

Presentation to
American Spice Trade Assoc
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Managing Volatility in Commodity Markets



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Topics/Organization

- Macro drivers in ag
- Volatility
- Risk mgmt strategies----general applied to ag
 - Add storage....inventories and ndmill
- Risk mgmt strategies----specifics
- Risk mgmt ideas....spices
- Summary

Why is risk (has risk become) more important

- *More risky*
 - Across all markets and competition
- *Profits are greater than in the past.*
 - Need to manage risk, preserve positive profits, and reduce risk of catastrophic losses
 - And, to pre-empt entry by new rivals
- *Analogies*
 - Gains/losses >\$100 million depending on approach to risk management
 - Firm 100% hedged, lost 13\$million in one year; now reported record large profits >\$20 million
 - Fertilizer risk analogy
 - PNW port capacity and oil prices

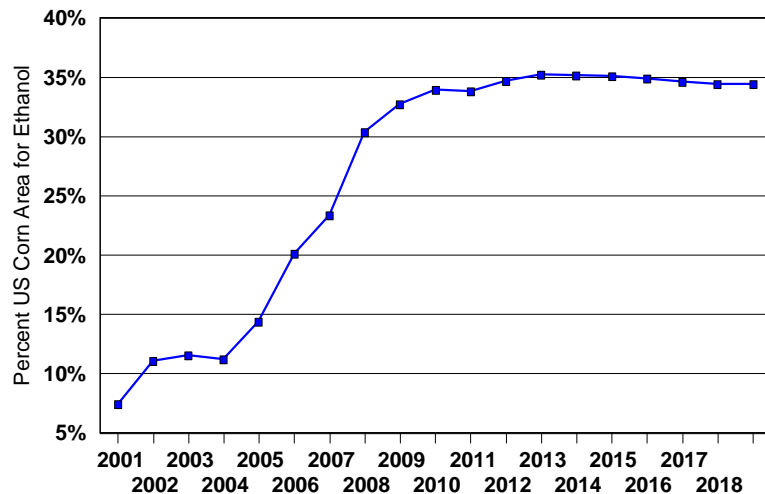
Topics

- External factors
- Measures of risk
- Examples--numerous
- Strategies for Risk Management
 - Framework
 - Price risk (trading risk)
 - Strategy Risk

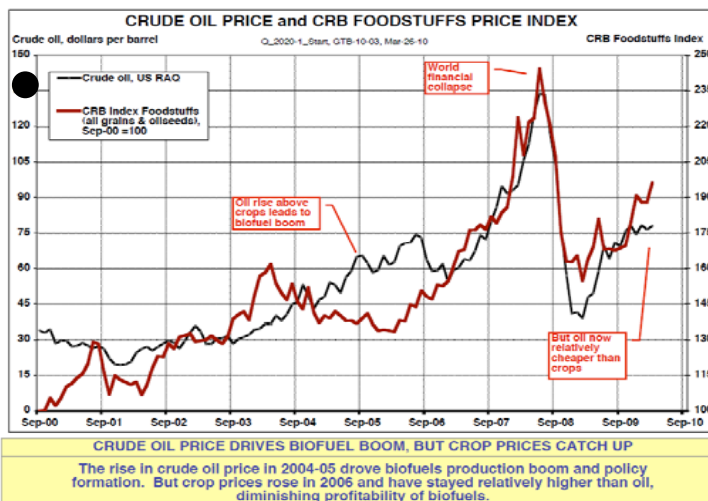
Macro Drivers to Changes in Agricultural Markets

- **Global supply and demand**
 - Demand growth exceeds productivity growth
 - China, Brazil, FSU
- **Biotechnology**—change in trend, geography, future traits, wheat, US vs.. ROW
- **Change in geography of production and trade**
 - Partly in response to biotechnology
 - More cropping alternatives
- **Biofuels**—35% of corn area in US is now supporting ethanol
- **Volatility**---more risky—
- **Major Themes**
 - Growth in exports driven by demand growth exceeding productivity growth (bullish—8-10 years)
 - Increase investment in ag and ag infrastructure

Oil Prices and Ag



- 35% of corn plantings now are used for ethanol
- Ag has become inextricably tied to oil prices.
- 2012: Record area planted to corn (75 Years) and soybean
- **Now:** OIL and Ag are highly positively correlated
 - Energy is an input into agriculture
 - Agriculture is an input into energy via ethanol and biodiesel.



Popular Press Representation of the Same Theme

- *Economist*: by 2050 world grain output will have to rise by half and meat production will need to double ...when growth in grain yields is flattening out, there is little extra farmland and renewable water is running short...
- *Wall Street Journal* “Food Prices Rise as Asia Projects Stall
- *Business Day*: (Sept 1 2010) Scramble for food companies a warning of crisis to come
 - And, overall inflationary expectations for most commodities, including grains and oilseeds!
- *Business Week* (October 10). Coping with Commodity Shock:
 - Extreme price volatility and supply concerns are forcing companies to rethink strategies
 - This commodity cycle has a much bigger exogenous shock to it than past ones
- *Financial Times* (Oct 15 2010) Production must rise to banish hunger
- *WSJ* Oct 21 2010. Dilemma Over Pricing: From Cereal to Helicopters, Commodity Costs Exert Pressure.
- *Business Week* (Oct 25 2010): Those Amber Waves are Fueling Exports—

Economist Magazine—Feb 2011...

- Increasing growth rates in consumption
- Declining area planted world wide
- Productivity growth rate is insufficient to meet demands

Wilson Average growth rate in demand for most grains/oilseeds is 2-4%

- Across all countries and grains
- Varies with many countries in the 1-2% growth rate area
- This is in addition to new sources of demands (biofuels)
- **Yield growth rate:**
 - about 1-2%/year (wheat=.8%/yr; ND=1.5%/yr) corn 1.4%/year)
- **Implication:**
 - More land,
 - More yield and technology
 - High prices and reduced stocks (and hence, more risk)



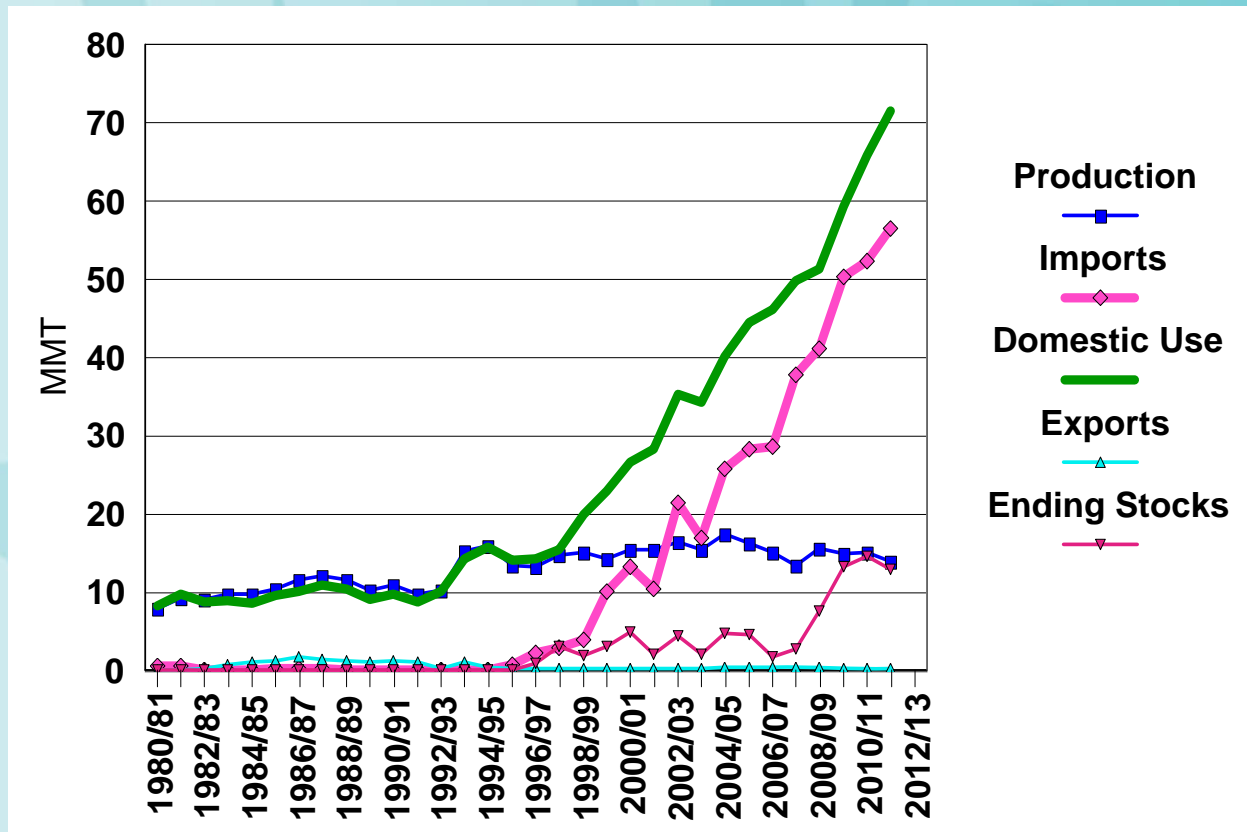
Summary of the Problem:



- Change in demand
 - Accelerating population growth
 - Urbanization
 - Dominance by China in many commodities
- Growth in ag productivity is slowing...
 - 1960's 3.5%/yr
 - 2010 1.5%
 - Fertilizer use increased from
 - 1961 2 t/sq km
 - 2010 11 t/sq km
- Declining area planted in many countries/regions of the world
- Paradigm shift in commodity prices
 - 1900-2000 declining prices
 - 2000 to current..rapid real appreciation in all commodity prices

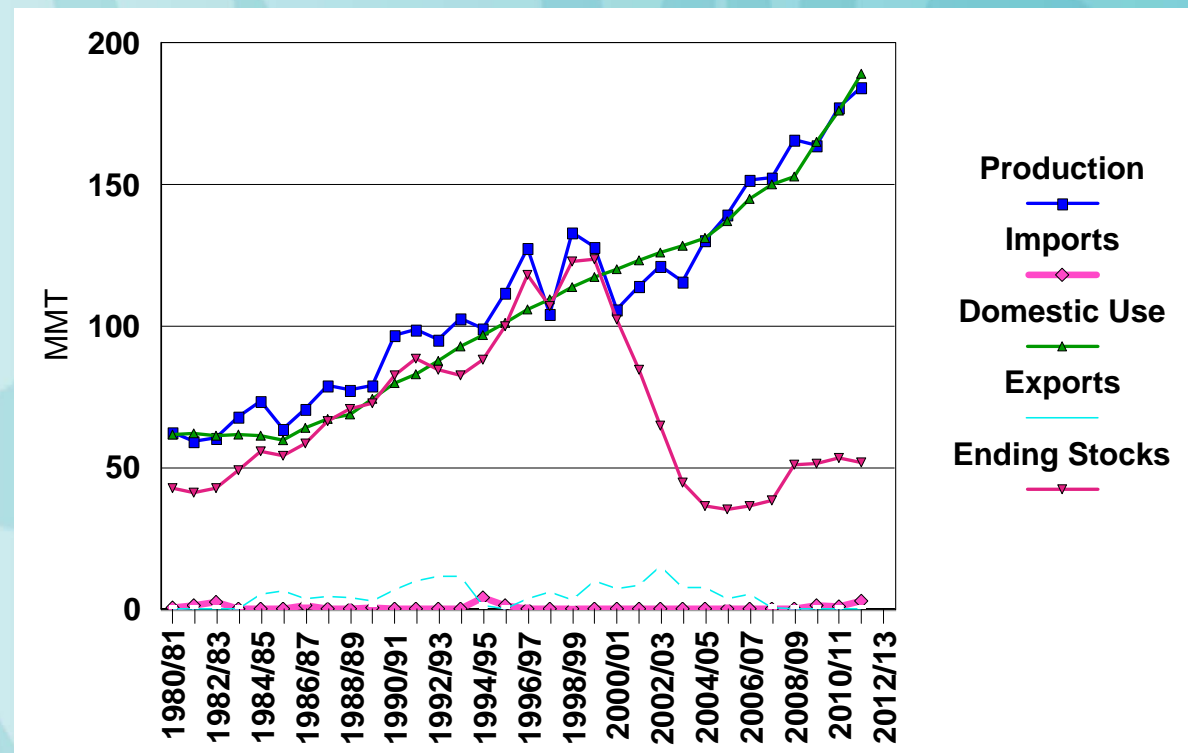
China Soybean Supply Demand

- Near nil growth in production
- Rapid growth in consumption driven by increase in income, urbanization and changes in diets
 - 18%/year for imports
- Recent changes in imports are exhausting most world soybean production in recent years
- Imports were expected at 42 mmt
- *Projections have this increasing to 52-55 mmt by 2010/11;*
 - *Cargill to 65 mmt next year*
 - *Basse—Nov 18 to 60 mmt this year*
- *USDA : persistently underestimated this source of demand:*
 - *2000 Baseline projected 10 mmt by 2010/11*



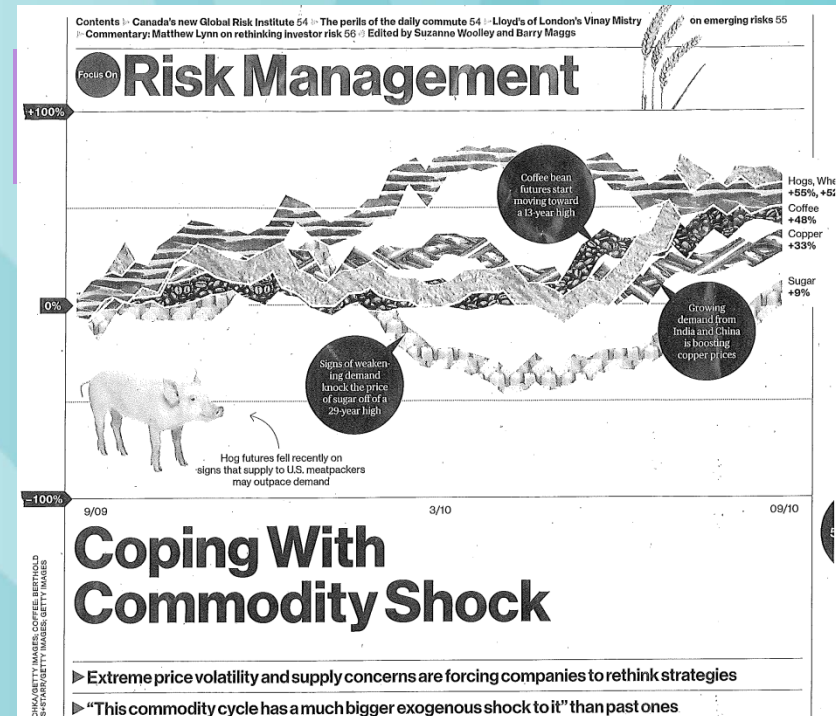
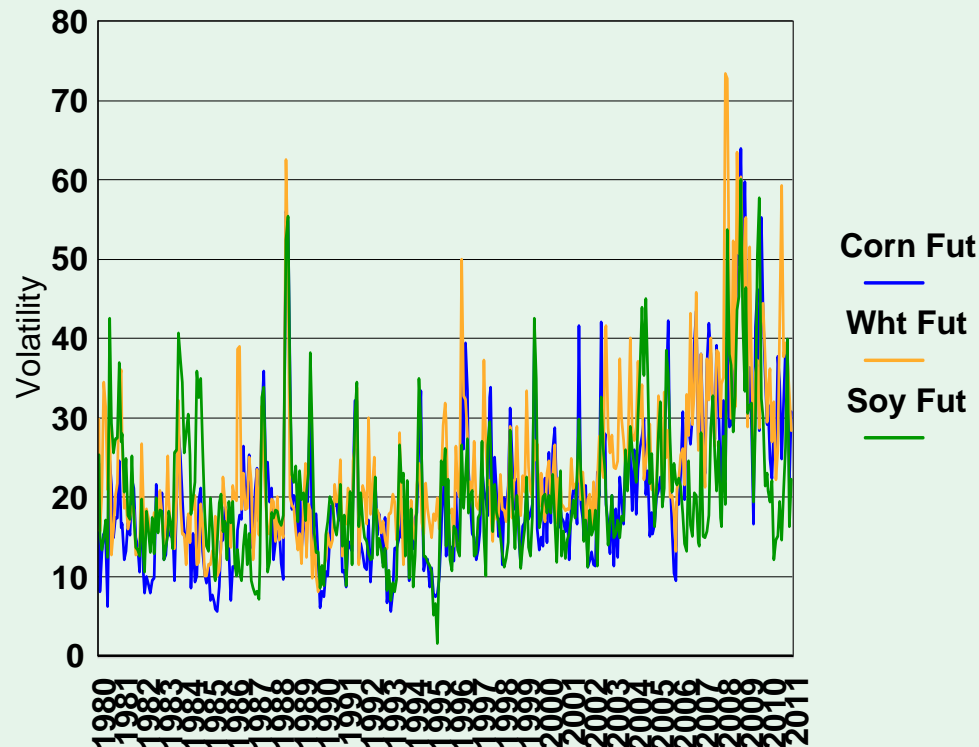
China Corn Supply Demand

- Periodic exporter (from North to South)
- Draw down in stocks is a significant change in policy in early 2000
- *Recent suggestions of like acceleration in corn imports*
 - Hanver Li (JCI Intelligence) anticipates that China will import some 1.7 mmt of corn this year, 5.8 mmt next year and as much as 15 in 2014-2015.
 - Basse (November 2011) at 8-12 mmt by 2014
 - Rabobank 10 mmt (Nov 2011) by 2014 (down from 25 mmt est in Dec 2011):
 - U.S. Grains Council projects China to need to import 5-10 million tons of corn for the 2011/12
- Numerous Chinese apparent strategic efforts on corn acquisition (buy at CME<600)



Risk: Has doubled for most crops and oilseeds

- Ag Price Risk



Companies & Industries

Nestlé's Recipe for Juggling Volatile Commodity Costs

▶ To counter rising expenses, the Swiss food giant tightens operations and moves upscale

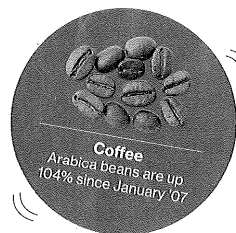
▶ "Have you seen sugar prices? Have you seen grain prices?"

When then-26-year-old Paul Bulcke moved to Peru in 1980 to help market Maggi bouillon for food giant **Nestlé**, it wasn't a plum assignment. Hyperinflation was battering the country's economy, forcing the Swiss company to raise prices almost every other day. Some months, inflation reached 1,000 percent. Then the Andean nation in 1985 froze prices at a time when shops were offering holiday discounts. "There's no business school that can prepare you for that," says Bulcke, now 56 and Nestlé's chief executive officer. "What you learn there is how to reconnect the dots very fast."

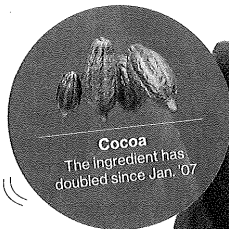
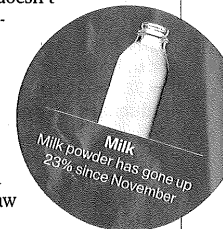
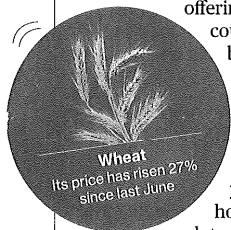
Bulcke is again using the quick-response skills he honed in Latin America, this time to cope with the volatility in food and raw material costs that's buffeting the world's largest food and beverage company. Few corporations are more exposed to the vicissitudes of fast-changing commodity prices than the maker of everything from Crunch chocolate bars to Nescafé coffee to

Purina pet food. Nestlé spends more than \$30 billion a year on raw materials, including about 10 percent of the world's coffee crop, 12 million metric tons of milk, and more than 300,000 tons of cocoa. Prices for those ingredients have been anything but stable. "Have you seen the sugar prices? Have you seen grain prices? Have you seen milk prices?" Bulcke asks excitedly. Almost every one of its major commodities has at least doubled within the past four years. Nestlé expects its raw materials bill to rise by as much as \$3 billion this year, its biggest increase ever. The International Monetary Fund said this month that it may take years before agricultural output increases enough to put a substantial dent in worldwide food prices.

That's pushed Belgian-born Bulcke to craft a strategy that doesn't depend on commodity prices falling. Instead, he's working to squeeze costs out of operations while raising prices and launching more upscale, higher-margin products in which raw



Nestlé CEO Paul Bulcke



Volatility--Risk

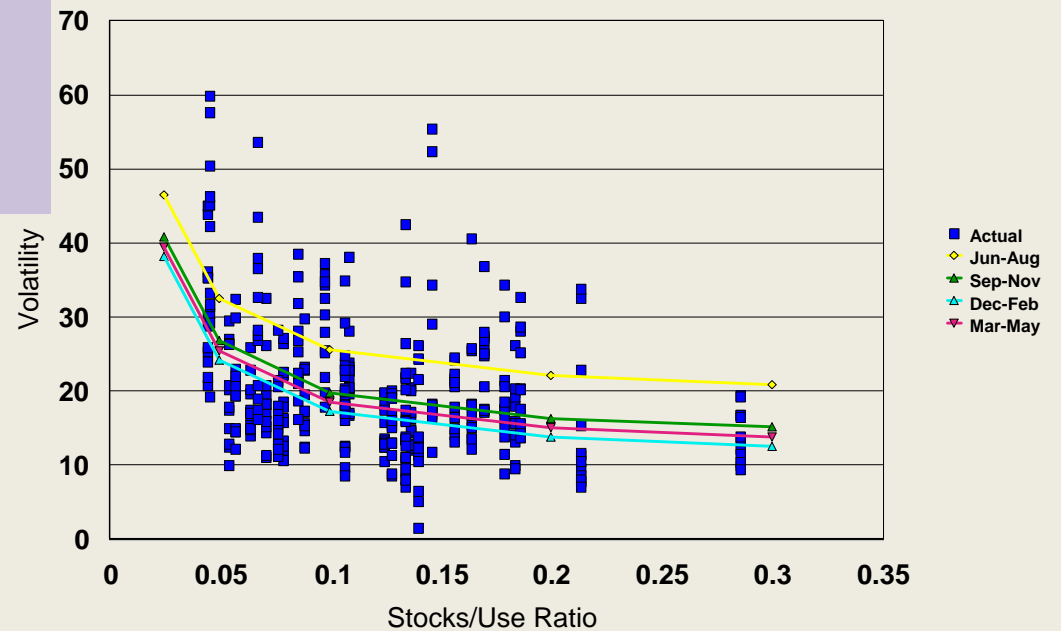
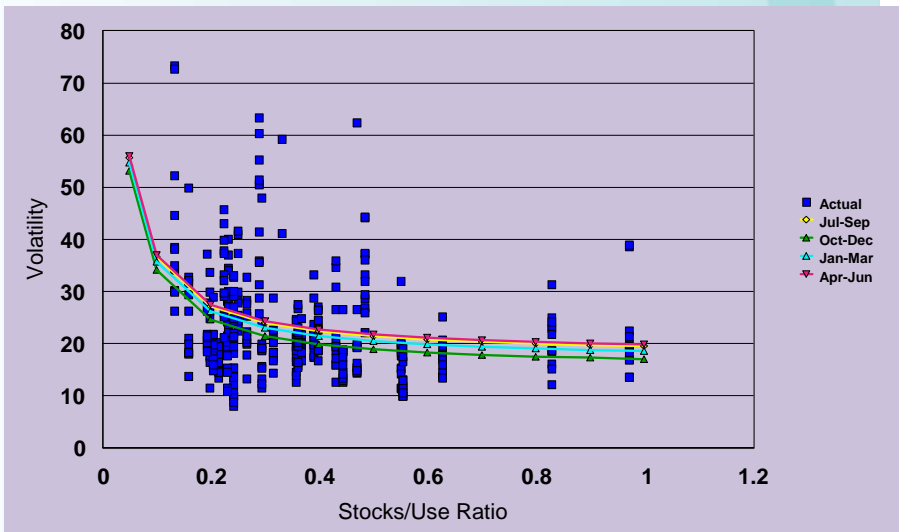
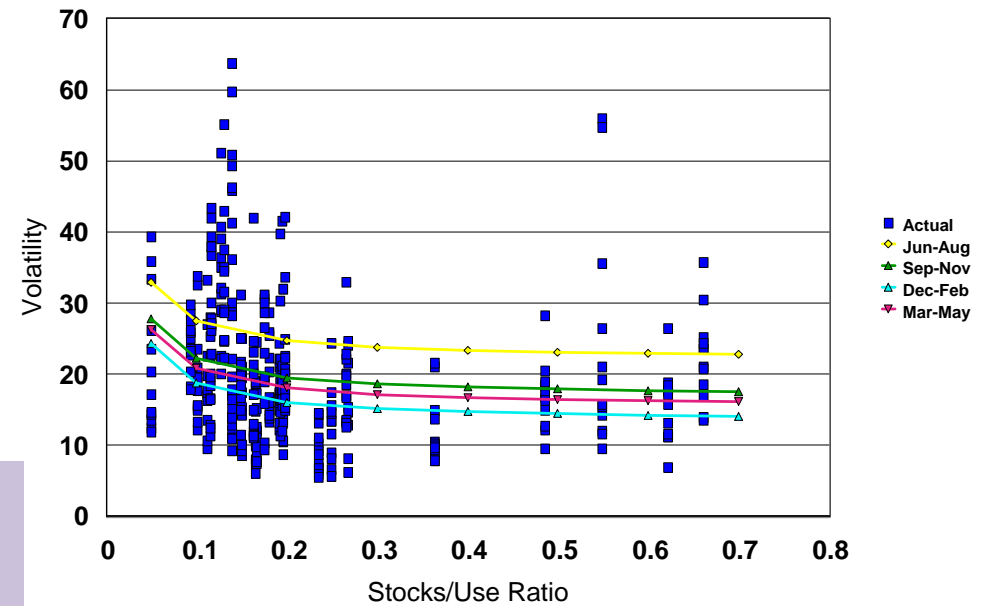
- Volatility:
 - Measure of risk of price changes
 - Influences option (on futures and cash markets) values
- Volatility: The volatility has escalated sharply, and to quote,
 - *the future will be one of “intense moves and meteoric volatility”* Rich Feltes
 - *Volatility the dominant factor in the ‘wildest 12 months in the history of the grain market’* (World Grain, Nov 2008)

Causes of volatility

- *Economist* (*The 9-billion people question*)
 - Distinguishes attention to high prices as: structural, temporary and irrelevant (focus on politics)
 - Reasons for high prices
 - Drought in Russia and Argentina
 - Floods in Canada, Pakistan and Australia
 - Export bans and Panic buying
 - Efforts to build grain reserves at high prices
 - Not due to speculation, though this may make prices more volatile
- *Rabobank* (*Looking for Delta*) combination of factors that will lead to higher and more volatile prices going forward
 - Increased dependence on countries having more “volatile weather” (e.g. Russia/FSU, Arg, Australia)
 - China demand, and strategic reserve (tightening)
 - Brazil...efficiency is more dependent on currencies which are more volatile
 - GM crop...looking beyond corn, the results are less optimistic
- *JP Morgan* (*Dec 2010*): Too much dependence on countries that are using excessive interventions, exacerbating the ability of markets from resolving crop shortfall problems
- *Conventional academic literature* (Garcia and Leuthold, *JARE*): Volatility is related to
 - Stocks or inventories
 - Informational flows (seasonal and due to shocks during growing season)
 - Time to maturity effects
 - Government intervention (loan rates; export embargoes)
 - Speculative behavior (mixed)
 - Peck and others found an inverse relation between spec trading and price variability;
 - More recent results including hedge funds is mixed

Volatility: Wheat, Corn and Soybean

- Volatile significantly impacted by st/use (nonlinear) and seasonal effects)
- But, there are many other factors impacting this relationship

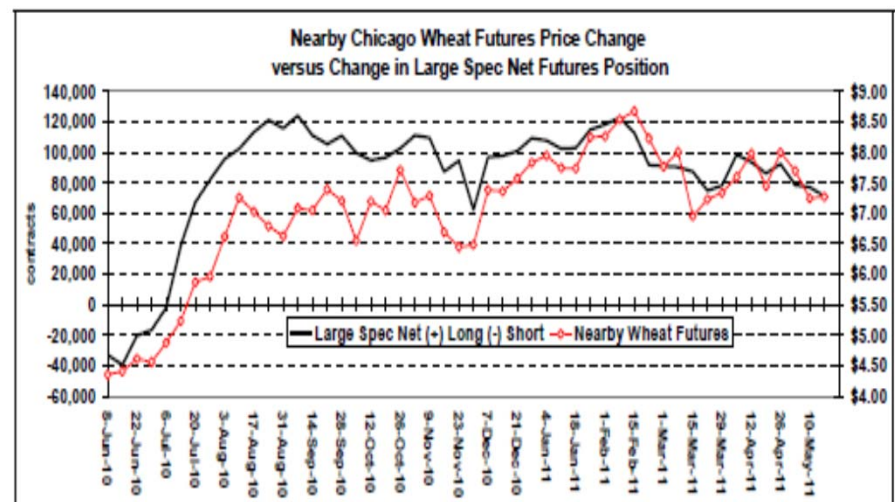
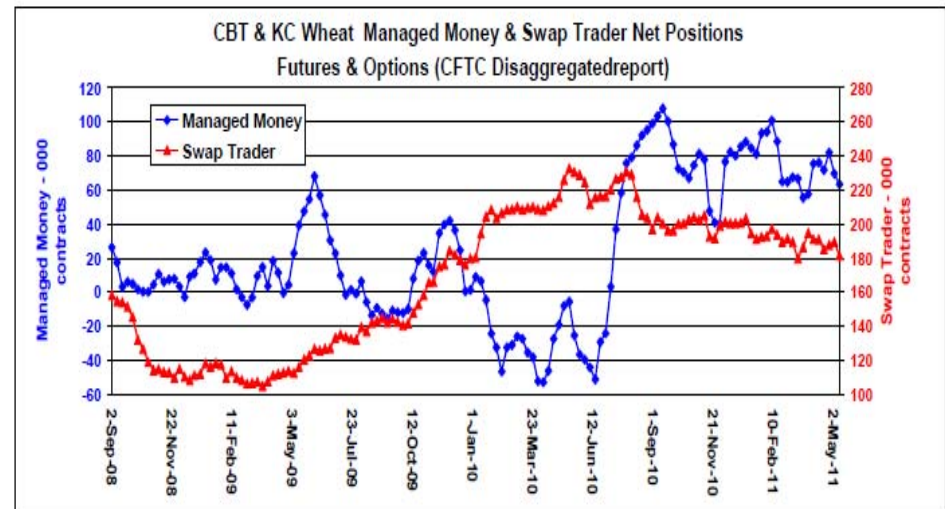


Volatility Impacted by

- Supply/demand (most important)
 - If stocks are tight (in surplus), volatility will be high (low)
- Speculative trading including hedge funds and passive trading
- Volatility in all prices and market functions.
 - Futures
 - Basis (in some cases basis volatility exceeds that of the underlying futures)
 - Marketing functions: ocean rates, rail rates etc..
- Outlook:
 - For most commodities:
 - Growth in consumption exceeds productivity growth rates
 - stocks are abnormally tight by historical standards
 - Tight stocks will continue
 - Hence: Expect volatility to be greater than normally for next 6-8 years

Impacts of Speculation on Futures

- **Key change:**
 - Hedge funds are exempt from speculative limits
 - Large amount of money invested in commodities, primarily long, and in many cases have prescribed trading positions (Goldman Sachs Index Fund)
- **Impacts:** Highly debatable
- **Results:**
 - Greatest impact on CME wheat
 - Changes in commitment of large spec traders is highly positively correlated with CME Futures levels



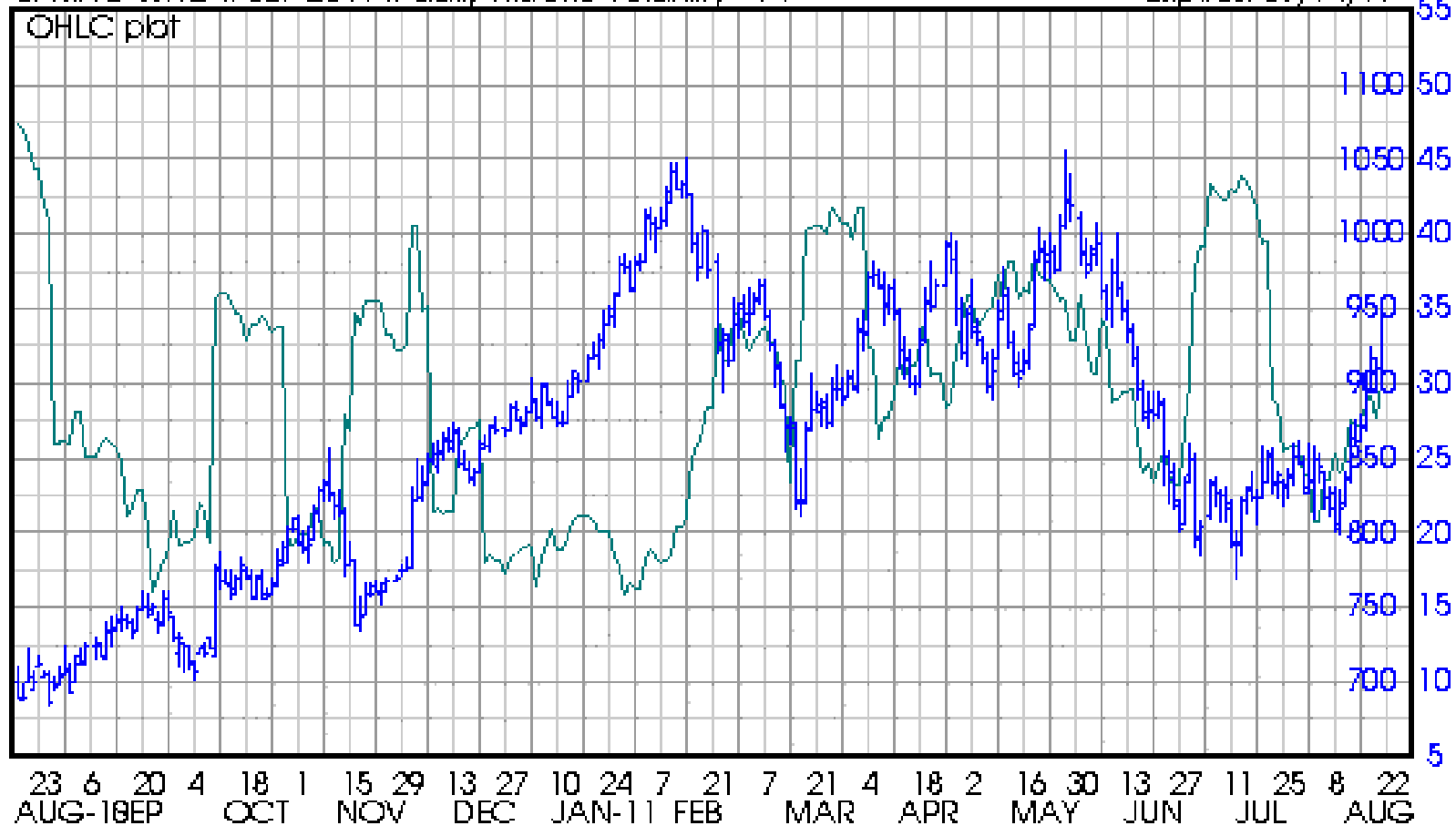
Dec 2011 Corn



MGEX Sept 2011 Historical Volatility

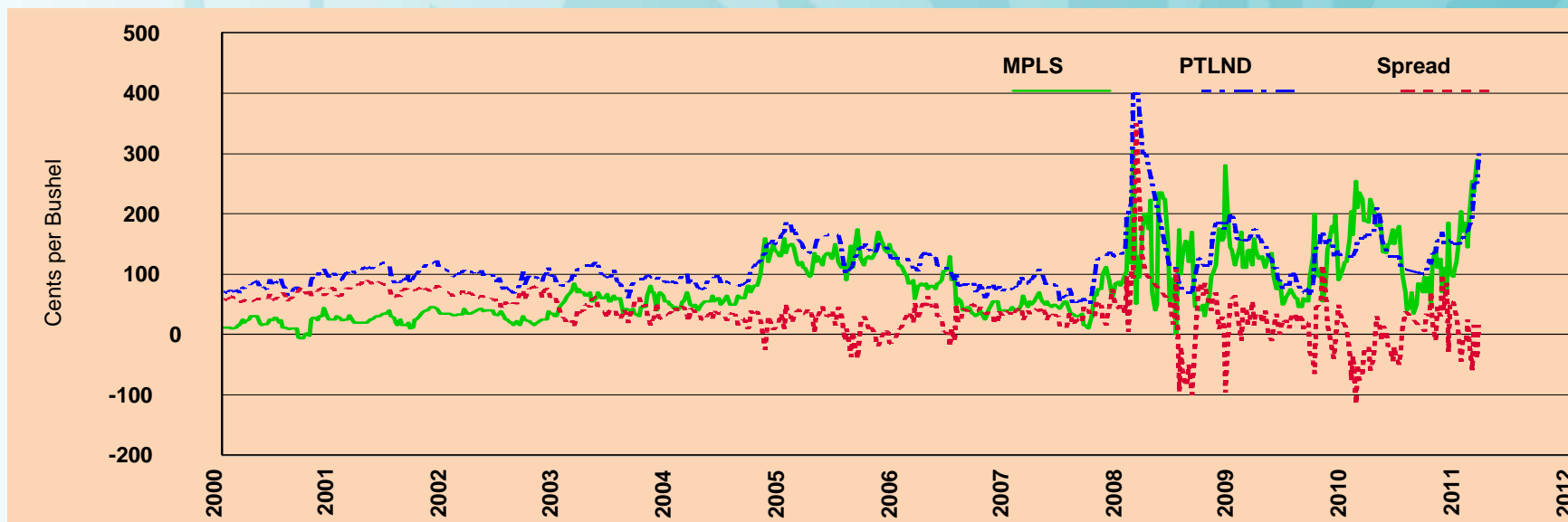
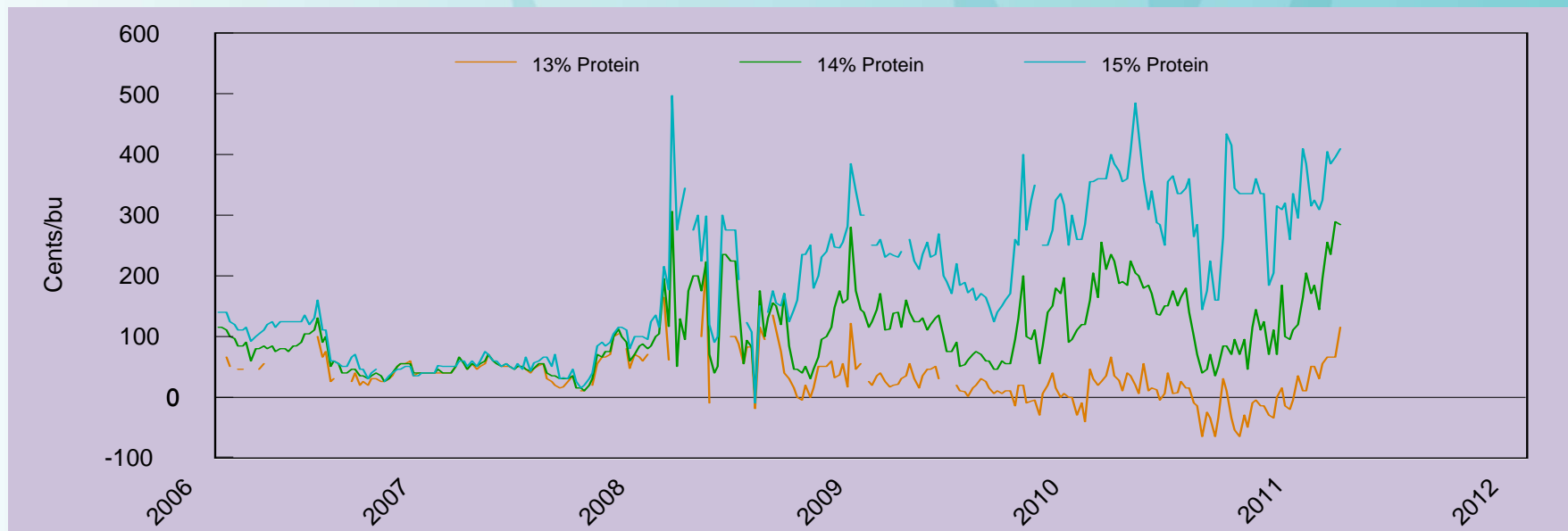
SPRING WHEAT SEP 2011 .. daily Historic volatility 14

Expires: 09/14/11

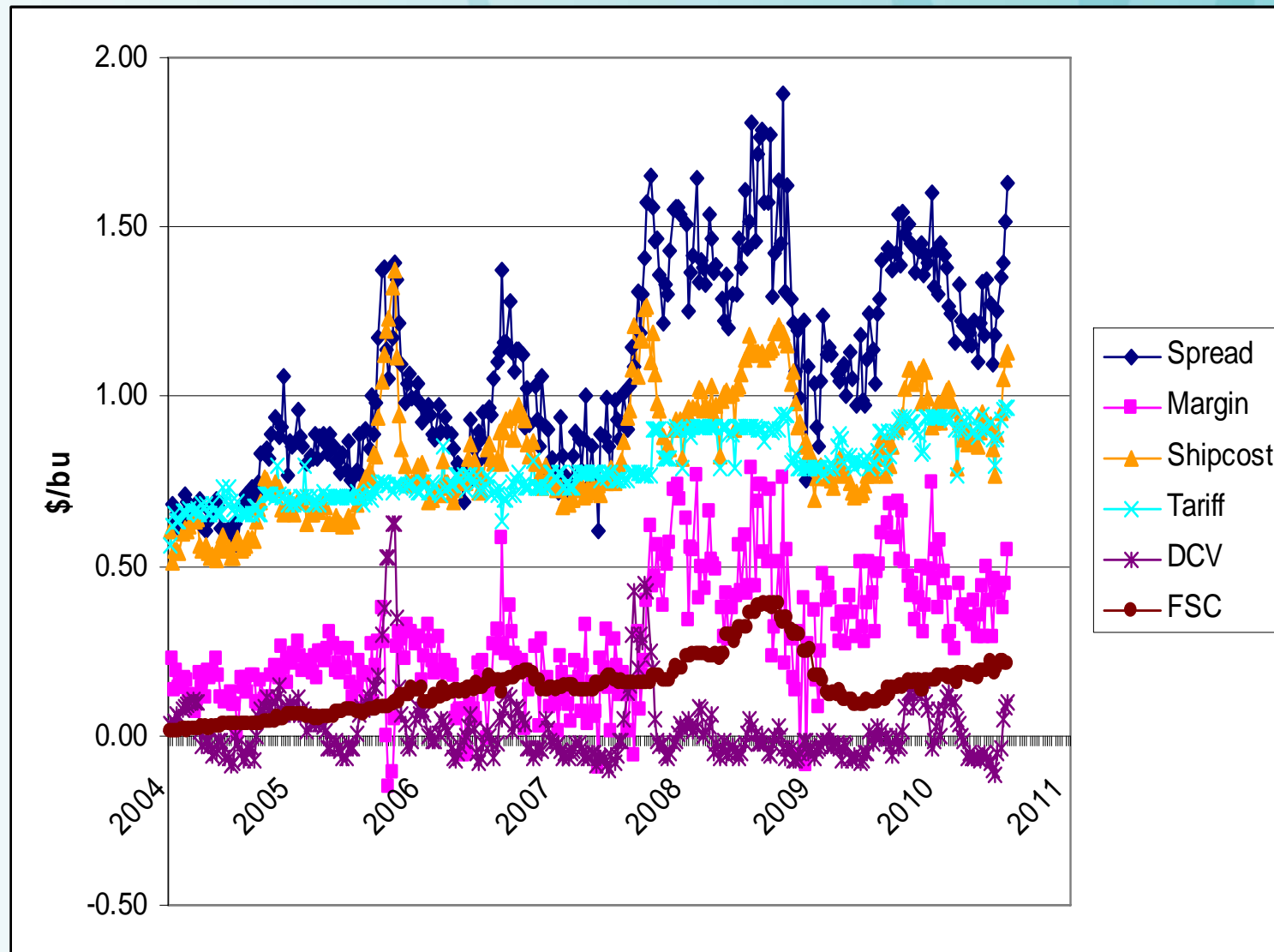


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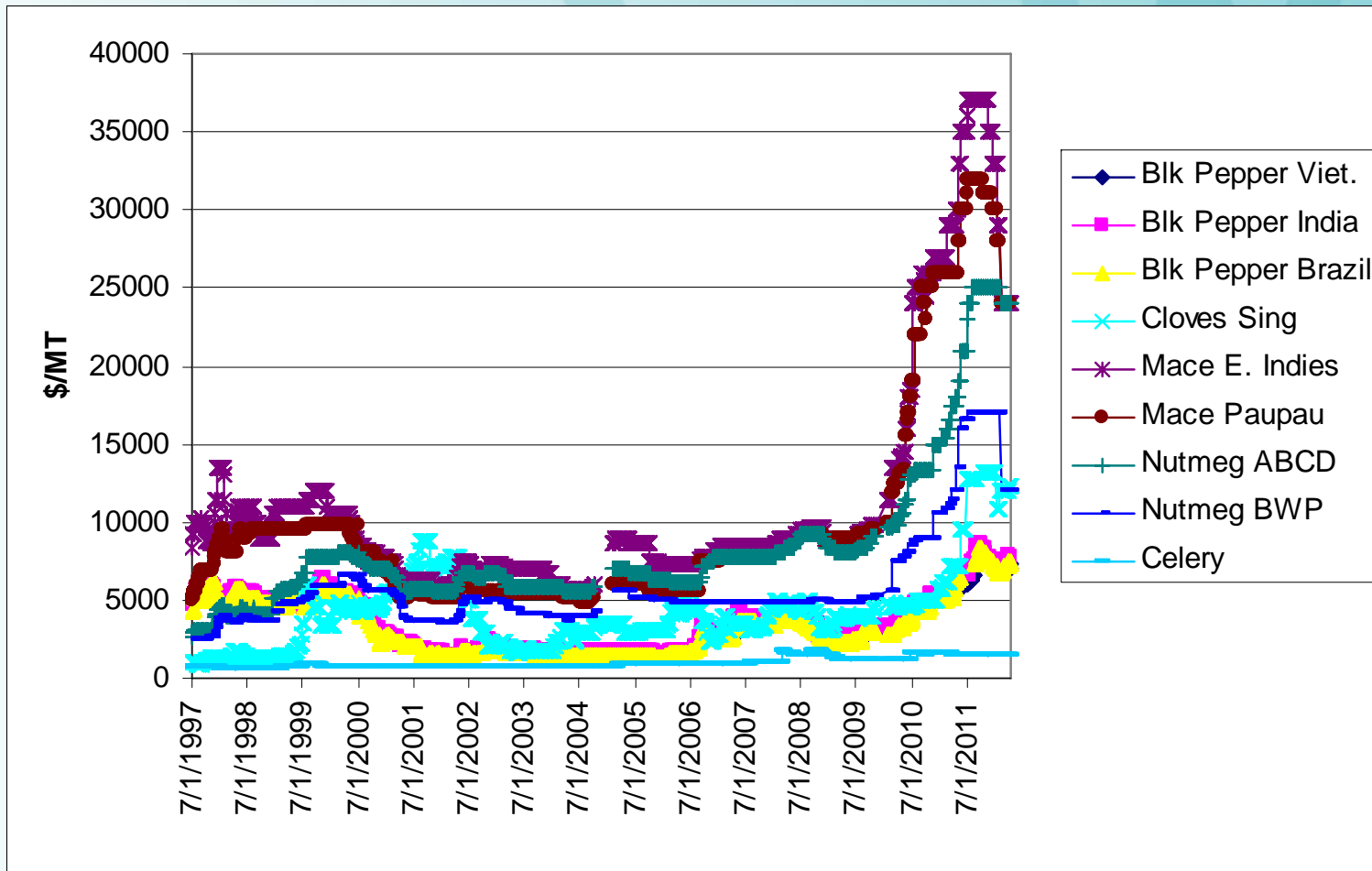
Mpls. And PNW Spring Wheat Protein Basis 2006-2011



Corn: Comparison of Spread, Margin and Elements of Shipping Cost

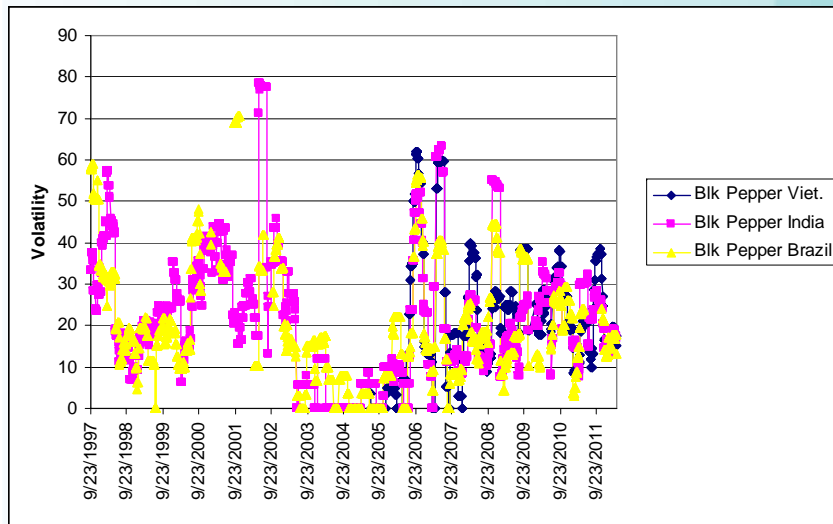


Spice Prices

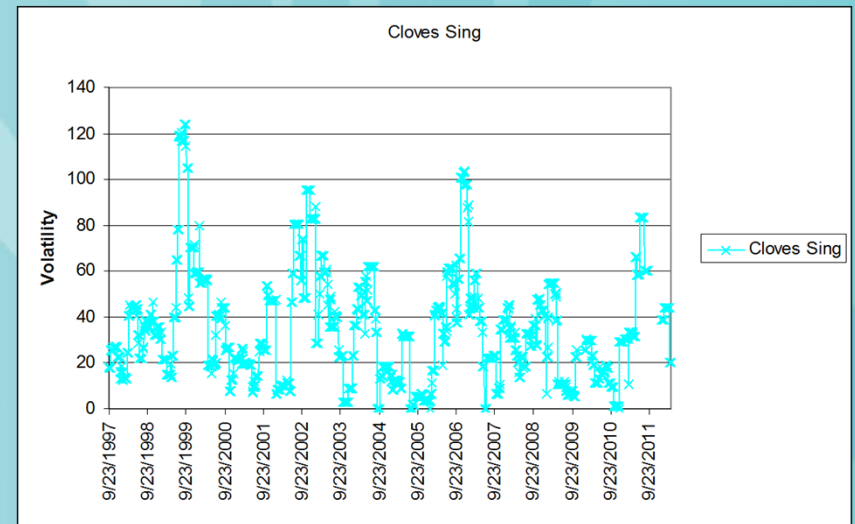


Spice: Price Volatility 60 day

- Black Pepper

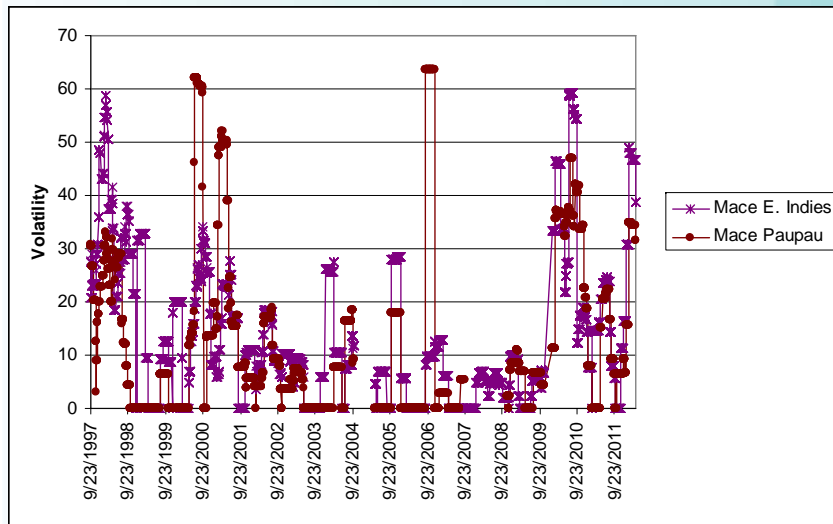


- Cloves

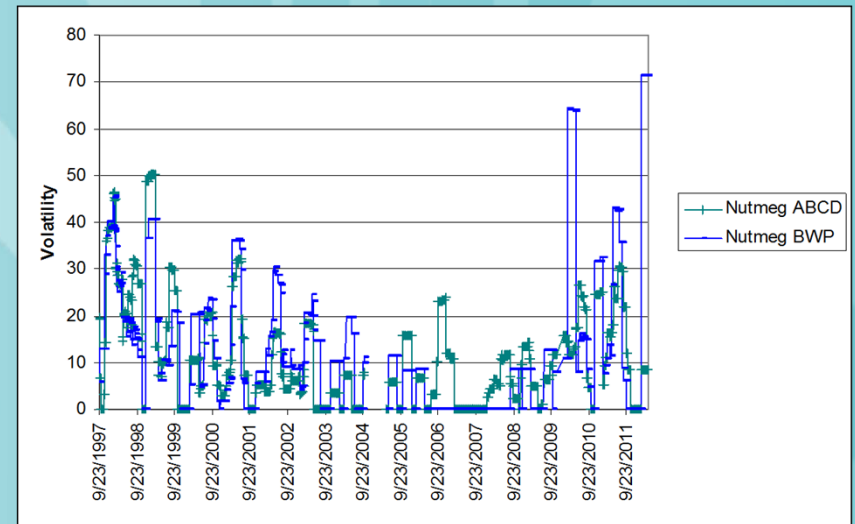


Spice: Price Volatility 60 day

- Mace

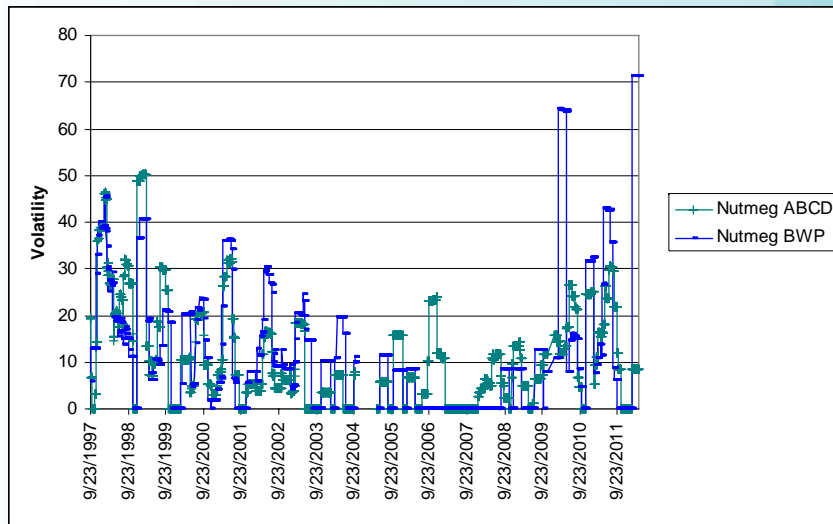


- Nutmeg

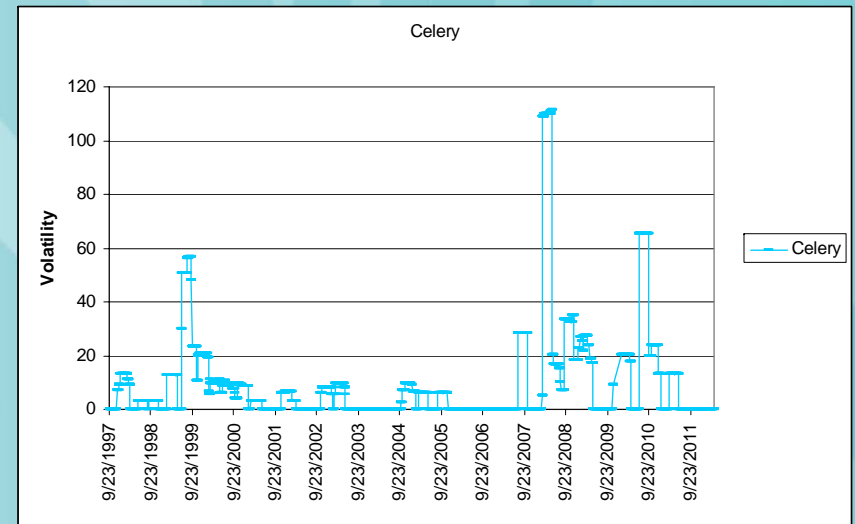


Spice: Price Volatility 60 Day

- Nutmeg



- Celery



Correlation of Prices

	Blk Pepper Vietnam	Blk Pepper India	Blk Pepper Brazil	Cloves Singapore	Mace E. Indies	Mace Paupau	Nutmeg ABCD	Nutmeg BWP	Celery Seed	Corn	Soybeans	Wheat
Blk Pepper Viet.	1	0.99	1.00	0.84	0.88	0.93	0.93	0.87	0.69	0.85	0.73	0.57
Blk Pepper India	0.99	1	0.99	0.33	0.75	0.76	0.62	0.64	0.42	0.55	0.42	0.33
Blk Pepper Brazil	1.00	0.99	1	0.25	0.72	0.73	0.56	0.59	0.36	0.49	0.36	0.27
Cloves Sing	0.84	0.33	0.25	1	0.63	0.64	0.79	0.75	0.50	0.54	0.38	0.32
Mace E. Indies	0.88	0.75	0.72	0.63	1	0.99	0.91	0.95	0.70	0.76	0.63	0.48
Mace Paupau	0.93	0.76	0.73	0.64	0.99	1	0.93	0.94	0.79	0.88	0.77	0.72
Nutmeg ABCD	0.93	0.62	0.56	0.79	0.91	0.93	1	0.97	0.76	0.81	0.68	0.55
Nutmeg BWP	0.87	0.64	0.59	0.75	0.95	0.94	0.97	1	0.67	0.73	0.58	0.45
Celery	0.69	0.42	0.36	0.50	0.70	0.79	0.76	0.67	1	0.86	0.85	0.79
Corn	0.85	0.55	0.49	0.54	0.76	0.88	0.81	0.73	0.86	1	0.93	0.86
Soybeans	0.73	0.42	0.36	0.38	0.63	0.77	0.68	0.58	0.85	0.93	1	0.90
Wheat	0.57	0.33	0.27	0.32	0.48	0.72	0.55	0.45	0.79	0.86	0.90	1

Risk Management--overview

- Diversify
 - Multiple assets (e.g. hedging, across enterprises)
- Insurance
 - 3rd party
- Contracts—transfer risk to partners or 3rd parties
- JV,s alliances

Strategy toward Risk: *Diversify—Longer Term!*

- Responses to risk in commodity markets

- Risk measurement: You can manage risk better by measuring it!
- Hedge (and cross-hedge)—though hedge eff. has deteriorated
 - Transfer a portion of risks to 3rd party
- Contracts: Increase in contracting for a portion of purchases
- Insurance mechanisms
- Buffer stocks (temporal diversification)
 - For non-hedgable commodities, this is an appropriate strategy
 - Accumulate stocks when prices are low; draw down stocks when prices are high
 - Costs are important; but in many cases would be less than the cost associated with market volatility
- Geographic diversification:
 - Increase the geographic scope of purchases

- Strategic Risk Management:

- Measure risk! If you don't measure, you can manage it!
- Requires assessment and use of each of above for portions of purchases
- Strategic questions
 - How much should be allocated to each strategy
 - How should these change over time



IN THEORY

Risk – a racing sailor's curse

One definition of risk is 'exposure to the possibility of loss.' That basically sums it up for sailboat racers. When you take a risk you are accepting the chance that you will lose something you have – boats, time, your standing in the series, a chance to catch up, etc.

In the perfect world, sailors would not take any risks at all. Ideally, we would always know what the wind is going to do, and therefore we would go the right way on every leg without any risk of losing.

But the race course is not perfect. Since we will never know exactly what's going to happen (and that makes the sport interesting), every move or decision we make on the race course involves a certain level of risk. For example, if you start near the pin end the risk is that the wind will shift right. If you get too far to one side of the beat or run, there may be more pressure on the other side, and so on.

One thing that separates good sailors from average sailors is their ability to manage risk. As a general rule, good sailors don't take much risk. They do a great job of figuring out what the wind will do, and when they're not sure they use rules of

thumb to put themselves into positions that always seem to minimize their exposure to risk.

Rules of thumb are very helpful in reducing risk because they have historically had a high probability of success. They also help you be more consistent by improving the quality of your decision-making. They allow you to choose tactical and strategic options that have a good chance of working, while minimizing risk at the same time.

The reason to reduce risk is so your series score will include good races over and over again. The best way to do this is usually not by trying to win any particular race. In many races, the boat that crosses the finish line first had to take a lot of risk to get there. It's great to win, but not if you had a 50-50 chance of winning or getting 20th!

How much risk to take

Risk by itself is not necessarily bad or good. Though it's smart to avoid risk much of the time, there are many situations where you might choose to take small, or even big, risks. The key is knowing when and where to do this. Here are some risk-related factors to consider:

Timing – Is it early or late in the race/series? Generally you should be less willing to take risks early on since you have the entire race or series to improve your position. As you get closer to the finish, however, and you are running out of time, you might be willing to take bigger risks.

Happy or not happy? – Are you satisfied with your position in the race or series? If so, protect what you have and avoid taking risks. If you are not happy, that's when you might consider taking more risk to improve your standing.

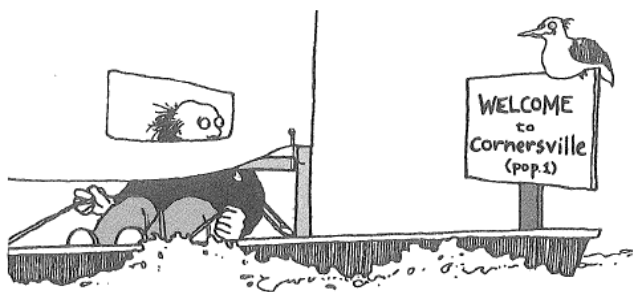
Strategic confidence – How comfortable are you with the strategic information you have gathered and the game plan you have made? If your confidence is high, you have little need to take risks. If you're not sure what the wind will do next, you will probably end up having to take a bit more risk.

Boatspeed – Are you faster or slower than the other boats in your fleet? If your speed is good, you don't need to take risks to get to the front of the fleet – just stay near the other boats. If you're off the pace, you may need to take some strategic risks in order to compensate.

Size of the 'reward' – If you make a risky move, how much could lose or gain? If the gain/loss ratio is pretty high, this might be a risk worth taking. But if you risk losing 20 boats for a possible gain of 5 boats, that is probably not a worthwhile option.

Try to consider all these factors when you are racing and making decisions that involve risk. Taking risks is not so bad when you take them consciously as part of a planned strategy. But many times decisions involving risk are made spontaneously, or subconsciously, without much thought.

For example, you are sailing upwind on port tack, headed to the favored right side. Suddenly one of your competitors tacks on your



There are many ways to take risks in sailboat racing. One classic is to sail off to an edge of the course by yourself. Though this move has the potential for a large payoff, the risk of losing is usually much greater (that's why there aren't any other boats around!). As with most tactical or strategic choices in sailing, the key is making decisions that have a high probability of success.



wind. Instead of footing off to keep going right, you tack to starboard, but it takes several minutes to find another lane of clear air on port tack. A small incident has just grown into a huge, unplanned risk.

If you are going to take a risk, at least do it consciously as part of your overall plan for the race.

How to minimize risk-taking

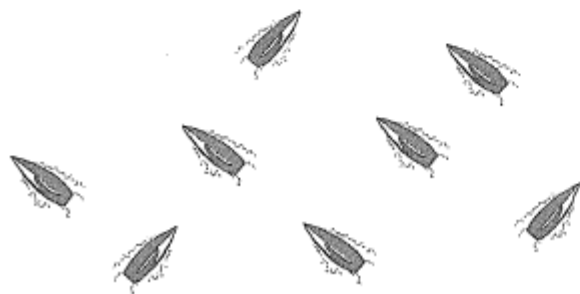
As a rule of thumb, you should generally take as few risks as possible. Focus on things you can do to improve your performance that involve no risk at all. These include working on boatspeed, improving your boathandling and avoiding breakdowns. All of these things are no-brainers because they have an up-side with no down-side.

Unfortunately, there is no free lunch when it comes to strategy and tactics. So if you don't have a clear strategic plan, rely on the rules of thumb in this issue to help you reduce risk, be consistent and improve your chances of success.



While you're racing, you should always have a good idea of how much risk you're willing to take. For example, if you have a marginal inside overlap at the leeward mark, will you stick your bow in there even if the outside boat is yelling 'No room!'? If it's early in a race or series, or if you're happy with your position in the race, the general rule of thumb is to minimize risk-taking.

SITUATION A



Risk Factors

The amount of risk that's involved with any particular tactical or strategic option is related to two things:

1) How much you have to lose. When you are in first place in a race or series, you obviously have a lot more to lose, and therefore a lot more at risk, than when you are in last place. In Situation A, the Red boat is in first place and separates far to the right of the fleet. This is extremely risky because she could potentially lose all the boats behind her (and she has little or nothing to gain). In Situation B, Red also takes a flier, but this time she starts out in last place so she is not risking very much (except perhaps

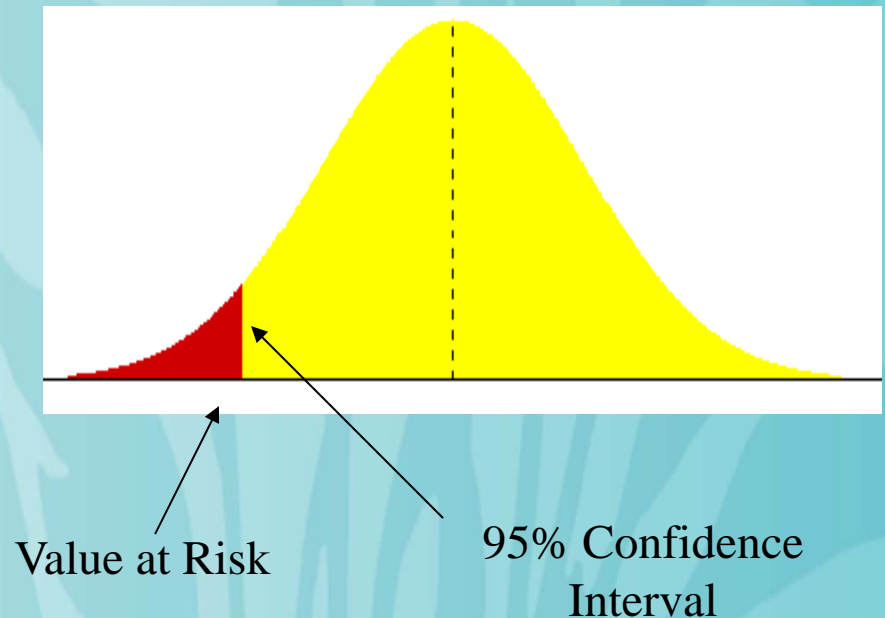
Value-at-Risk (VaR)

- *Measure risk: If you don't measure it, you can't manage it!*
- *Value-at-Risk (VaR)* is formally defined as the
 - maximum loss that can be expected to occur within a particular time frame and with a certain probabilistic level of confidence.
- For example: we could say “we are 95% certain that our trading portfolio will incur no more than a \$20,000 net loss over the next week”.
 - Maximum Loss = \$20,000
 - Time Frame = One Week
 - Probabilistic Level of Confidence = 95%

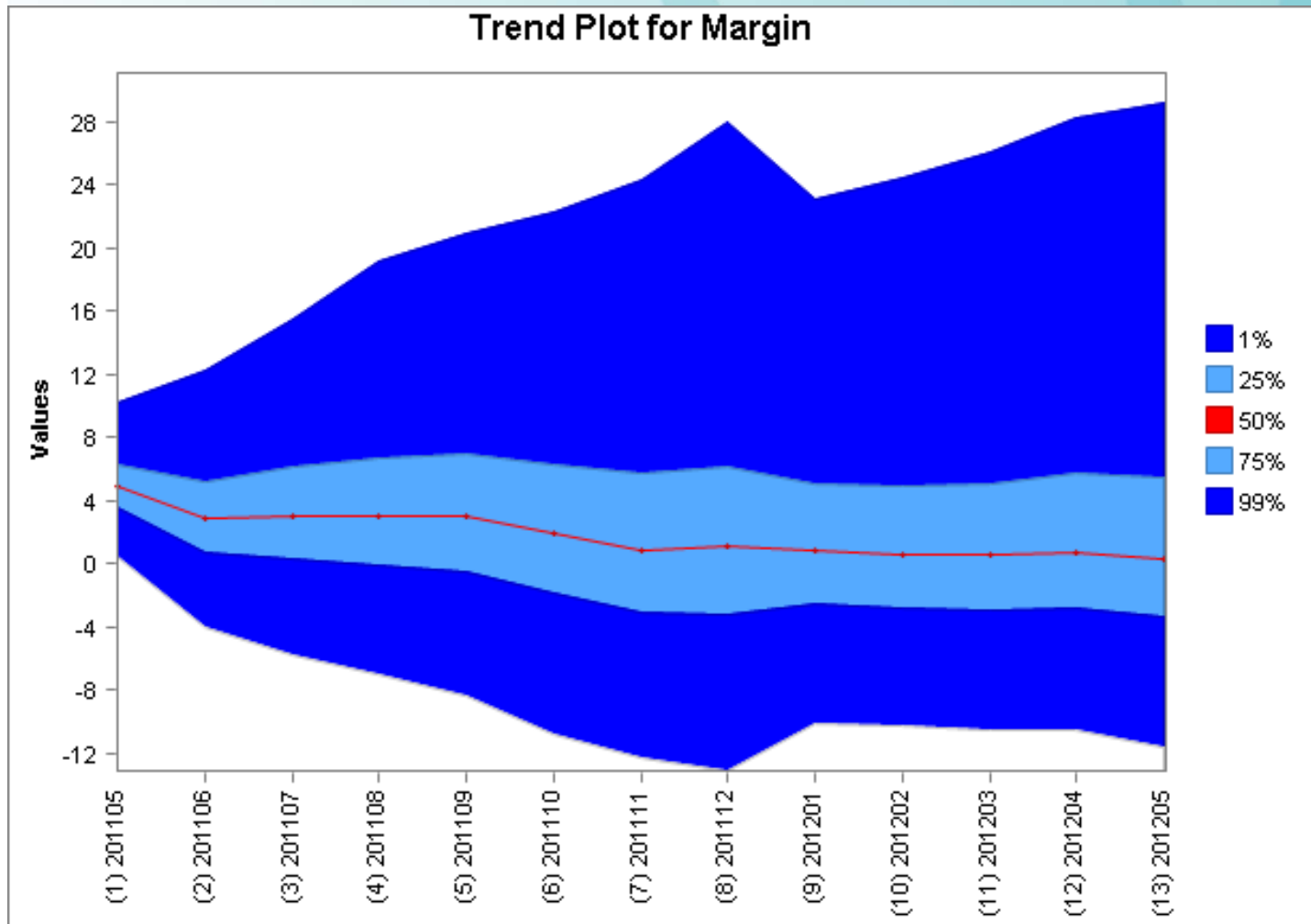
Advantage: VaR focuses on downside (true) risk

- Separates upward potential from downside risk
 - Potential for large profits not “true” risk
- Management’s concern is “Worst Case Scenario”
 - Consistent with VaR’s focus

Distribution of Returns

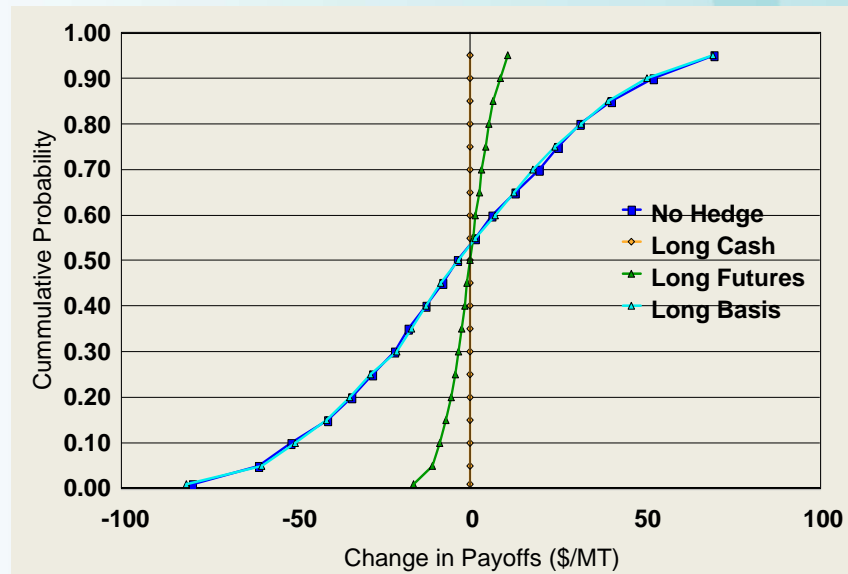


Distribution of Margin: All Random

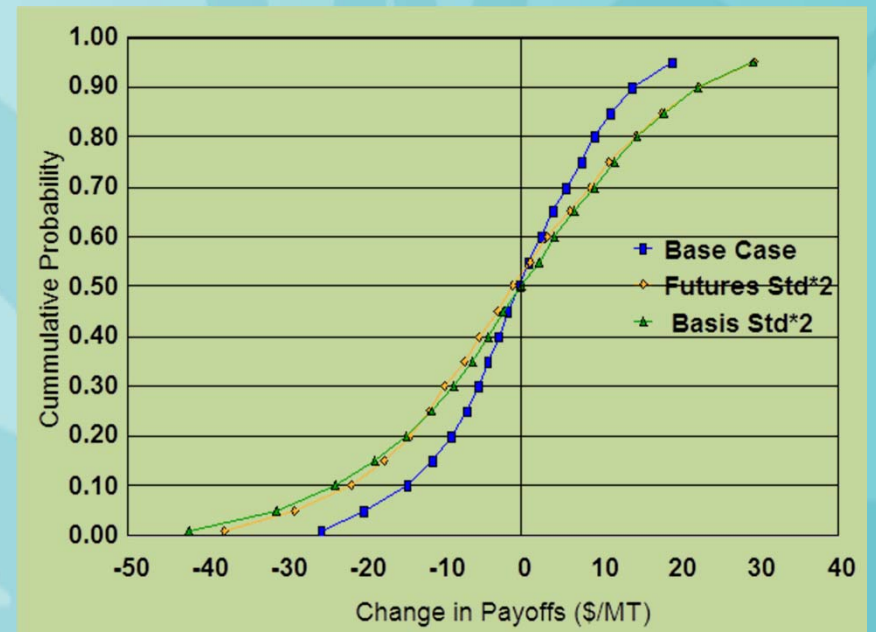


Short Cash: Risk of Change In Payoffs by Strategy

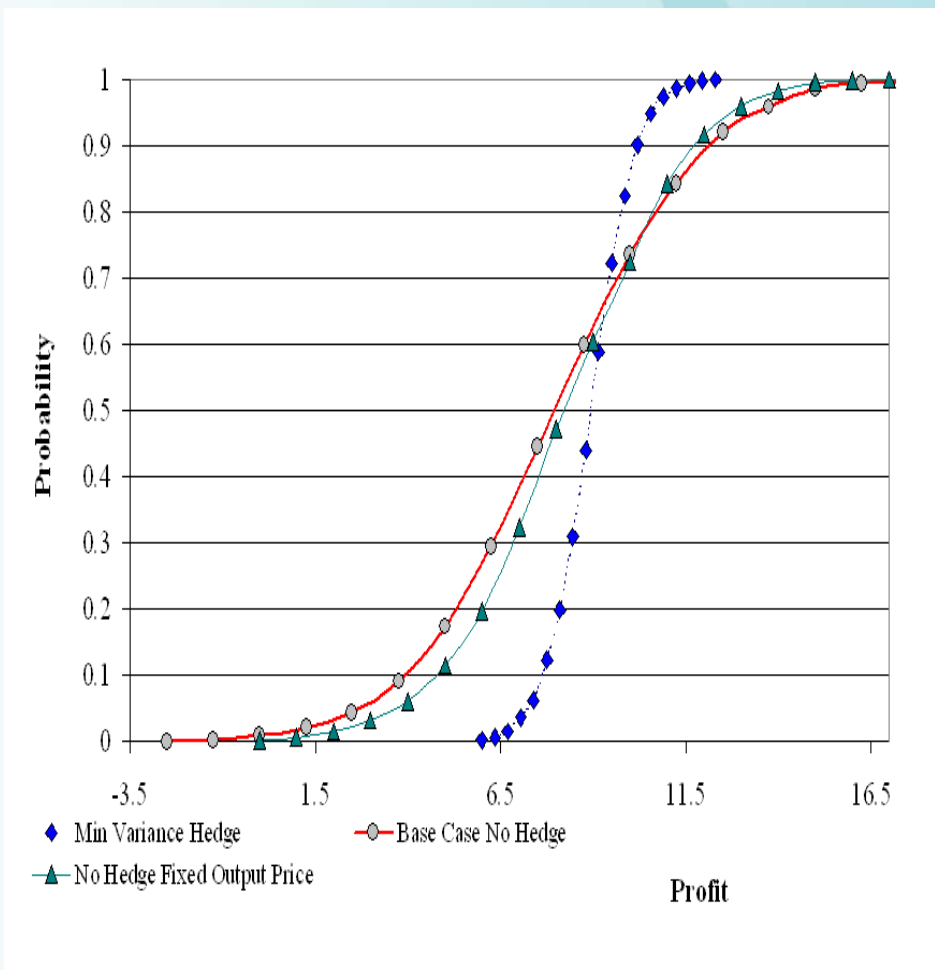
- CDF to Illustrate VAR for basic wheat hedged positions



- Sensitivity to Increases in Futures and Basis Risk (no hedge): *Risk increased by *2*

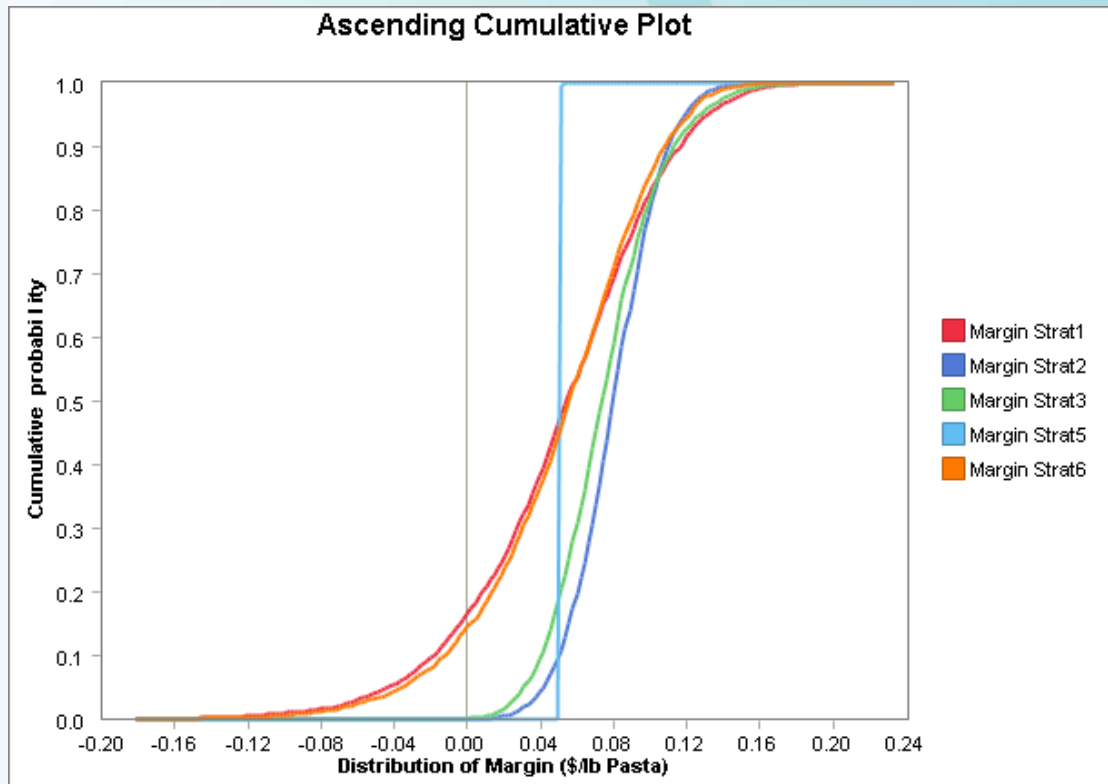


Impacts of fixed output (flour) Prices



- Motive
 - Either through price regulation, or contracting, output prices are fixed
- Impacts (cdfs)
 - Much greater risk than otherwise
 - Hedging becomes much more important as risk management tool

Margin Distribution (CDF) by Strategy



- Risk is represented by cumulative probability
 - Nil for “long cash”
 - is greatest for “no hedge”
 - reduced for long futures and long basis contracts
 - But, not eliminated
- Interpret
 - Prob of loss in Margin
 - MaR: there is a 5% chance the margin will be less than X

Strategy 1 – Random—spot
Strategy 2 – Fixed Futures
Strategy 3 – Options 1 Long Call
Strategy 5 – Fixed Forward
Strategy 6 – Fixed Spread

Hedging as a strategy

- Major commodities:
 - Valid tool
 - But, still <100% of risk is mitigated and does not assure quantities
 - Over time, correlations are decreasing, meaning a greater share of price risk is not being reduced by hedges
- Cross-hedging
 - Prospectively valid, depending on the correlations
 - Single or multiple futures markets
 - Does not assure quantity
- Alternative: Use transparent futures to tie prices to in cash forward contract!

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MARKETS • NEWS • POLICY • PROGRAMS

VOLUME 26, NUMBER 32 / March 14, 2011

Newsstand price — \$1

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COVER STORY

Battle for acres heats up

The annual competition for planted acres might never have been stronger than it is this spring. The grain trade is worried about tight global supplies, increasing demand for, and prices of, both major and specialty crops. The high prices mean farmers face difficult planting choices this spring, especially in areas where planting might be delayed. Farmers worry that planting the wrong crop could cost them a lot of money.

Story by Jonathan Knutson, Agweek

The battle for acres this spring may be the fiercest ever.

Prices of virtually all of the crops grown in the Northern Plains are high, providing farmers with plenty of profitable planting choices, at least on paper.

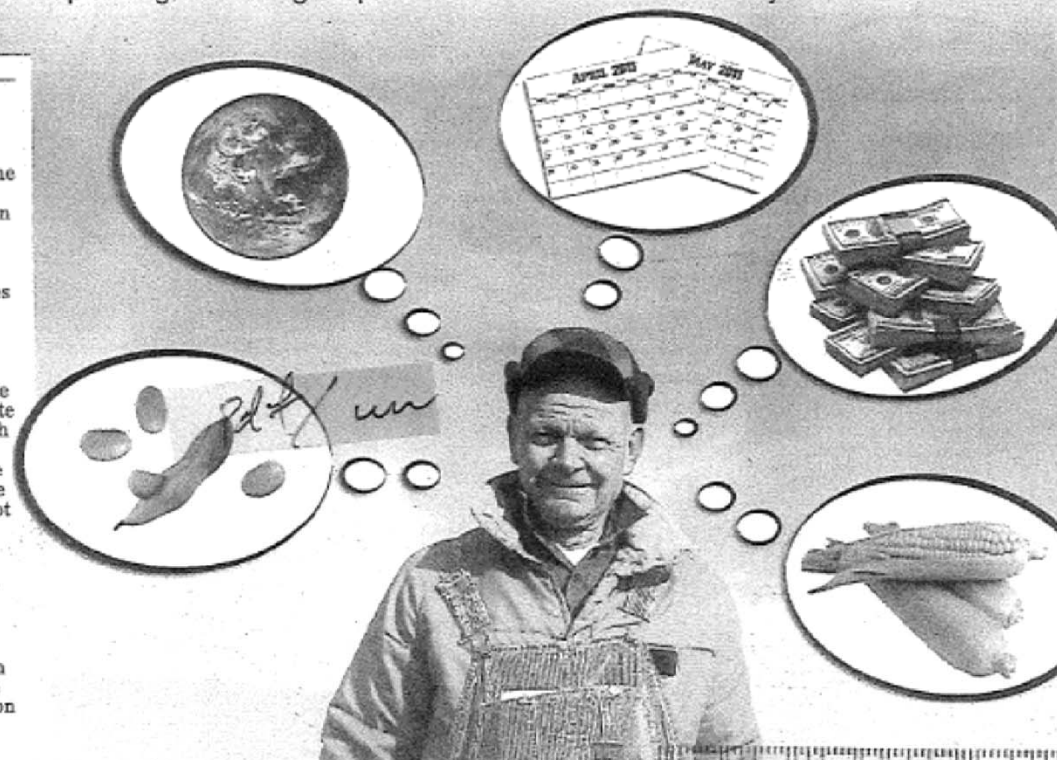
But there's plenty of anxiety, too: expenses are high, the strong prices may not last, the weather may not cooperate. Making the wrong choice at planting could hurt more than ever.

"The stakes are so high. There's a lot more stress," says Scott Knoke, North Dakota State University Extension Service agent in North Dakota's Benson County.

Concern about a late spring increases the stress, especially in areas such as his where the soil is saturated and some fields may not get planted, he says.

Given the likelihood of late planting, "there's a lot of indecision yet. The trigger (on what to plant) will be pulled at the very end," says Terry Weckerly, a Hurdsville, N.D., farmer and president of the North Dakota Grain Growers Association.

The battle for acres is an annual affair on the Northern Plains. Enough acres must be allocated to all the crops grown in the region



ACRES: See Page 8

Contracts: Mega Competition for acres of all crops results in escalation in contracting

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Gavilon (Chester, Mt.): Contracting while new elevator under construction!



The screenshot shows the Gavilon Grain - Chester website. The header includes the Gavilon logo and navigation links: About Gavilon, LOCATIONS, Commodities, Services, News, Careers, and Contact Us. The main content area is divided into sections: CHESTER HOME, SIGN UP FOR CASH BIDS, BACK TO ALL FACILITIES, and a central image of a Gavilon grain terminal. To the right, contact information for Marie Thompson is provided. Below this, the CASH BID INFORMATION section displays cash bids for Hard Red Winter Wheat and Spring Wheat, including delivery dates, bids, basis, futures prices, and changes. The website is powered by Net Solutions Group, Inc. and CBOT.

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About Gavilon | LOCATIONS | Commodities | Services | News

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GAVILON GRAIN - CHESTER

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Mailing Address
3365 Whitlash Road
Chester, MT 59522

Receiving Hours

Contact Information
T: +1 (855) 321-1452
F:
E: [Contact Grain Facility](#)

Manager
Marie Thompson

CASH BID INFORMATION

All cash bids are subject to change without notice. Please call the facility to confirm current prices. [Click here](#) for a printer-friendly cash bid listing.

Chester
Cash bids as of Friday, March 11, 2011, at 2:37 PM. Futures prices are delayed by ten minutes.

HARD RED WINTER WHEAT - 11.5

Delivery	Bid	Basis	Futures	Change	Futures Month
Aug/Sept 2011	7.30	-1.19	8.4875	↓ -13.75	Sep 11 KCBT Red Wheat

SPRING WHEAT - 14.0

Delivery	Bid	Basis	Futures	Change	Futures Month
Aug/Sept 2011	8.58	-0.14	8.7200	↓ -14.75	Sep 11 MGEX Spring Wheat

Data provided by [Net Solutions Group, Inc.](#)
Cash bids as of Friday, March 11, 2011, at 2:37 PM. All prices delayed 10 minutes.

CBOT
Chicago Board of Trade

Taskbar: Microsoft Office Word, Lotus Organizer, BARI - Mail..., Ag Risk Man..., FW: - Messa..., FW: Gavilon ..., Chester - C... Search Desktop 5:12 PM

Contracts and Risk Sharing

- By definition
 - any type of contract is a mechanism of risk sharing
- Risks are pervasive
 - Price, quality, quantity, acceptance rates, etc.
- Futures contracts
 - Mechanism to share “price” component of risk to a 3rd party
 - Thus, many contracts allow pricing relative to a “futures” price...essentially to allow for 3rd party risk transfer
- Absent of futures component of pricing
 - Risk is strictly shared between buyer and seller!

Competing Contracts for Specialty Grains: Common Features/Summary

- **Act of God:** Guaranteed vs.. non-guaranteed delivery
- **Premiums and Discounts for Quality Deviations**
 - Market values at harvest
 - Pre-specified in contract
 - Explicit high quality premium
- **Right of first refusal on Surplus production**
 - Typical
 - At market prices (as opposed to contract prices)
 - At some prescribed price differential (at time of contracting)
- **Pricing**
 - Some are simple fixed price
 - Others include basis to futures or multiple futures
 - Grower has option to timing of pricing
 - 2 part pricing: base quantity at contract price; surplus at discount (reflecting implicit storage costs)
 - Minimum price features and in some cases average price features
 - Min/max
 - Min and Lookback option (RR Sunflower)
 - Average price (equivalent to an Asian option)
- **Storage Options**
 - Most require on-farm storage; buyers call; storage fee following specified time; and on-farm samples submitted
- **Agronomics**
 - Most use certified seed bought from buyer
 - Declare or buyer recommends acres for specified production
- **Innovations** (provisions)
 - AOG and Other

Contracts and Risk Sharing

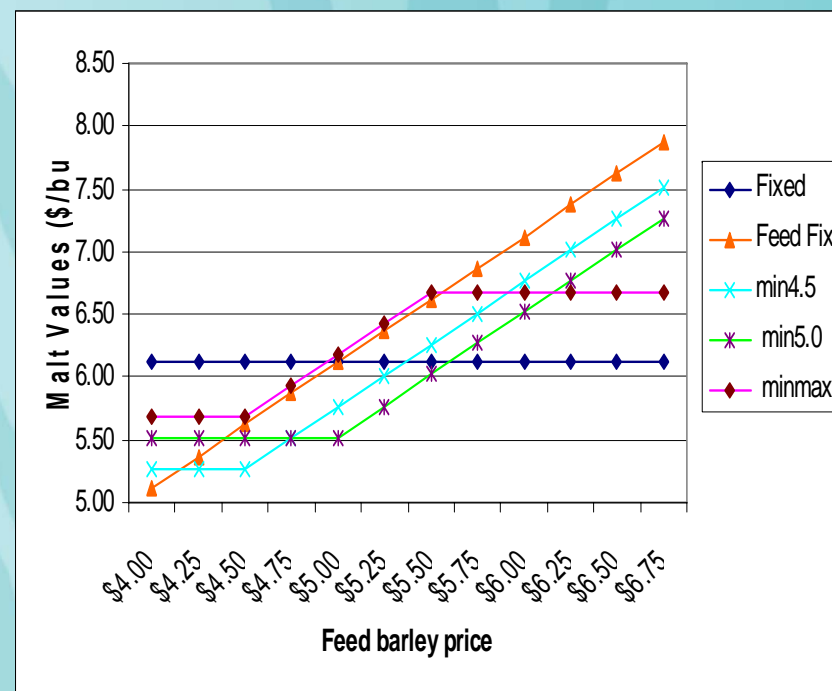
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Summary of contract alternatives

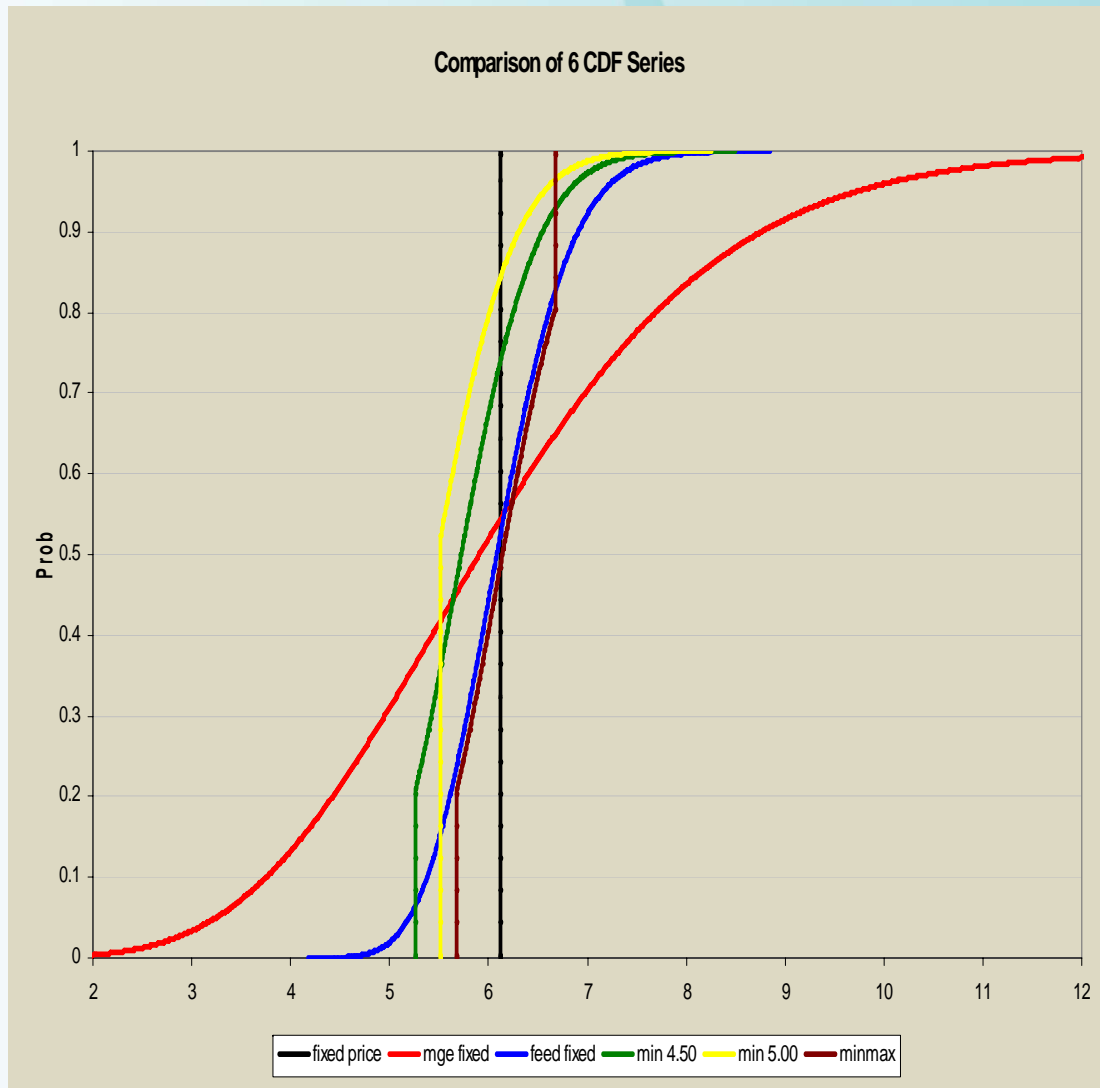
Contract Type	Risks		Risk Transfer Mechanism
	Buyer	GROWER	
Fixed Price	Risk of price decrease	Risk of price decline in market prices and Feed	Long puts;
Spread or Ratio to tradable futures	No risk		Trade futures
Min Price (on cash contracts!)	No risk		Buy calls
Min Price	Risk but offset by lower price		Internalized
Min/Max contract	Lesser risk	Min and max price are fixed for grower	
All grain: fixed differentials		Risk is acceptance proportions	Internalized
<i>Below not developed here; but, were previously developed</i>			
Multigrade 2: Pool	No risk	Grower has risk	None obvious
Right of First Refusal		Risk of selling overage	Option provided by Grower to buyer

Grower Payoffs of alternative contracts

- Contract types
 - Fixed is fixed price
 - Spread to feed barley (Rdm feed fix): This is a fixed spread
 - Spread to feed barley with floor (4.50 or 5.00)
 - Min/Max or floor/ceiling
- Results indicate that for a grower
 - If feed barley decreases, the best contracts are: fixed price; min/max; min contracts and then Spread to feed
 - If feed barley increases: the best contracts are: fixed spread to feed; min contracts, min/max; fixed price



Price distributions (For growers) MGE Wheat



- Ranges of prices are shown for each contract alternative
- At prob=.5, that is the most likely value (or mean)
- As noted, the greatest to least variability (risky) are (ranked by the coeff of variation)
 - MGE spread contract (mge fixed)
 - Spread to feed
 - Min feed (4.50 and 5.00)
 - Min/max
 - Fixed price

Simulation results for grower prices

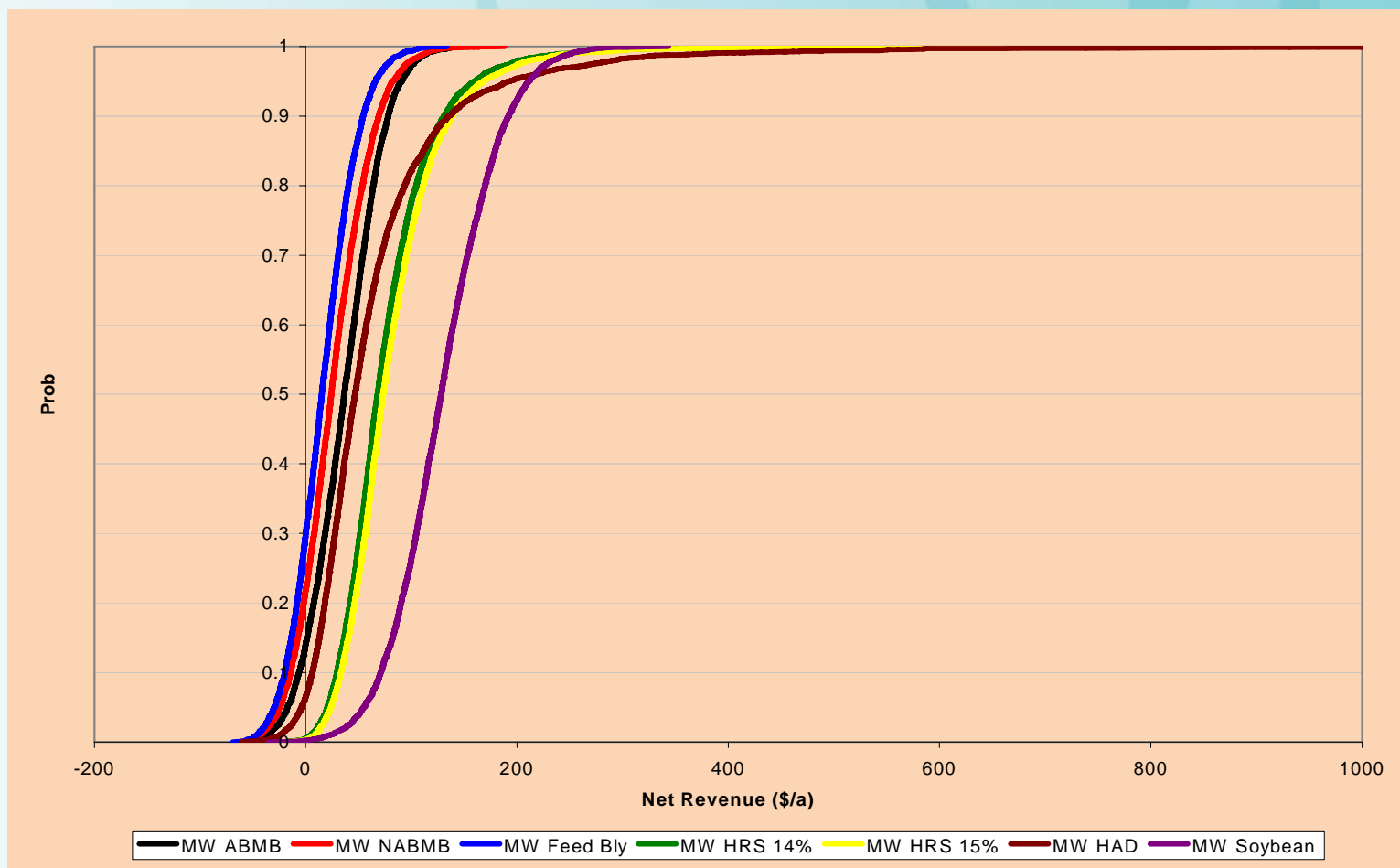
	Mean	Std Dev.	Coef. of Var	Minimum	Maximum
Input Values:					
Feed Barley MW (estimate) for Sep 09	5.00	0.60	0.12	3.05	7.74
MGE Wheat Sep 09	9.00	2.00	0.22	4.02	20.47
Resulting Price Distribution for Alternative Contracts					
Fixed Price	6.12	0.00	0.00	6.12	6.12
Spread to MGE Wheat	6.12	2.00	0.33	1.14	17.59
Spread to Feed Barley	6.12	0.60	0.10	4.17	8.86
Spread to Feed Barley: Min 4.50 (for feed)	5.82	0.52	0.09	5.26	8.50
Spread to Feed Barley: Min 5.00 (for feed)	5.76	0.37	0.07	5.52	8.26
Spread to Feed Barley: Min 4.50/Max 5.50	6.16	0.38	0.06	5.68	6.68

- Key points
 - Mean price should reflect the “expected price”
 - Differentials amongst the means are the critical point
 - Risk
 - The least to most risky contracts would be: fixed price; Min/max; Min=5.00; Min=4.50; Spread to feed barley no min; spread to MGE wheat
 - Minimum/max prices
 - Contract with the greatest downside protection: Fixed price
 - Contract with the greatest upside potential: Spread to MGE wheat
- Major point: Different contract types have different capabilities of reducing risks to growers

What costs?

- Value of competing crops
 - Typically, the most common competing crop
 - Net returns per
 - Derive contract price that equalizes net returns per acre
 - Considering all relevant variable costs
 - Including effect of insurance differentials
- Risk premium
 - More specialty crops entail greater risks
 - Growers/suppliers must earn a premium (risk premium) to compensate for the added risks

Comparison of Distributions of Net Returns (\$/a)

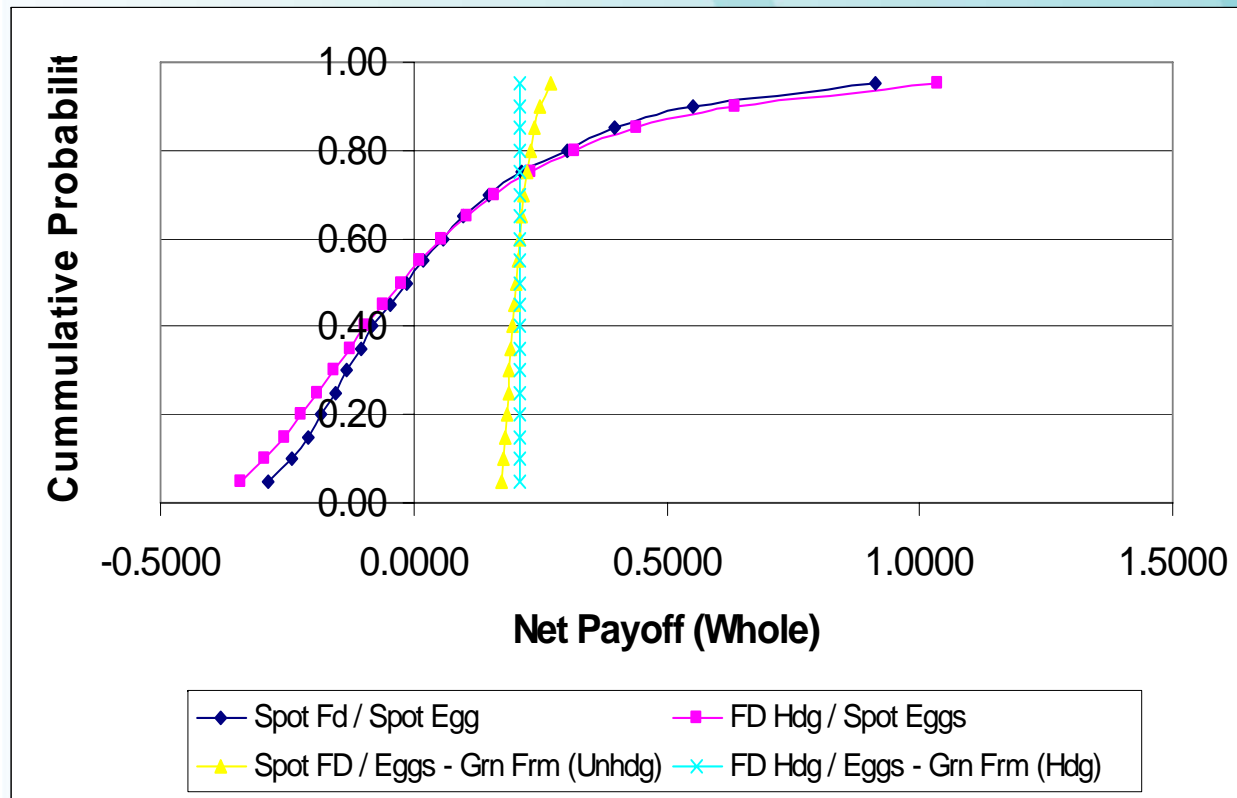


Example: Contract strategy for eggs (inputs and outputs)

Egg Costs	Egg Price	Price/ Payoff	St Dev	Min	Max	Prob <1.85
Payoffs: Simple Price-cost						Prob > .21
Spot	Spot	.1379	.828	-.41	21	.25
Hedged	Spot	.1380	.864	-.45	22	.26
Spot	Grain formula—unhedged	.2107	.037	.16	.59	.61
Hedged	Grain formula-hedged	.2106	.000	.21	.21	

- Egg market extremely risky, and no apparent transparent mechanism for hedging
- Strategy
 - Contract formulae for egg with growers, based on corn and sbmeal
 - Contract formulate to customers based on corn and sbmeal
 - Transfer risk to 3rd party
 - Adopt on 70% of business
- Grain formulae: generates higher return and lower risk!

Results: Distribution of Payoffs (Price-cost) of different strategies



- Payoffs= simple (Price-cost)
- Unhedged costs and/or hedged costs along with spot eggs are highly risky
- In some contracts/
 - Risk or neg payoff=.4
- Risk reduced substantially by
 - Grain formulae for egg pricing; either hedged or unhedged

Insurance Mechanisms

- Crop Insurance:
 - Embedded in major commodities in US, and increasingly in other countries
 - Partly subsidized
 - Discriminates against crops not covered by subsidy mechanisms
- Alternatives
 - Private underwriting of insurance is possible
 - E.g., Swiss-Re and others
 - http://www.swissre.com/clients/corporations_businesses/crop_shortfall_solutions.html
 - **Crop-Shortfall Solutions (swiss-re)**
 - Insurance cost/protection must be evaluated relative to alternative risk strategies
 - Most important is insuring physical quantity vs. financial payoffs!

Insurance:

Novel insurance products can be interpreted and valued as 'real options': *Agricore United and Use of Weather Derivatives to Guarantee Handling Volume*

- Background: AU, SWP and Droughts
- Agricore United increases future revenue stability

WINNIPEG, MANITOBA--Agricore United announced today it has entered into a new integrated risk financing program to take effect January 1, 2004 that will cover many of its traditionally insured risks and enhance its existing grain volume insurance program placed on January 1, 2003. The risk financing program will be written for an initial three-year term. The multi-year program, which carries an additional \$20 million of grain volume coverage in addition to the \$25 million currently in place, will provide the company with cost-effective protection from revenue reductions that may result from significant declines in industry-wide grain handling, which typically occur following drought years. "In addition to providing coverage similar to that existing for our traditional insurance exposures, this program will further improve the stability of Agricore United's cash flow," said Peter Cox, Chief Financial Officer. Developed with Willis Group Holdings (New York), the new program will be underwritten by a member of the Swiss Re Group, a long-term risk partner of Agricore United. The program will provide an insuring platform similar to heritage UGG's integrated risk financing program, which took effect December 31, 1999 and continued until December 31, 2002. The UGG program was a first in providing grain handling volume insurance within a pioneering financial agreement to include insurance coverage for a major business risk as well as traditional property and casualty risks. "As with the Heritage UGG program, this new vehicle is intended to lower the annual long term cost of risk while at the same time reducing cash flow volatility," added Cox. A normal shipping year in Western Canada would see 32 to 33 million metric tonnes of grain shipped. The new integrated program provides coverage when shipments drop below about 25 million tonnes down to a limit of 19 million tonnes - the level experienced in the 2003 crop year (following one of the three worst droughts in the last 90 years). ...

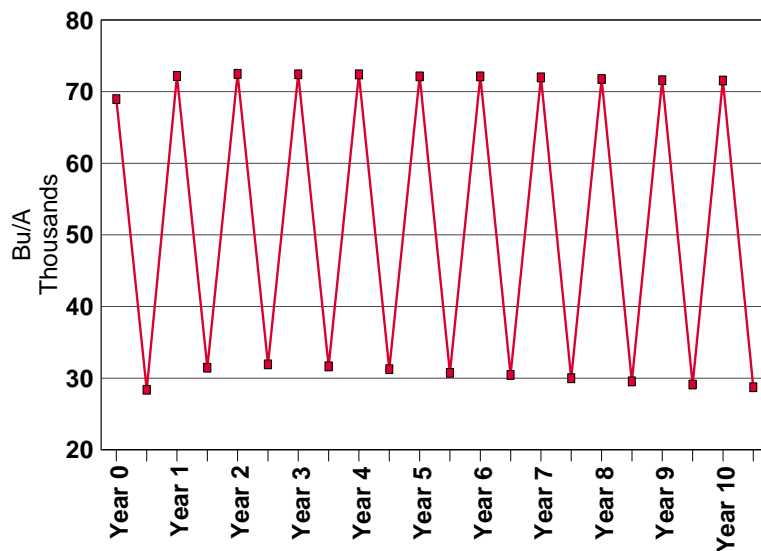
Crop Insurance: *Google on the Prairies*

- *Climate Corp.*
- Founded by former Google employees
- Example of how cloud computing modeling and technology are reshaping agriculture
- **Target:** crop production risk



Buffer Stocks

Mean Inventory Levels Through Time



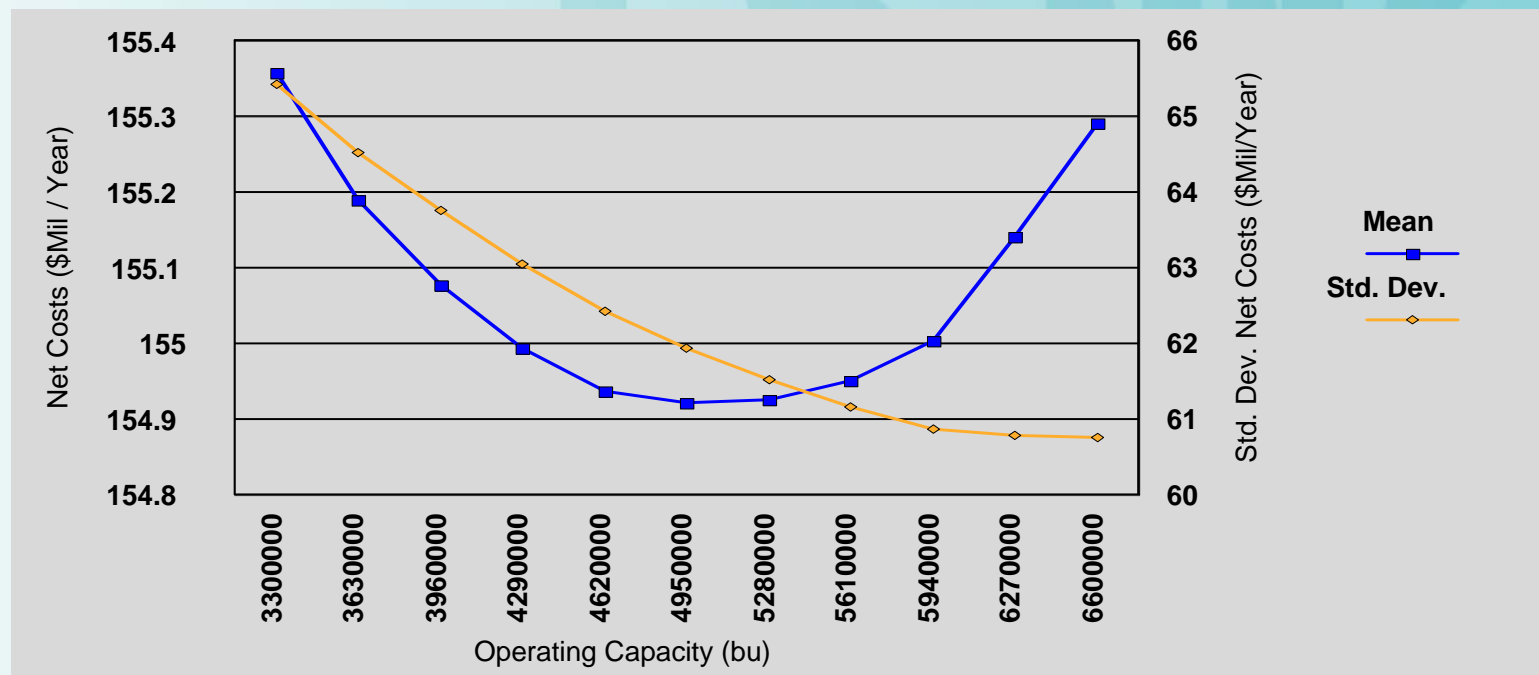
- Temporal diversification—intercrop year
- Common in many industries and provides partial risk protection against—just the opposite of JIT
 - Price and spread risk
 - Quantity and quality risks
- Concept
 - Accumulate stocks when prices are low
 - Draw down stocks when prices are high
 - Accrue costs of storage
 - Extremely beneficial in big-carry markets
- Recent efforts
 - by countries toward increasing “strategic reserves”
 - By companies to hold company owned stocks (as risk reducing strategy)

Government/private firms Incentive to Hold Stocks

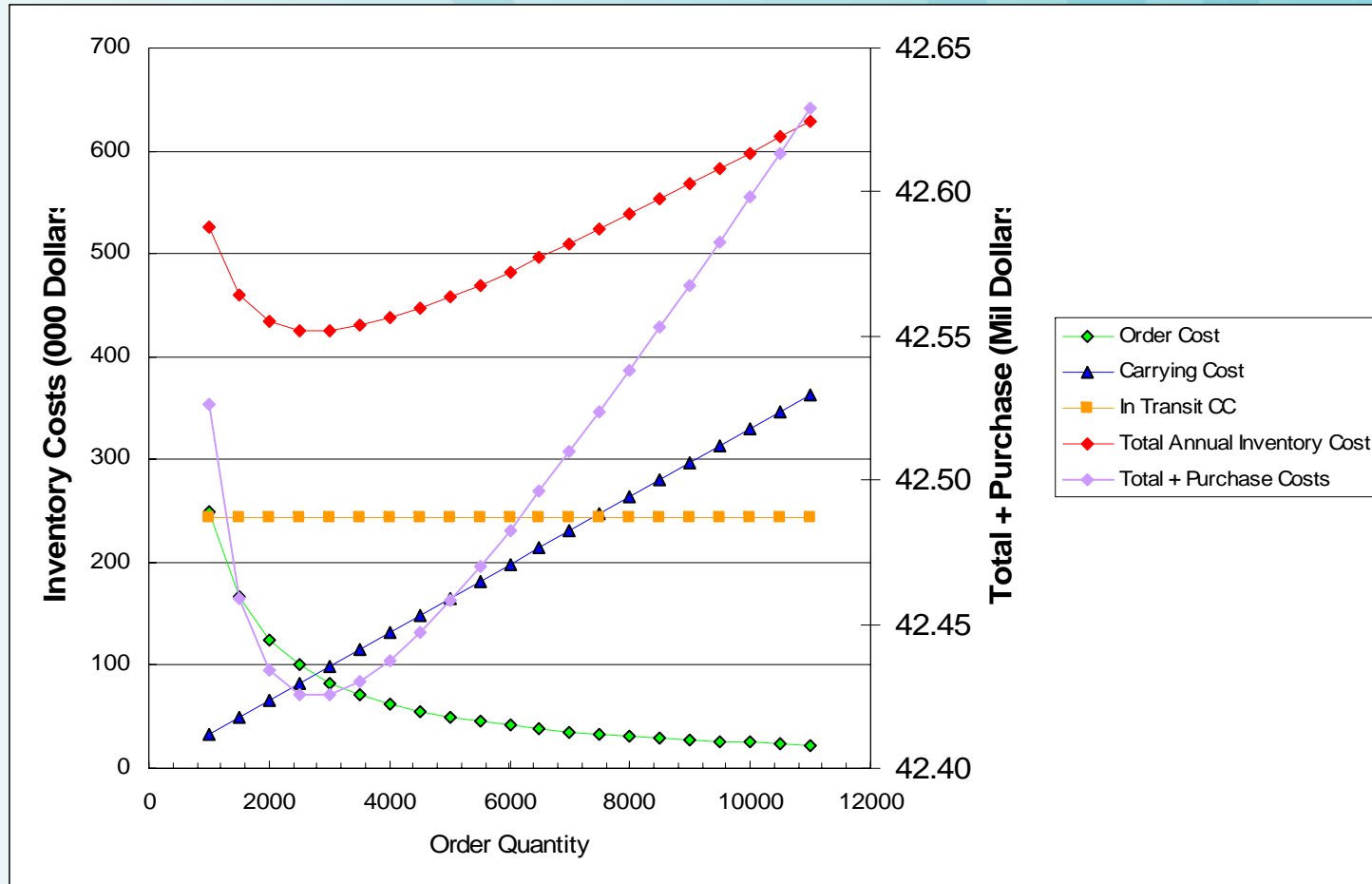
- Buffer-stocks should be evaluated by companies
 - at least several large agbus firms in US and world wide assertively use stocks as buffer stock
 - Very effective way of managing price risk
 - Can be evaluated using real options (stocks are like a call option)
- Countries: Should evaluate buffer stock strategy e.g.,
 - Gov. Mexico—to induce private sector storage
 - Subsidizes ½ (now all!) price of put....concurrent with holding cash inventory
 - Long cash/long put protects against price declines
- Chinese Headline March 4
- 发件人: MANews <>发送时间: 2011-03-04 23:02 收件人: 04Mar11
- **ANALYSIS-Grain importers build silos as food prices soar**
 - By Nigel Hunt
- Major points
 - Exporters no longer willing to finance global stocks
 - Egypt, South Korea, Saudi Arabia look to add capacity
 - Russia proposes buffer-stock for targeted customers
 - China now holds more grain than major exporters combined

Mean and Standard Deviation of Net Cost as Storage Capacity Increases

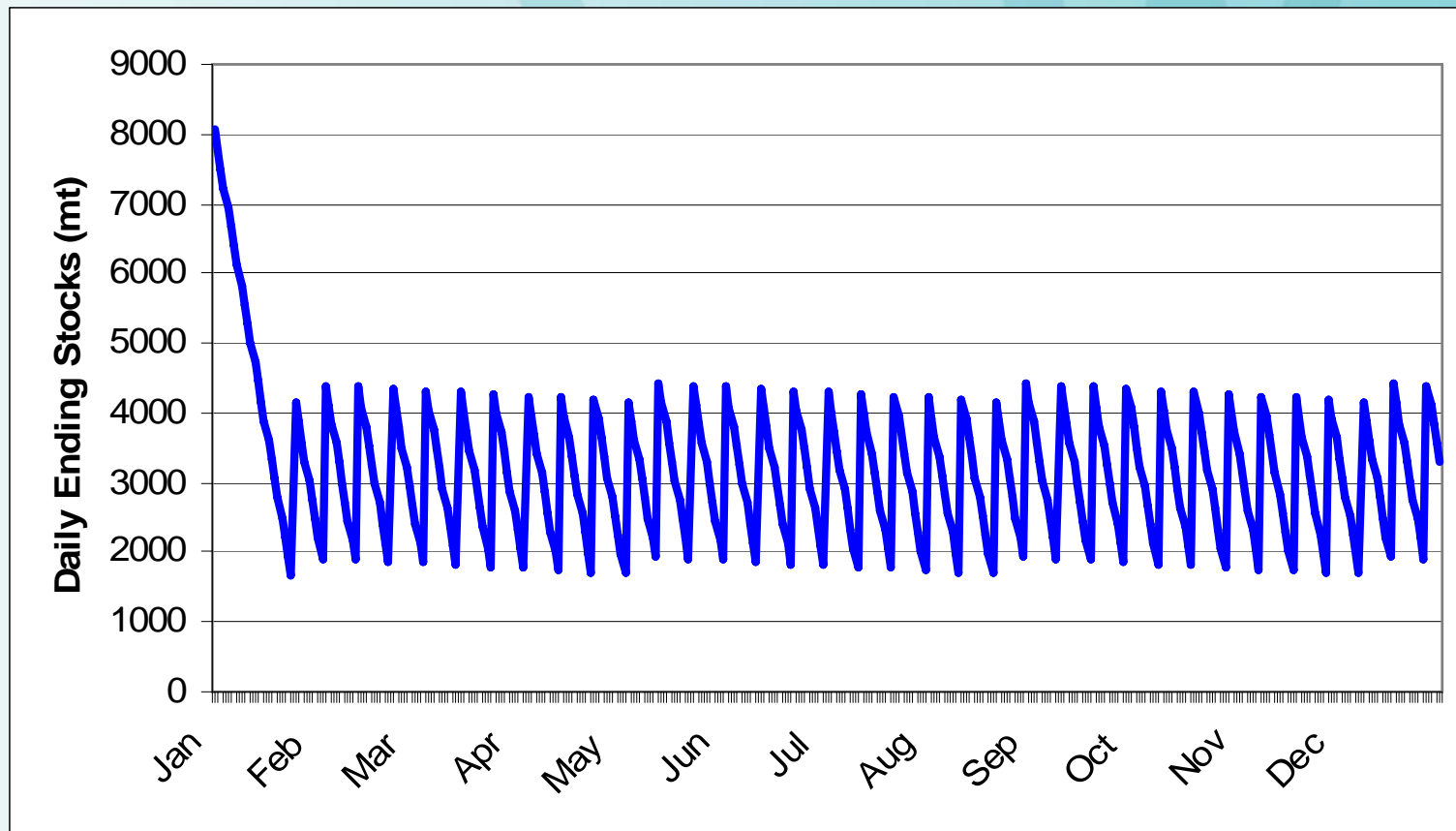
- Through simulation, derived how the st. dev of purchase costs changes as storage capacity increase
- Results Increasing storage capacity has the impact of reducing the st. deviation, or risk, of purchasing costs
 - Strict interpretation of the st. dev of net cost
 - While not dramatic, this does show that increasing capacity has the impact of reducing costs, and risks associated with purchasing



EOQ Models of Purchasing:



Base Case: Daily Ending Inventories Over Time

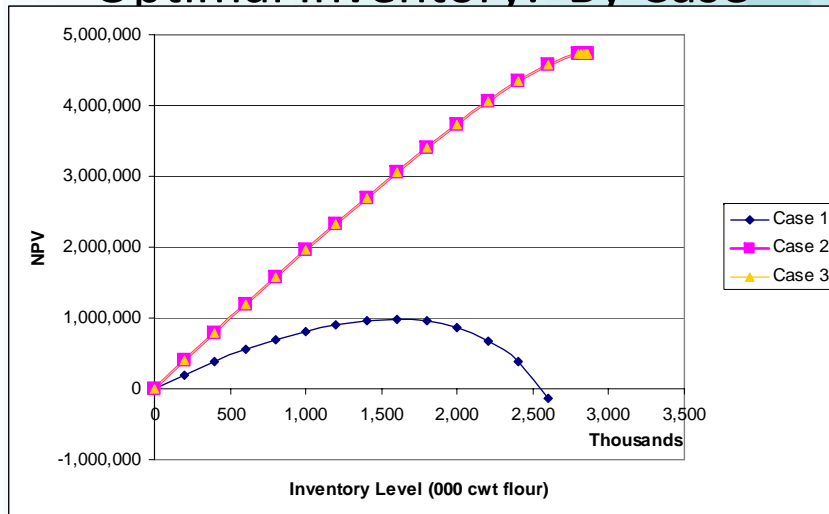


Option Based Model of Inventory Decisions

- Inventory is viewed as a *real option* on future sales
- Ref: Stowe, J. and T. Su. 1997.
 - A Contingent-Claims Approach to the Inventory-Stocking Decision. *Financial Management* Vol. 26(4):42-55.
- Concept:
 - Inventories viewed as a real option
 - It provides an option on future sales (product sales) and associated profits/margins
 - If short (inadequate inventories), risk of stock-out, and loss of future margins

NPV by Inventory

- Optimal Inventory: By Case



	Case		
Feature	1	2	3
Salvage Value for ex. Inv.	No	Yes	Yes
Penalties for being short	No	No	Yes

		Wheat Inventory				
	NPV	Cwt fl equiv.	Bu of wheat	Share of cap	\$/cwt	C/bu
Case 1	986,764	1,586,049	3,671,411	78	.62	.27
Case 2	4,738,669	2,826,462	6,542,736	139	1.68	72
Case 3	4,736,547	2,843,797	6,582,864	141	1.67	72

Geographical Diversification

- Essential element of strategy
 - Mitigates impacts of adverse conditions in a single region in a given year
- Elements of strategy
 - Identify relevant differentiated geographical regions
 - Determine portion to be purchased from each
 - Allow this to vary over time
- Example: NA Mbly and durum
 - Optimally: 20-40% from each of 3-4 regions
 - Upper MW: Low cost, but risky
 - West: Higher in cost, and less risk
 - Canada: Low cost, but risky and uncorrelated w/other regions

Risk Policy Document

- Who puts it together:
 - Document should be put together by management and/or outside consultants.
- Document should contain (at a minimum):
 - Description of market risks.
 - List *approved* strategies and instruments for managing these risks.
 - Structure of risk management department and relationship to other departments.
 - Procedures for risk reporting.
 - Procedures for active risk management.
- Approval
 - This document should be formally approved by the Board of Directors or other governing organization.
 - Copies should be distributed throughout the organization.

External reporting of risk positions: From Management to the BOD

- **Governance about hedging and risk policy should entail:**
 - approval of a risk policy and hedging guidelines by the Board;
 - Management would use these guidelines to manage risk using approved mechanisms (as described in the risk policy);
 - regularly, risk would be reported internally, typically through either the Controller (or a designated Risk Manager) and they would regularly report this information to the General Manager.
- **Specific roles for the BOD**
 - approve the document describing the hedging and risk management strategy.
 - convey expectations that risk management at the Mill conforms to this policy.
 - review varying measures of risk positions on a regular basis.
- **Reporting:** A set of measures about risk positions should be reported to the BOD on a regular basis including:
 - ***Management discussion on its exposure to risk.***
 - At each meeting, Management should provide a qualified discussion on its risk management strategy. Specifically,
 - address issues related to coverage in individual months, and the overall basis position.
 - Management should identify any abnormalities regarding risk that would result in a deviation from the hedge policy. This would include a qualitative assessment of the major risks confronting the Mill and how these are being addressed.

Summary Points: Implications

Risk/Volatility:

- Increase in risk in all markets and marketing functions, and likely sustained
- Challenges for risk management are immense, and will continue,

Management organizations

- Organize or, Re-organize to include risk at a high level within the organization
 - e.g., Corporate risk officer which is common in many larger corporations, and, increasingly common in AgBus.
- Measure risk (either internally or externally)
 - Reporting of risk: (Risk policy document)
 - Create a structure of reporting on risks related to trading and projects.
 - To Sr. Management and/or BOD
- Alternatives that could be explored/developed for Spices (over time)
 - Hedging/cross-hedging
 - Insurance
 - Contracting w/novel contract features
 - Buffer stocks
 - Geographical strategic diversification
- **Strategy:**
 - Develop above as appropriate and over time
 - Determine portion of each that should be element of risk strategy



Thank you

