Dealing with Nature's Risks:

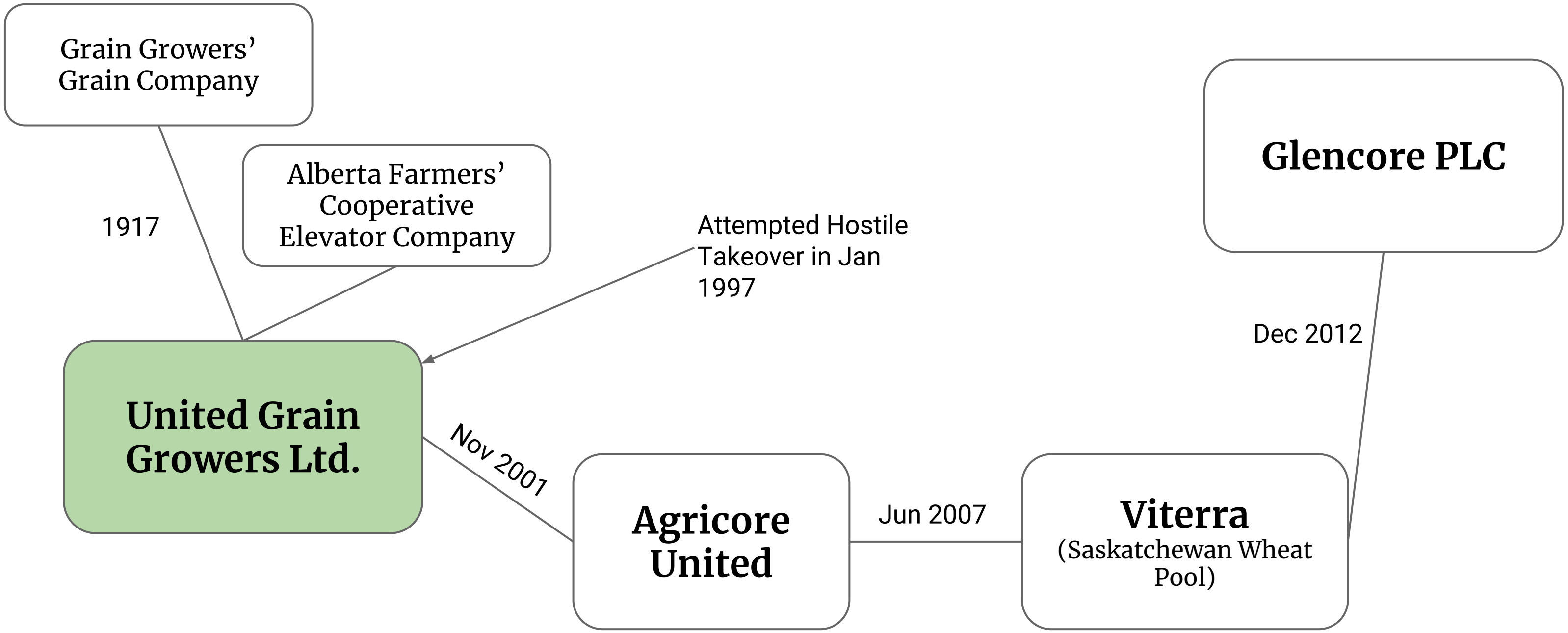
A Case Study of United Grain Grower (UGG) Limited

United Grain Growers Ltd. (UGG)

- Farmers’ Cooperative
- **Founded in 1917** through the United Grain Growers Act
- Headquartered in Winnipeg
- Business in Western Canada and Lakehead, Ontario
- First issued limited voting rights shares in an **IPO in 1993**
- Main transports included **wheat, barley, oats, and corn.**

Source:. University of Manitoba United Grain Growers Ltd Corporate Archive

History



Source: University of Manitoba United Grain Growers Ltd Corporate Archive

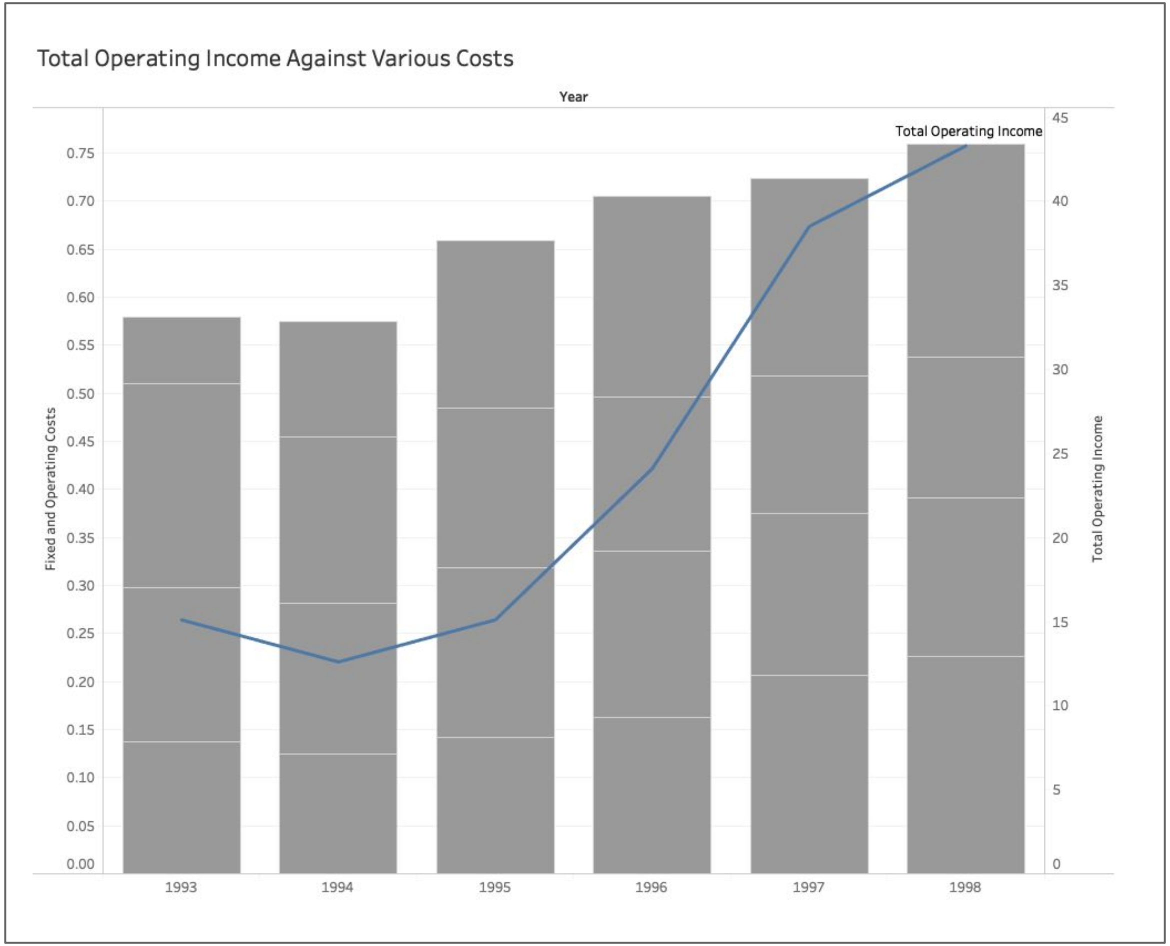
Revenue Sources

1. **Grain handling**
   - Operate elevators
   - Market non-board and board grains
2. **Crop production services**
   - e.g. provide weed killer
3. **Livestock production services**
   - e.g. provide poultry feed
4. **Farm Business Services**
   - Help finance innovation (loans, machinery, etc.)
   - Agriculture Consulting

What Should We Hedge?

Depends on:

1. Share of income
2. Costs
3. Volatility
4. Risk appetite, etc.

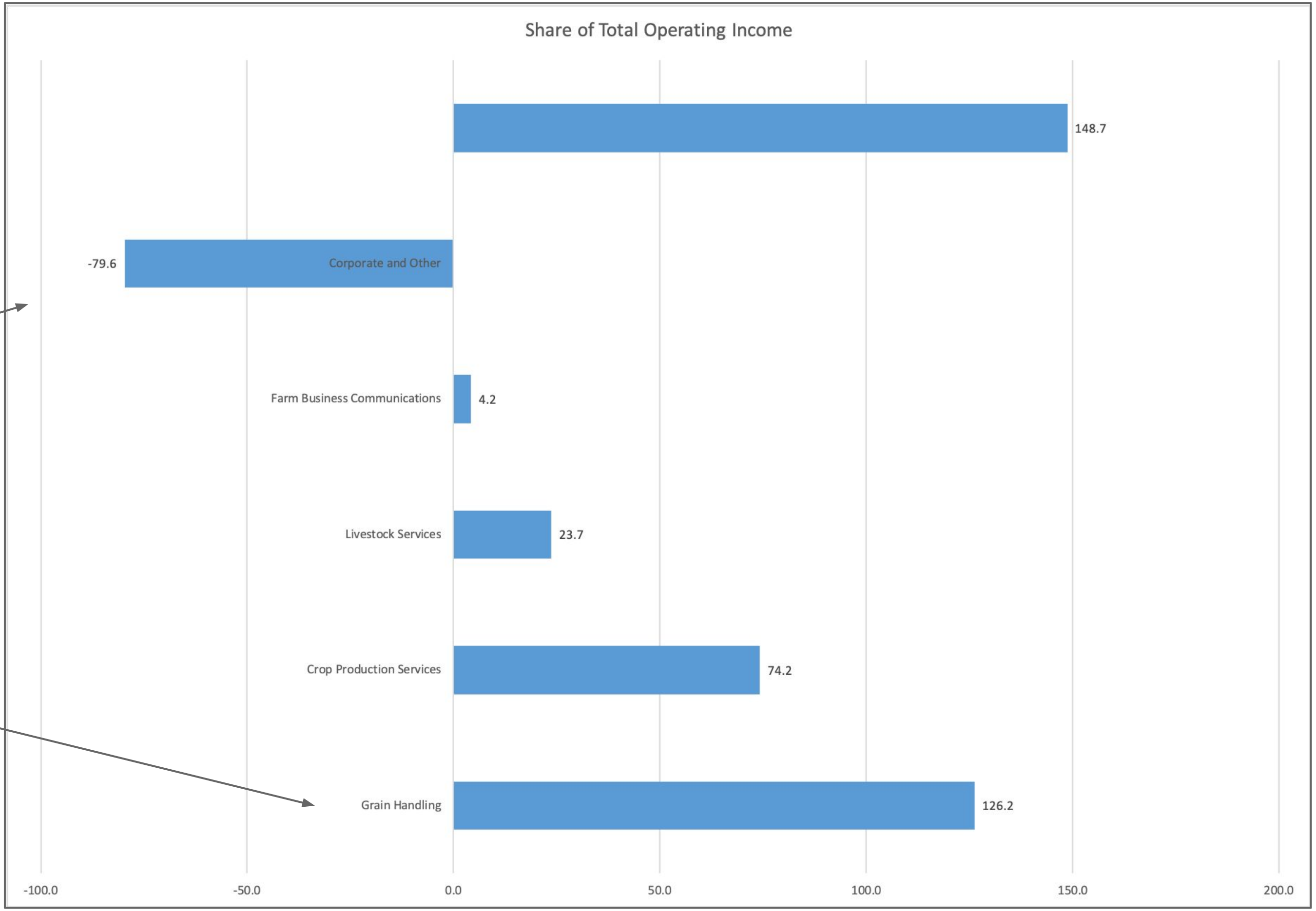


Fixed Cost Structure Summary Plot

1. (Share of cost of) Crop Production 2. (..) Livestock Production 3. (..) Farm Business 4. (..) Share of cost of Grain Handling
Source: UGG Income Statements

Total Income

1993 – 1998



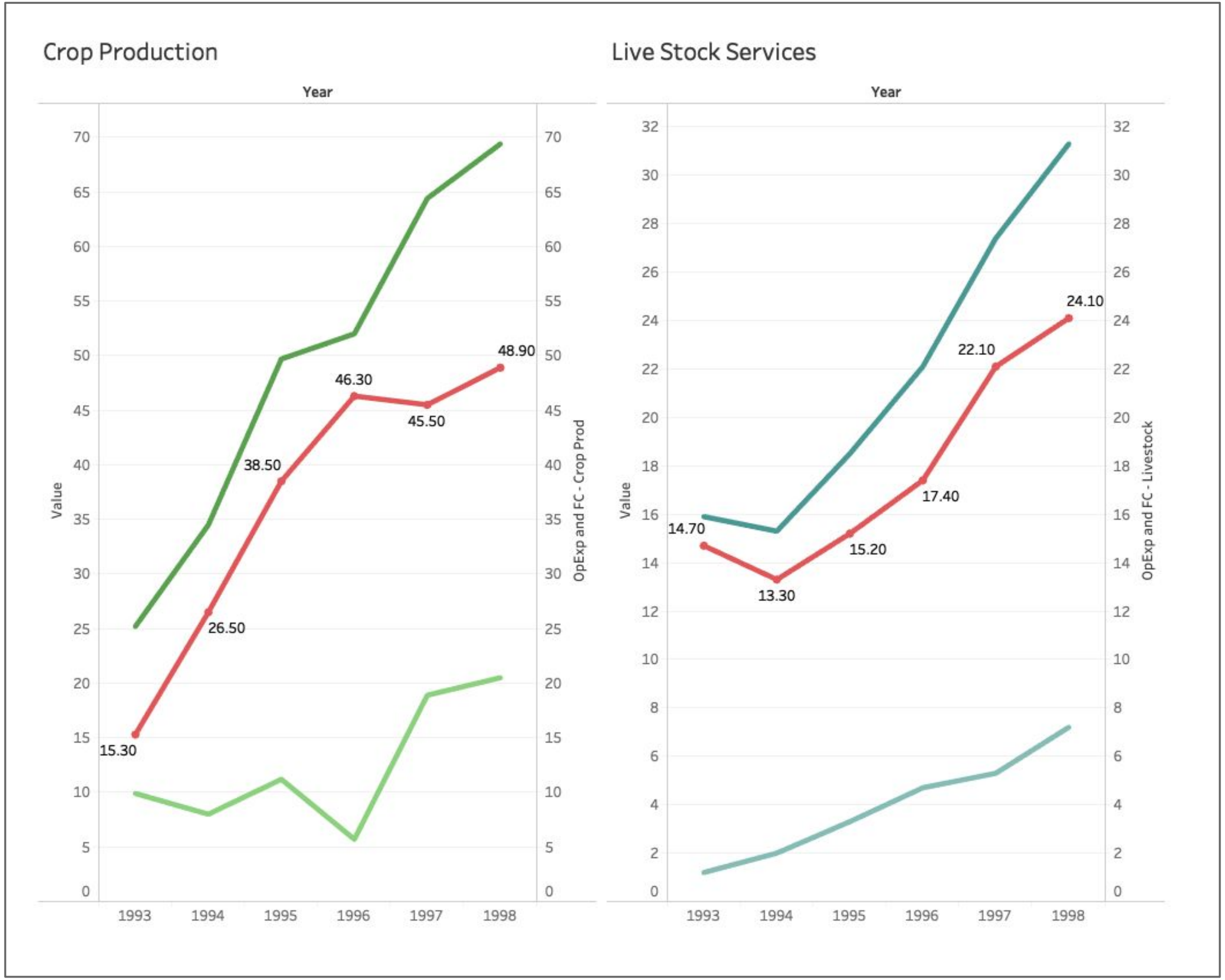
Corporate Expenses are huge

Grain Handling is the largest revenue source

Source: UGG Income Statements

Revenue streams with Rising Fixed and Operating Costs

- UGG invested heavily in crop production and livestock production
- Proportion of income from grain operations decreased from 70% to 50%

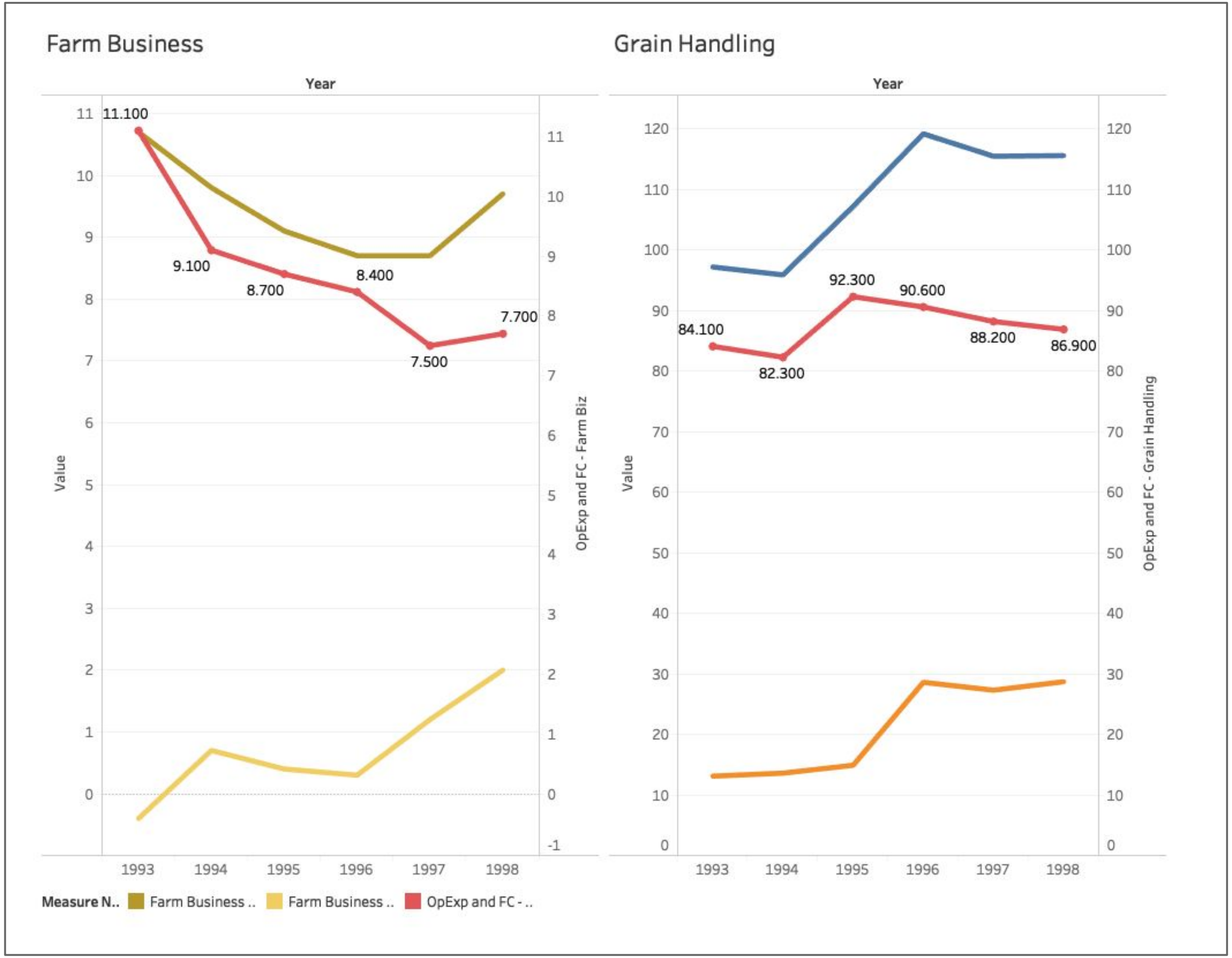


Fixed cost & operating cost = Gross revenue - Unit cost - Net operating income

Source: UGG Income Statements

Revenue streams with diminishing fixed and operating costs

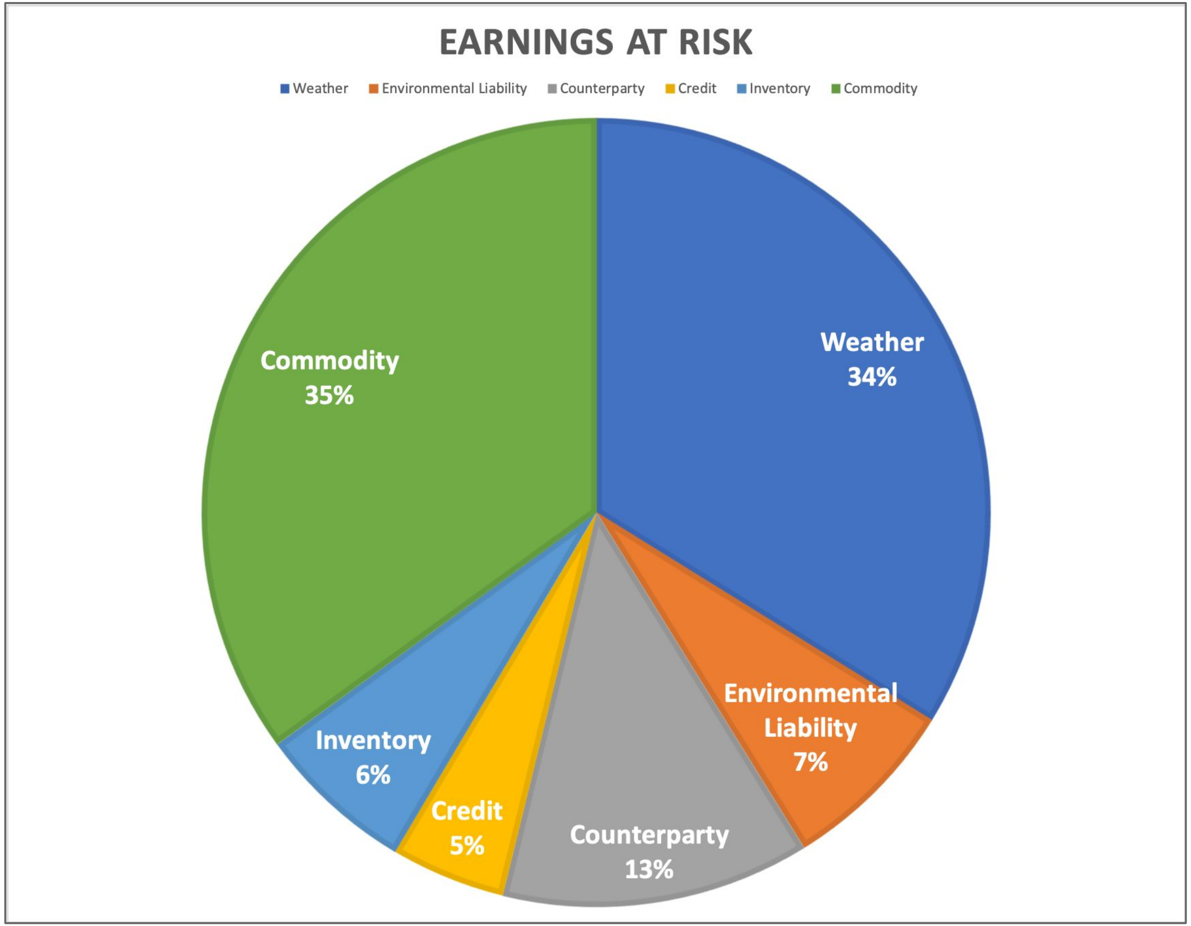
Grain Handling and Farm Business has stable costs, but net operating profits **do not trend together with costs**



Source: UGG Income Statements

RISK PROFILE

Earnings-at-Risk are highest from Commodity and Weather Risks, which translate into Operations and Price Risks



Source: Case Study on United Grain Growers Ltd.

Operation Risk

Agricultural product distributors will face risks from both the supply and demand side:

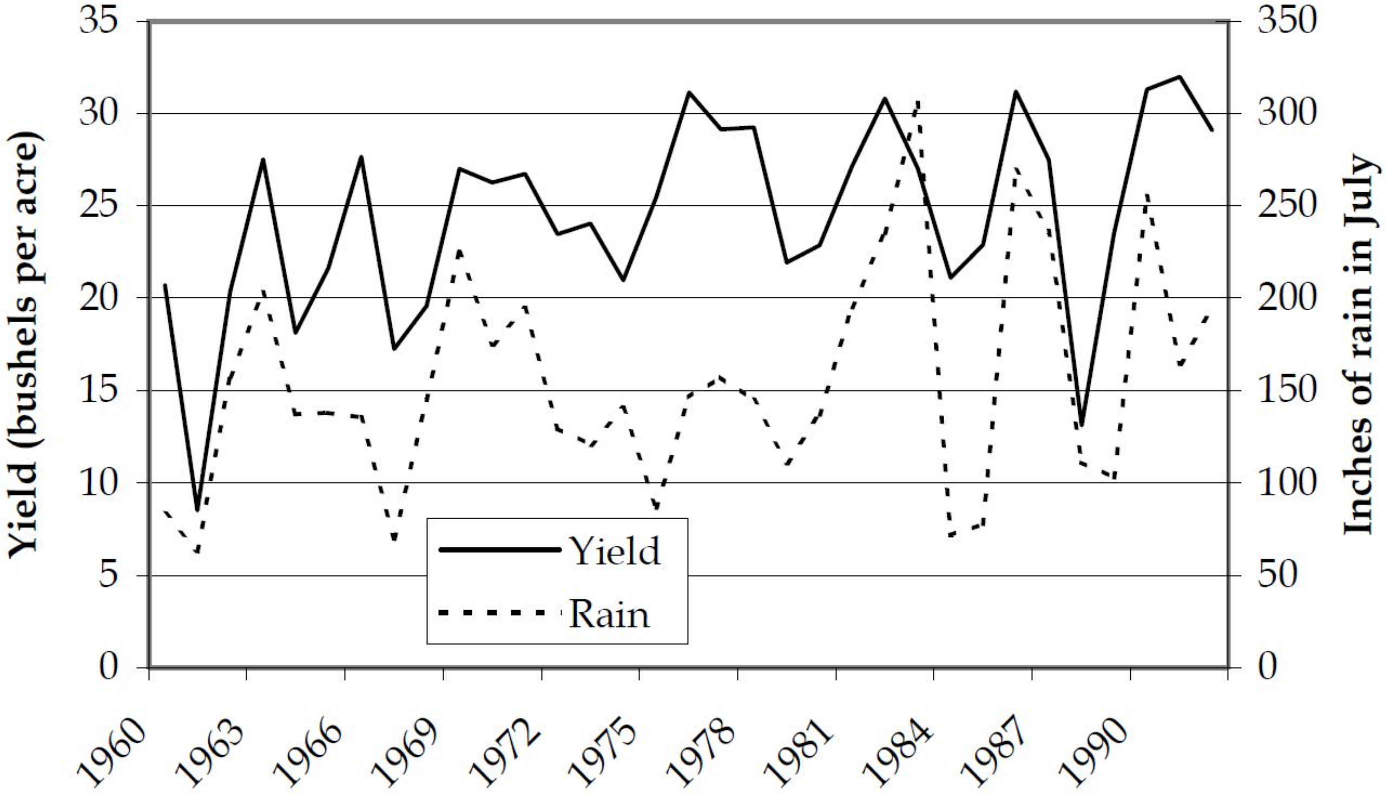
Supply Side:

- In general, supply depends on factors such as the technology, weather conditions, etc.
- The main source of uncertainty in an agricultural market is weather.

Demand Side:

- Demand for agricultural products is relatively inelastic.
- A major factor that affects demand is changes in taste and preferences.

Historical Wheat Yield and Precipitation



Source: Data Stream

Price Risk

- For our analysis, we make the assumption that prices will depend on the quantity of produce in the market i.e. Dominating Price in the Market = F(Quantity).
- However, UGG did not experience any price volatility with regard to wheat, barley, and oats (board grains). This was because the Canadian Wheat Board set a price floor.
- Much of the price risk the firm faced was with regards to corn.

Source: Case Study on United Grain Growers Ltd.

Historical Corn Prices (1992-2001)

Source: Macrotrends

Insurance

Weather Derivatives: financial contract which pays off a certain amount in the event of extreme weather conditions.

The Boston Logan Airport purchased an option that paid when winter snowfall exceeded a specific amount.

Note: Insurers are already beginning to take steps to address climate change risks by reducing coverage and/or increasing premium payments.

Source: Forbes

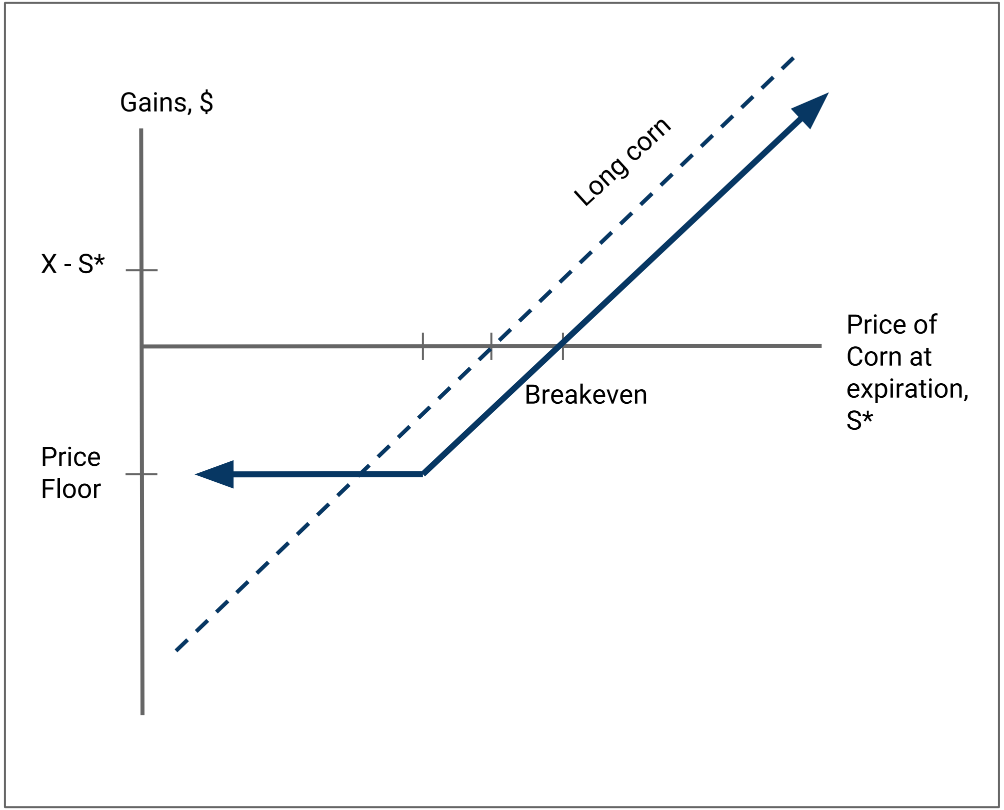
Hedging Price Risks: **Terms**

Futures Contract:
(Buying a futures contract is) an obligation to buy something at a previously agreed price.

Put Option:
An option to sell a futures contract at a previously agreed price.

On-the-Money (OTM):
When the price of the underlying asset is the same as the strike price

Setting up a Price Floor with a Protective Put / Synthetic Long Call



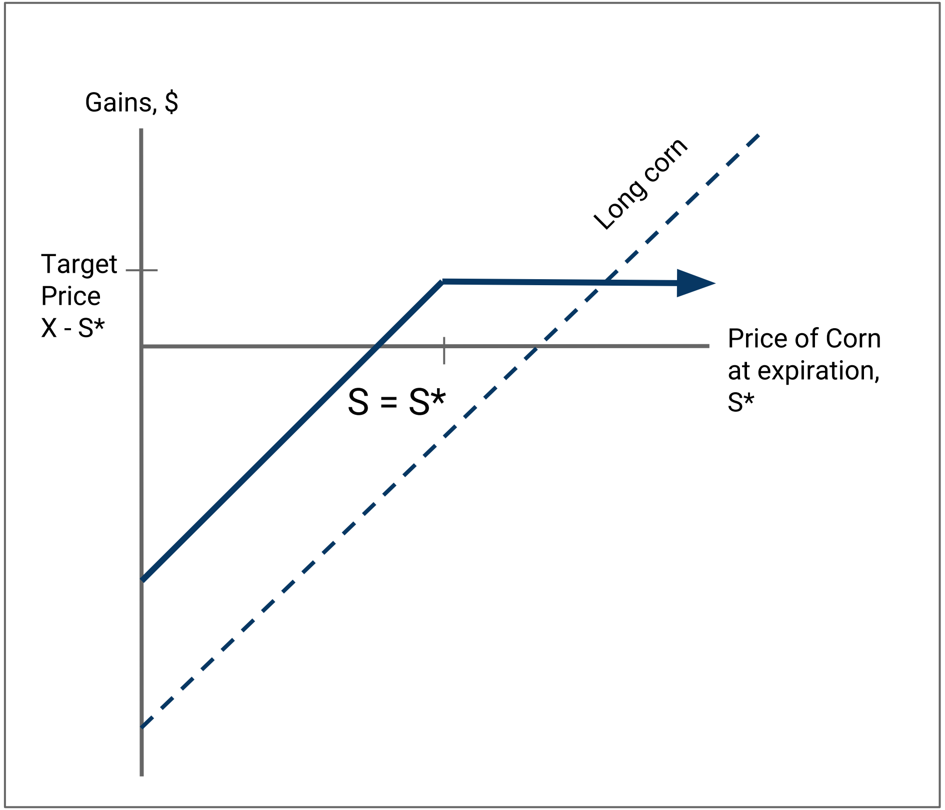
Payoff Diagram of a Protective Put

Strategy: Buy 5,000 bushels of corn, buy 1 OTM put on any expiration dates

Strength: Unlimited gains, capped loss

Weakness: Bigger set of prices with loss

Yield Enhancement with a Covered Call



Payoff Diagram of a Covered Call

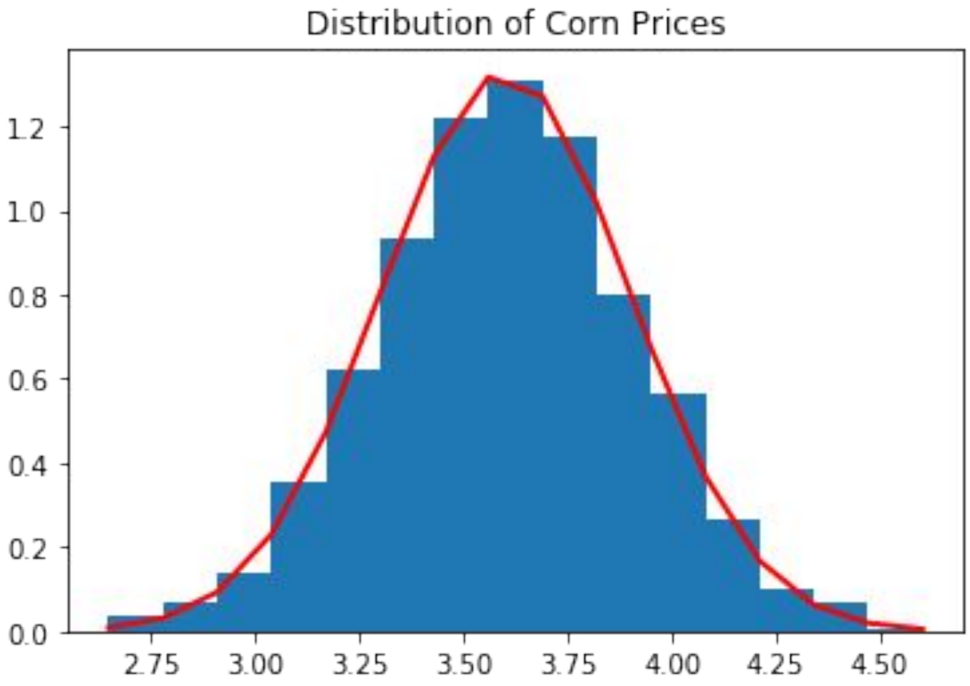
Strategy: Buy 5,000 bushels of corn, buy 1 OTM put on any expiration dates

Strength: Higher maximum loss than protective put

Weakness: Limited gains

Possible Price Movements of Corn

25th Percentile	3.4005
50th Percentile	3.5300
75th Percentile	3.8050



$\mu = 3.60$, $\sigma = 0.3$

Cash Flow Table

Target & Strategy	OTM Put	Max Loss	Cash Position		Future Prices		
Corn @ $3.70/Bu JUL 2019			Price Today	Cash Position	$3.4005	$3.530	$3.805
Protective Put**	0.191	($0.02)	$3.53	$17,650	($0.02)	($0.02)	$0.08
Covered Call	0.145	($0.03)	$3.53	$17,650	$0.06	$0.19	$0.36
Cash	-	($3.53)	$3.53	$17,650	($0.1295)	$0.00	$0.295

Price Floor** $3.459

*OTM @ 25th Percentile = 333’67 / Bu; ATM @ 50th Percentile = 340’63 / Bu; ITM @ 347’19 / Bu

Conclusion

- Analysis of income and cost structure
- Market environment
- Hedging strategy not optimal
- Climate change risks need further analysis and research

Thank you