather risk is removed, the variation in EBIT is smaller, as shown by the lighter curve, though the expected value is the same.**

Source: UGG and Willis Corroon



**EXHIBIT 9 Potential Impact of Integrated Risk Program on Historical Operating Income, 1985-1998 (in millions of Canadian dollars)**

Source: UGG and Willis Corroon.



Note: A major drought reduced the 1988 grain harvest, which was marketed in 1989, by about 20%.