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Grain Contracting Strategies: The Case of Durum Wheat[1]

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Abstract

One of the impacts of higher prices along with greater volatility in futures, basis and spreads is that there is pressure for greater use of cash contracts for grain. Indeed there has been growth in contracting for a number of competing crops in recent years. There is a wide array of cash contracts with varying terms that pose major strategic alternatives for buyers and the marketing system, particularly as buyers seek to use contracting as an element of risk mitigation. Durum is a crop where many of these issues and challenges are apparent. Durum is more risky than competing crops. There is greater price and yield risk as well as quality risk, and in contrast to competing crops, futures do not exist, cross hedging is poor and forward contracting has been used minimally.

There are three purposes of this paper: First, we provide a survey of contract terms used in grain contracting with growers. Second, we illustrate some issues in contracting of some of the specialty grains (durum) in the upper Midwest. Finally, we develop a model to analyze alternative contracting strategies in the case of durum. We introduce alternative pricing features, as well as explore other alternatives and analyze them in terms of risk and return to growers.

Introduction

Markets for many components of grain prices have become more volatile in recent years. As a result of these and other reasons, there has been an escalation in contracting which involves risk sharing between buyers/sellers. Contracting differs from hedging in futures markets in which risk is transferred to an anonymous third party. One of the challenges in contracting is determining the appropriate risk premium for market participants, and how that is shared between the buyer and seller. The problem is compounded by a number of factors. One is competition for acres. The impact of this is for an escalation of pre-plant contracting, and in which contract terms impact inter-crop and inter-firm competition. Second is that while standard terms exist in commodity type

[1]This is a summary of a more comprehensive research paper by the same title and is available at http://ageconsearch.umn.edu/ and is AEReport 648.

grain contracts, contracting in this competitive environment has resulted in challenges structuring contracts to be incentive compatible. Third, if a contract is offered by a buyer, it is done so in part as a means of risk mitigation by buyer (and seller). Consequently, if one breaches, it abrogates the risk mitigation strategy of the counter party.

Durum is a crop where many of these issues and challenges are applicable. Durum is more risky than competing crops. There is greater price and yield risk as well as quality risk. And in contrast to competing crops, futures do not exist, cross hedging is poor and forward contracting has been used minimally.

The purpose of this paper is to analyze problems of contract alternatives and some of the issues confronting the grain industry related to contracting. There are three specific purposes. First, we provide a survey of contract terms used in grain contracting with growers. Second, we illustrate some issues in contracting of some of the specialty grains (durum) in the upper Midwest. Finally, we develop a model to analyze alternative contracting strategies in the case of durum wheat. In this, we introduce alternative pricing features, as well as explore other alternatives and analyze them in terms of risk and return to growers.

Volatility

It is now common knowledge that there has been an escalation in volatility in recent years. While there may be debate about why or whether it will continue, all market participants acknowledge that the escalation in volatility has increased risk in grain marketing.

There are several points that are perhaps less recognized. First, not only has there been an escalation in volatility in the underlying futures markets, but there has been an increase in volatility in several other elements of prices. For example, the basis in many markets has increased similarly (Figure 1, as an example). In fact, the basis volatility has increased sharply, and in some periods, it has been more volatile than the underlying futures market price. Taken together, this has reduced the hedging effectiveness of the instrument (though it remains better than alternatives) and severely altered optimal hedge ratios. Similar observations exist at many other basis markets. There has also been a radical change in volatility in premiums/discounts in grains, as well as in shipping costs, notably ocean rates, amongst rates for other modes. Durum prices at Minneapolis and the spread between durum and Minneapolis Grain Exchange (MGEX) futures show increased volatility from 2007 forward (Figures 2 and 3). All of these have implications for buyers.

Contracting for Grains

Three topics related to contracting for grains are presented. One is the factors contributing to the apparent growth in contracting. Second, is the battle for acres and implications for contracting. And, third, we summarize some of the major clauses contained in grain contracts in the new emerging contracting competition.

Growth in Contracting

The most recent broad based survey on contracting in agriculture (to our knowledge) was done by MacDonald et al., (2004) who examined contracting of commodities in the U.S. in 2001 and

compared use of contracts to that in various time periods. They indicate that the number of farms using contracts and value of production under contract increased from 1969 to 2001. They illustrate that the share of wheat under contract increased from 6% of value in 1991-1993 to a high of 9% in 1996-1997 and declined to 5% in 2001. Most of the contracting of crops was focused in fruit, vegetables, rice, sugar beets, and peanuts. MacDonald et al., (2004) conclude that the spot market is having difficulty providing accurate price signals for products geared toward new consumer demands. They indicate that this trend for increased use of vertical coordination, through contracts and ownership will continue.

More recently, it is our observation that contracting has escalated drastically. While it is difficult to document this without a broad-based survey, it is our expectation for some commodities; pre-plant contracting for some grains and oilseeds has been adopted for more than 70% or so of industry demand, and has now become common business practice in the industry. We attribute this is in response to three important factors. One is the battle for acres. The second is the apparent escalation in risk, as a result of the increase in volatility as described above. Third is the apparent deterioration of, or unavailability of, traditional hedging mechanisms for managing risks (Wilson and Dahl, 2010).

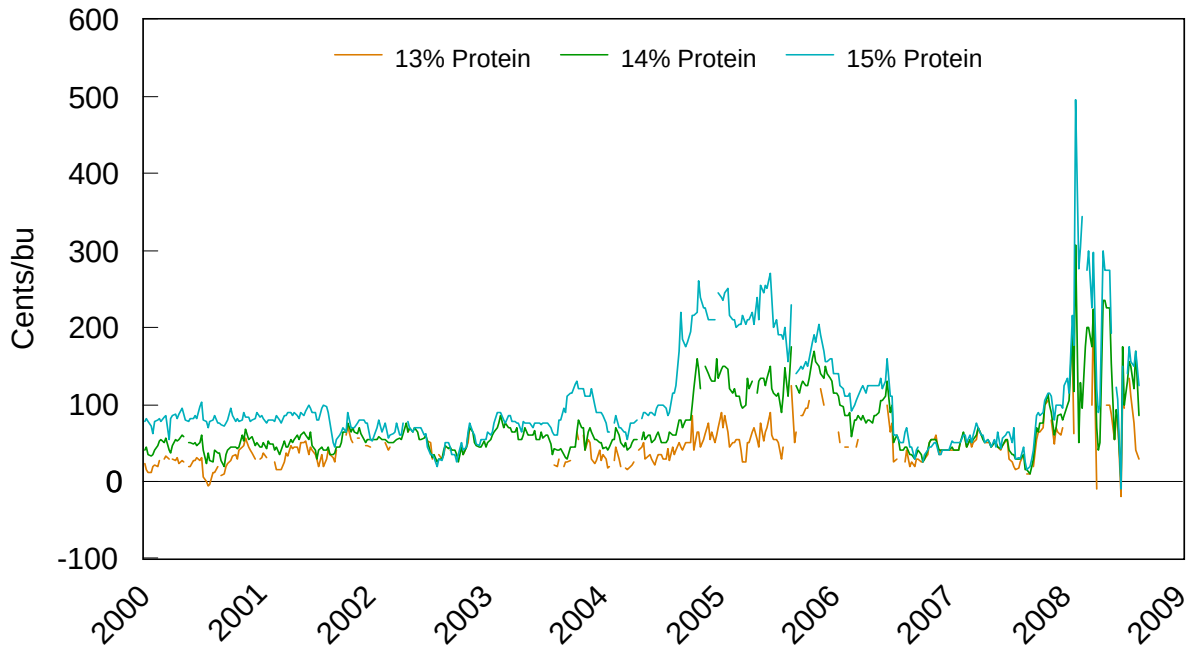

Figure 1. Minneapolis Basis for Hard Red Spring Wheat by Protein Level.

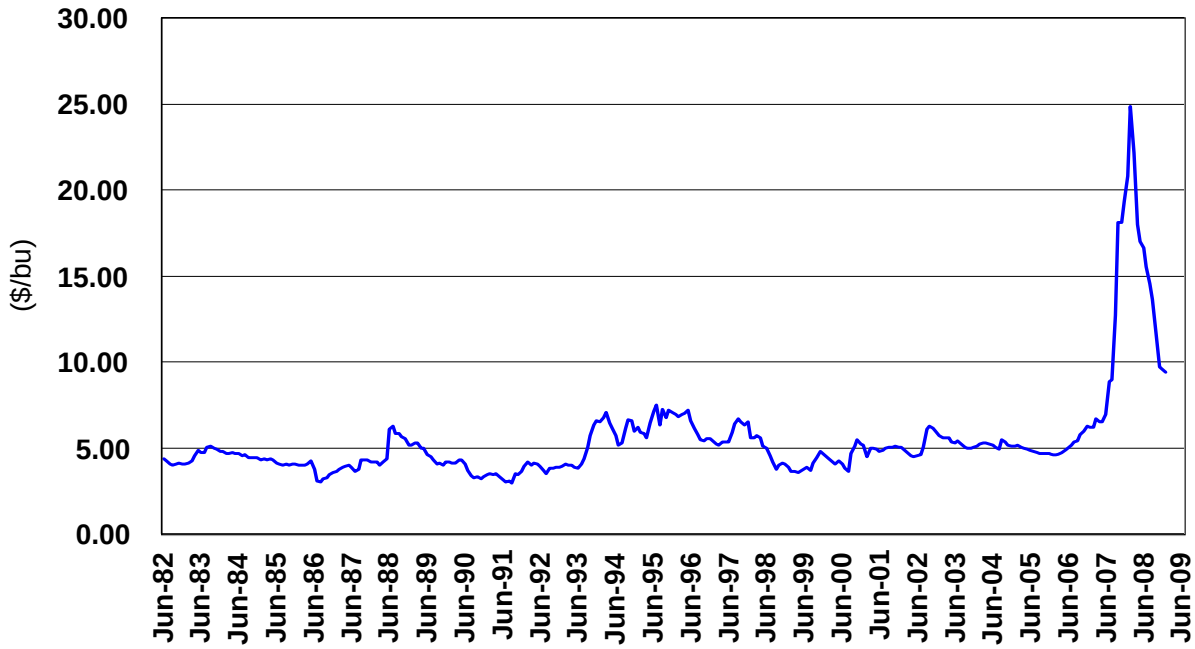

Figure 2. Monthly Minneapolis Hard Amber Durum Prices, June 1982-February 2009.

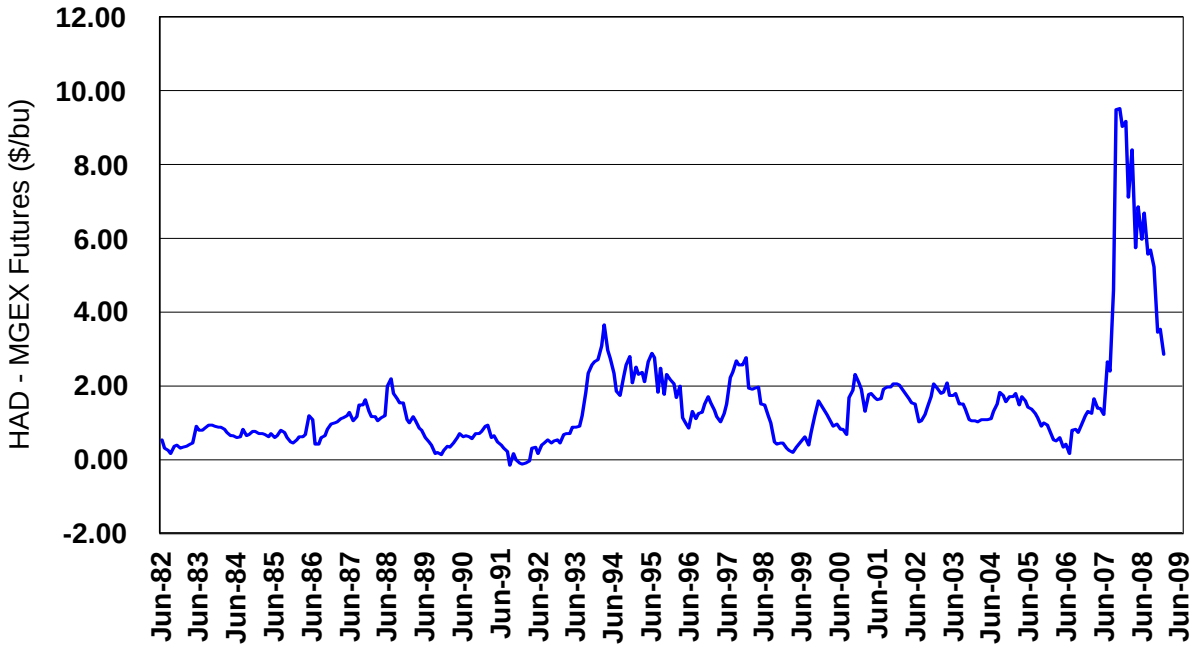

Figure 3. Monthly Spread Between Minneapolis Hard Amber Durum Prices and MGEX, HRS Futures, June 1982 to February 2009.

Contract Terms

A contract is a mechanism of risk sharing. Risks are pervasive including risks on price, quality, quantity, acceptance rates, etc. Hedging in futures contracts provide a mechanism to share an element of "price" risk which is transferred 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!

Figure 4 is used to characterize the types of contracting now used, as an alternative for procurement strategy (adapted from Wilson and Dahl, 2008). This highlights differences that may be embedded in different contract types. It illustrates the range of alternatives, from relying on simple spot transactions, to include varying types of contracting, and finally, the alternative is always that of vertical integration. Ultimately, it is the buyer that chooses where to be strategically positioned on this spectrum of alternatives.

To understand the scope and extent of contracting currently used in the upper Midwest, we surveyed a group of buyers and processors of some of the non-commodity type grains produced. These would be considered as marketing contracts, as opposed to production contracts (Michigan Farm Bureau, 2009) and these should not be considered as specialty crops since at least in the past they had been considered as commodities. These are represented as crops which are not as readily tradable as the major commodities such as corn, soybeans and winter wheat.

Act of God

Most of the contracts, though not all, contain Act-of-God (AOG) provisions. Sometimes these clauses are offered without a price differential. AOG provisions are common across crops but, they are by no means standardized. There are many different interpretations of AOG clauses. Those most common are: 1) a limit on the proportion of normal production or maximum contracted volume that can be covered under AOG; 2) a price differential for AOG provisions; 3) information requirements in order to verify yield losses which can include description of location of field and/or crop insurance adjustment assessments; 4) limitations on specific location to apply for contract (requirement that contract applies only to crop produced on specific field identified in the contract). Specific crops may require specific varieties for contracts, these include amongst others, malting barley and high oleic sunflowers and canola. AOG provisions may also involve the first right of refusal on purchase of any volume exceeding the contracted volume.

Pricing Alternatives and Provisions:

Overview

There are many types of pricing mechanisms. These include, as examples: Simple fixed price; Basis to single futures or multiple futures; 2 part pricing (base quantity at contract price; surplus at discount (reflecting implicit storage costs); and in a number of contracts there are option type features (implicit) including minimum price and in some cases Min/max, Lookback options, and Average prices guaranteed (equivalent to an Asian option). While several of these are option based contracts, our observation is that in practice, these contracts do not include a price differential to a fixed price contract and hence the buyer is implicitly absorbing the cost of the option.

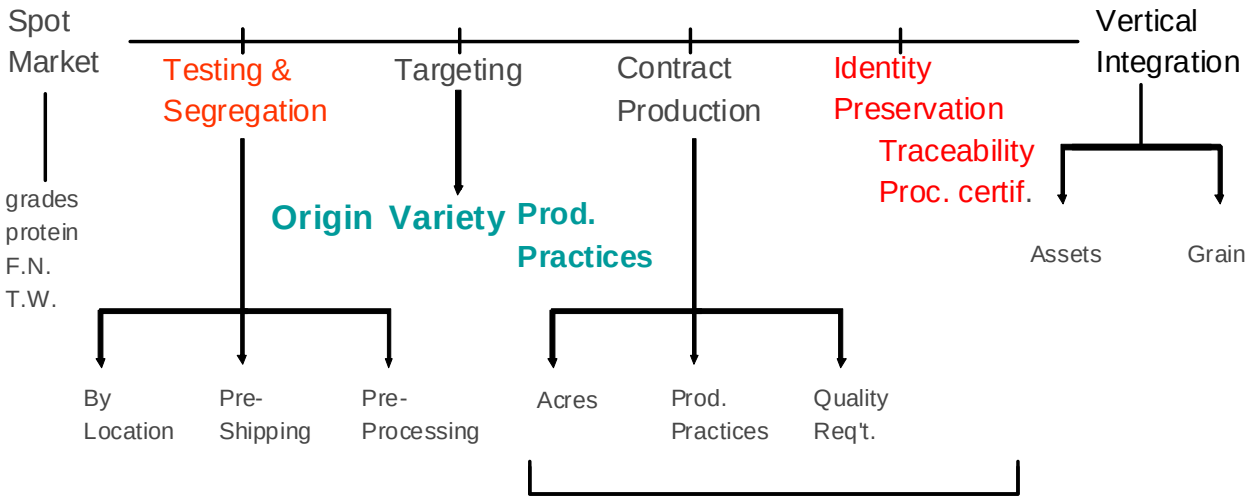

Figure 4. Segregation, IP and Traceability: Spectrum of Procurement Strategies.

A set of contracts are proposed in the empirical analysis that would give growers choices, and provide mechanisms to limit the exposure to price risk for the buyer. These include: Fixed price, Spread (or basis) to MGEX futures, Minimum priced with different floors and a Minimum/Maximum price contract. Details of these are described below. Typically growers have the option to timing of pricing. Interestingly, these all are option type features.

These are motivated in part due to what appears to be evolutionary pressures. A fixed price contract is straight forward. From a risk perspective it involves the buyer absorbing price risk that the seller is seeking to eliminate. A spread contract is an obvious alternative to a fixed price contract. It is nearly identical to a basis contract and importantly allows either the buyer or seller to individually transfer the futures portion of their price risk to third parties through the hedging mechanism.

Alternatives involve varying types of option based contracts. Even though there are no futures on durum wheat, option type contracts can be developed with premiums derived from the Black Option Pricing Model. The difference is that here it is applied to durum cash prices, instead of a more conventional futures traded contract. These are appealing in part that growers routinely suggest creating contracts with a floor price. However, floor price contracts, while attractive to growers, involve substantial risks to the buyer, i.e., prices may increase which would adversely impact the buyer, but favorably impact the grower. An alternative is to offer a min/max contract which would have the effect of being a risk sharing contract. In this case, the buyer provides a floor price guarantee to growers; and, simultaneously, growers would be providing the buyer a ceiling price guarantee. Taken together, these comprise a risk sharing contract.

The spectrum of alternative contracts would provide growers with more choices. Those contracts with less risk have value to growers—it allows them to lock in prices within an acceptable range, determined in their contract choice. These mechanisms allow the buyer better opportunities to control price risk. Price differentials among these choices are actuarially consistent and based on the

Black option pricing model. The buyer would be compensated for providing price guarantees (in terms of a lower purchase price) and growers would have to decide amongst alternatives that are actuarially sound.

Table 1. Example Contract Alternative Specifications

Contract Type	Feature	Price Level or Adjustment
Fixed Price		850
Spread Price	Fixed spread relative to MGEX futures on HRS	+200c/b over MGEX
Minimum Price 800	Price established by deducting the	-64
Minimum Price 850	option value of the implied minimum	-89
Min/Max Price 800/900	Price established by deducting the value of a put option, and adding the value of a call option	Net price adjustment=+5

* Prices here are basis Minneapolis, In practice and below, a deduction is used to establish a local price

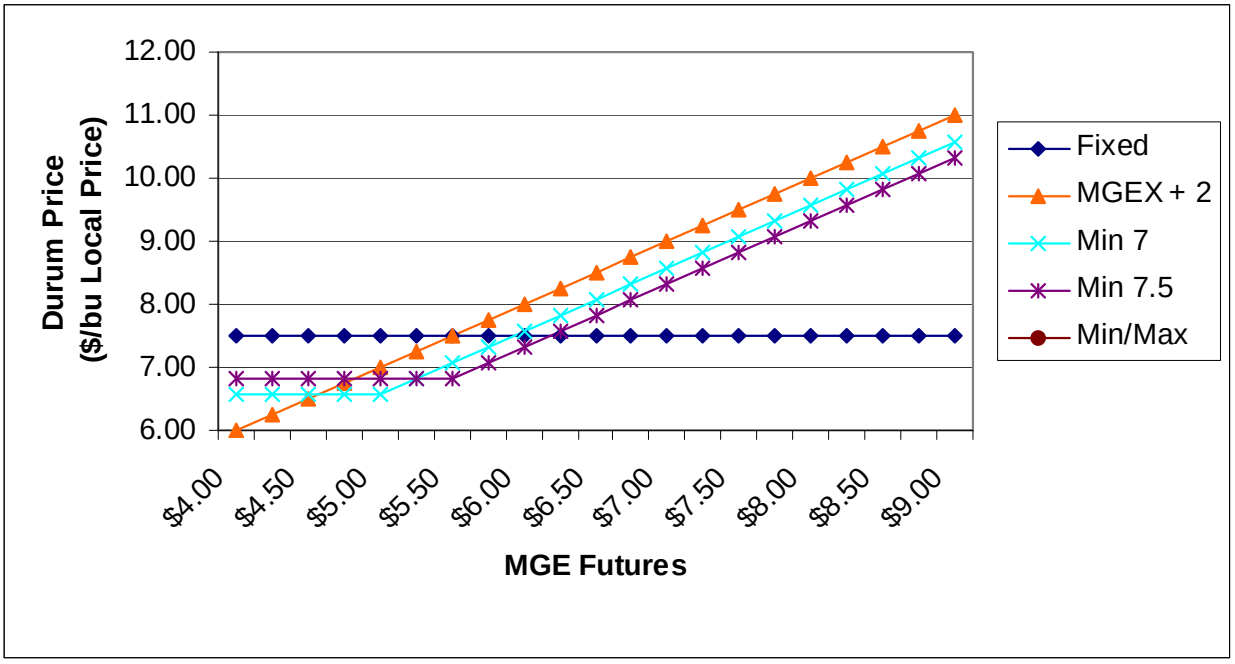

Figure 5. Relationship Between Durum Local Price and MGEX Futures, by Contract Alternative.

Mechanics and Base Case Assumptions

Mechanically, the price spread to MGEX HRS futures, is the basis of the underlying value to growers for all contracts. A minimum price contract involves deducting a premium from what the grower would otherwise receive.[2] A

[2] These are contained in Appendix A of Wilson and Dahl, 2009.

Min/Max price contract would be a form of risk sharing contract: the grower is guaranteed a floor; and buyer is guaranteed a ceiling. This spectrum of contracts instills the mechanisms for the buyer to reduce risk substantially—should it decide it prudent to pursue alternative price risk management strategies. Min/max contracts provide a natural hedge in that a ceiling price is provided. Price risks associated with other contract types can be offset using varying offsetting positions in futures and/or options.

For illustration, we use the general structure of contracts as described above. These are specifically defined below along with the assumptions used in their derivation (Table 1).

The spread contract would be a fixed spread relative to a defined MGEX futures month, e.g., December. The minimum price contract would provide a minimum price of $8.00/bu (or $8.50/bu) in our examples. If prices exceed this value at some prescribed time, the grower would receive the higher price. A deduction would be made from the fixed price contract by the value of the premium as shown in the table. If a higher minimum were specified, it could be provided, but, at a greater discount (implied option premium) to the grower. Finally, a min/max contract as defined here is for a minimum price for durum at $8/bu, and a maximum at $9/bu.[3] Here, the net adjustment (e.g., the implied put and call are 51 and 56c/b respectively) is +5c/b. Implicitly, this means the grower would be getting a higher net price, by 5c/b. This ultimately is due to the different values of the puts and calls for this contract.

Finally, using these, local prices were derived by deducting 100 c/b to represent a typical grower price in western North Dakota. These values are summarized in Figure 5 that shows the price that would be expected by growers, and buyers, under different contracts.

The preferred contract obviously depends on whether the overall wheat market increases or decreases. Here, in addition to a fixed price and spread contract, there are two minimum price contracts, $7.00 and $7.50/b, and a min/max contract. It is clear here that a minimum contract is preferred if futures are expected to increase. However, a minimum price contract should have a greater discount that a min/max contract as illustrated in the table and figure above.

An important feature of the option based contracts is the deduction for the premiums. Deducting a premium to derive a min price contract is conventional. In this case, it differs somewhat in that since there are no futures, it would be equivalent to the buyer providing a put option to the grower. This means that offering a minimum feature is a form of price insurance. However, it is risky for the buyer. If provided free, growers would always take it (i.e. free insurance). For this reason, it is important to offer this as an alternative, at a price differential. Offering a higher minimum is of more value. In practice, it is important to reflect the "insurance value" of the minimum in contract price differentials. The Minimum's can be chosen to reflect the cost of production and alternative minimums can be offered easily.

[3] Alternatively, a contract could be defined where there is a min/max provision for the spread, instead of the price level. These are not pursued at this time.

The Min/max contract is a bit novel and we recognize it is not a common contract, at least currently. Here the buyer provides growers a guarantee of a minimum (i.e. provides a put option to growers). Simultaneously, the grower provides the buyer a guarantee of a maximum price which would be equivalent to a grower providing a call option to buyer. For this reason, a Min/Max contract can be interpreted as risk sharing. The differential between the value of the PUT and the CALL is applied to the contract price. Here, the call has a slightly greater value than the PUT, so, buyer would be paying a net premium to growers choosing this type of contract.

Simulation on prices

Since these technically are each derivative contracts (with exception of the fixed price contract), their values depend on the outcomes of other variable(s). To illustrate the prospective characteristics of prices that may emerge for the alternative contracts, we simulated these using monte-carlo methods. Distributions that were used are shown below. Local prices are assumed at $1.00/bu basis relative to Minneapolis prices.[4] See Figure 6 and Table 2 for the results.

From a risk perspective (comparing the standard deviation and coefficients of variation), the minimum price contracts have the greatest risk for both growers and the buyer. This is in part due to while the minimum prices reduce variability on the lower end of prices, volatility when prices increase is retained. Contracts with lesser risk are the fixed spread contract, followed by min/max which would have the 2nd least risk amongst the alternatives; next only to a fixed price contract. Contracts with lesser risk should be of greater value to both growers and the buyer; hence the motivation to providing more alternatives. Growers which are risk averse, should prefer the latter contracts (fixed price and min/max).

[4] Distributions are presented in the data section of the larger report.

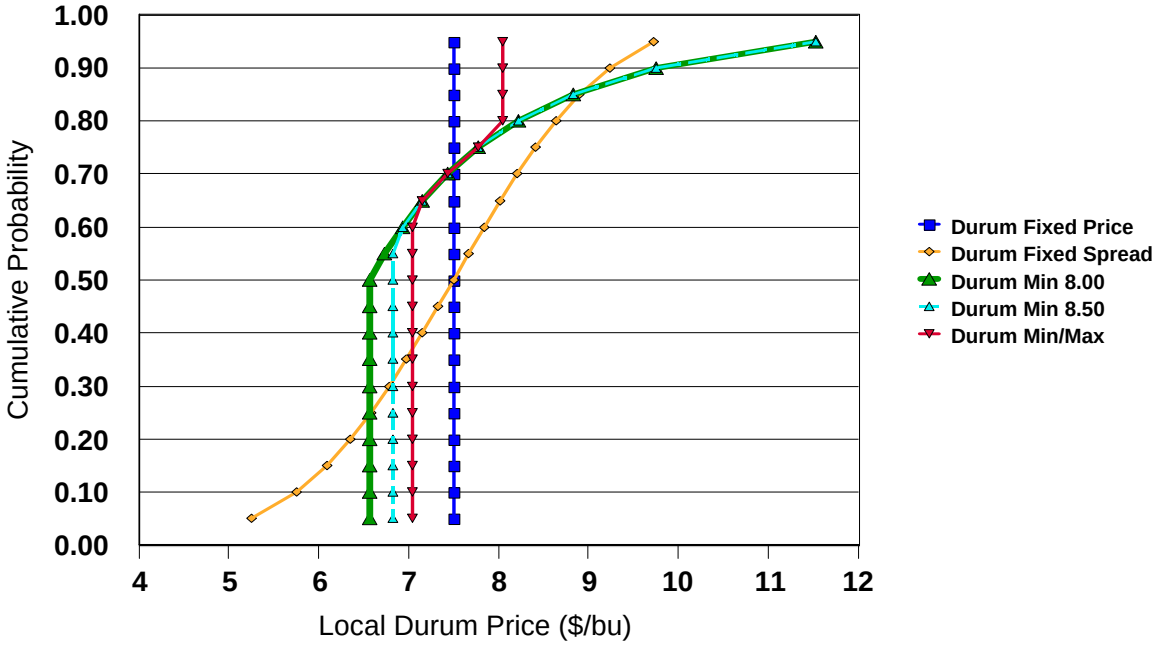

Figure 6. Distribution of Resulting Price Distributions for Alternative Contracts, Local Prices (North Dakota CRD 1), Acceptable Quality.

Table 2. Parameters for Input (Mpls) and Resulting Price Distributions for Acceptable Quality (Local Prices).

	Mean	Std. Dev.	Coef. of Var	Minimum	Maximum
Input Values					
MGEX Futures	6.50	1.36	0.21	1.57	11.78
Minneapolis Hard Amber Durum	8.27	2.06	0.25	6.34	20.36
Resulting Price Distributions for Alternative Contracts (Local Prices)					
Durum Fixed Price	7.50	0	0	7.50	7.50
Durum Fixed Spread	7.50	1.36	0.18	2.57	12.78
Durum Min 8.00	7.57	1.87	0.25	6.57	19.36
Durum Min 8.50	7.71	1.80	0.23	6.83	19.36
Durum Min/Max	7.34	0.42	0.06	7.05	8.05

Risk and Contracting: Case study on durum wheat

For illustration of issues related to risk and risk sharing, we show a detailed analysis of premiums that should be included in contracts for durum wheat. This crop has experienced problems similar to malting barley; in fact they are near identical (Wilson, Gustafson and Dahl, 2009). Traditionally, it has been a spot commodity and contracts were not used. Basically, supply exceeded demand and there was no need to contract. Over time there has been a decline in acres planted, ultimately to the point that the industry has had to rely more on imports. Reasons contributing to this include disease (i.e., vomitoxin), changing agronomic competitiveness, a change in the geography of production and Canadian competition. The primary competing crops to both durum and malting barley are hard red spring (HRS) wheat and canola, etc, in addition to soybeans, and up to 6-8 other more specialty grains. However, the difference between durum and malting barley has been that durum acres have continued to decline in recent years, while malting barley has increased, in part due to more assertive contracts.

There is substantial risk in the production of durum (Table 3). These are primarily related to price, quality and yield and all relative to the primary competing crop, in this case HRS. Specifically, price risk is much more volatile than HRS, and there is no public market for hedging, in contrast to HRS that can be readily hedged (see Std. Dev. In Table 3). There is limited (traditionally) transparency in forward contract values. Yields have similar risk. Finally, there is greater quality risk. This risk has two parts. One is the risk of not conforming to No. 1 and 2 requirements (grade, falling numbers, protein, etc). The other is the discounts that would apply if rejected which are highly risky. In addition, there are slight differences in crop insurance provisions.

Contract Types and Strategies

A base case was simulated which included returns over direct costs for two hrs alternatives, HRS Unpriced where prices were random, and HRS hedged where a portion of production is assumed hedged with futures with a hedge ratio of 1 and the remainder is random. Then seven alternatives for durum, Durum Unpriced with prices random and 6 with different price contracts on a fixed portion of expected production. The contracts were assumed to be limited to the first 20 bu/a of production with remaining production prices random and for those without AOG clauses, shortages require purchasing at random prices to fill out the contract.

Of these:

- 1) Durum Fixed Price assumes a portion of expected durum production is sold on a fixed price contract.
- 2) Durum Fixed Spread contract assumes a portion of expected durum production is sold on a fixed spread over Minneapolis HRS futures.

Table 3. Elements of HRS and Durum Risks

	HRS	HAD
Futures (Cash Price for Durum)		
Mean		
(Std. Dev.)	$6.50	$8.26
	(1.36)	(2.05)
Basis		
Mean	$0.76	$1.00
(Std. Dev.)	(0.58)	
Yield		
Mean	29.4 bu/a	28.5 bu/a
(Std. Dev.)	(2.4)	(2.1)
Quality Acceptance	.64	.38
(Rejection)	(.36)	(.62)
Quality Discount		Triangular ($0,$1,$4/bu)
Mean	$-0.20	$-1.67
(Std. Dev.)	(0.14)	(0.85)

Source: Based on distributions from the data described below (Table 4).

- 3-4) Durum Minimum 8.00 and Durum Minimum 8.50 are minimum price contracts for a portion of expected production, where contract prices reflect the maximum of current random prices or a minimum price. Minimums were $8.00/bu and $8.50/bu Minneapolis backed off to a local price and backed off for a premium reflecting the vanilla option value for a hypothetical option for extending the minimum price contact. Thus, local values for minimum values were $6.57/bu and $6.83/bu.
- 5) Durum Min/Max was for a min/max contract alternative were a portion of expected production was sold at a random value as long as it was between a specified minimum and maximum range. Again, this was based on a Minneapolis price backed off to a local price less an implied option value for the min/max contract. The minimum/maximum prices were $8-$9/bu Mpls, which translated to $7.05-8.05/bu local prices.
- 6) Durum Fixed Price AOG was a fixed price contract with an Act of God clause applied on a portion of expected production. The difference between this and Durum Fixed Price is the act of god clause where if production did not meet contracted volumes, only available production would have to be delivered for sale at contract prices.

Results: Base Case

Distributions for returns over direct costs for each of the alternatives are shown in Figure 7 and Table 4. Average returns were highest for the two HRS alternatives, HRS unpriced and HRS Hedged at $80/acre. Unpriced durum had an average return of $63/acre, while durum fixed price, fixed spread, and fixed price AOG contracts were higher

averaging $67/acre. The durum min/max strategy had slightly lower average returns of $64/acre, while both of the minimum contracts had the highest average returns of the durum contracts, averaging $69 and $72/acre for the Min 8.00 and Min 8.50 contracts, respectively.

Variability of returns over direct costs (a measure of risk) was lower for HRS (Hedged alternative (Std. Dev.) = $34/acre) and was much greater for the durum (unpriced standard deviation = $74/acre). It is also high for the durum minimum contracts (standard deviation: Min 8.00=$70/acre and Min 8.50=$69/acre). The lowest variability of the durum contracts was for the fixed price contracts with and without AOG, both with standard deviations of $44/acre.

Distributions for the alternatives also were positively skewed toward more positive values and had kurtosis (distributions tended to be more spiked than normal distribution). Thus, more observations clustered near the mean than near the tails. The implication of this is that more skewed alternatives would have a higher probability of achieving a return greater than the mean and those with higher kurtosis are more likely to be near the mean than those with lower kurtosis values.

Distributions of returns over direct costs for the alternatives were utilized to estimate certainty equivalents for each of the alternatives for a range of grower risk attitudes ranging from risk neutral to highly risk averse. Ranking the alternatives by certainty equivalents show that risk neutral growers would prefer the HRS and HRS Hedged as most preferred alternatives with all durum alternatives with lower certainty equivalents. Of the durum alternatives, the two minimum price contracts had the highest certainty equivalents, indicating these are the most preferred of the durum alternatives for risk neutral growers. As growers become more risk averse, the durum fixed price without AOG quickly becomes the most preferred durum contract, the durum fixed price with AOG becomes the second preferred durum contract, while the min/max contract becomes the 3rd preferred durum alternative. These are followed by the two minimum contracts (Min=$8.50) 4th and (Min=$8.00) 5th preferred durum alternatives.

Table 4. Results for Simulated Distributions of Returns Over Direct Costs, by Strategy.

	Mean	Std. Dev.	C.V.	Minimum	Maximum	Variance	Skewness	Kurtosis
HRS Unpriced	80	51	0.64	-52	366	2601	.51	3.70
HRS Hedged	80	34	0.43	1	366	1174	.94	5.36
Durum Unpriced	63	74	1.18	-47	560	5432	1.61	6.89
Durum Fixed Price	67	44	0.65	-30	364	1929	.73	4.25
Durum Fixed Spread	67	52	0.77	-76	346	2667	.46	3.63
Durum Min 8.00	69	70	1.02	-44	560	4909	1.75	7.61
Durum Min 8.50	72	69	0.96	-40	560	4720	1.79	7.86
Durum Min 8 Max 9	64	48	0.75	-39	375	2322	.81	4.20
Durum Fixed Price AOG	67	44	0.65	-30	364	1929	.73	4.25

Differences between certainty equivalents are the risk premium required for decision makers to be indifferent between alternatives compared and reveal the degree of preference of one alternative over another. Risk premiums were derived relative to the HRS hedge strategy. These show that for risk neutral growers, all of the durum alternatives have negative risk premiums indicating they are less preferred to the HRS hedge strategy. Risk premiums for risk neutral growers for the durum alternatives ranged from a low of $-8.35/acre for Minimum $8.50 alternative to a high of $-17.24/ acre for durum unpriced. For example, risk neutral growers would require reductions in variability and/or increases in returns that increase the certainty equivalent for the Minimum $8.50 contract by $8.35/acre before they would be indifferent between the Minimum $8.50 contract and HRS Hedged.

For more risk averse growers, the risk premiums for durum alternatives relative to the HRS Hedged strategy become more negative. This indicates that more risk averse growers would prefer HRS Hedged to the durum alternatives by larger values. For the most risk averse growers, they would prefer HRS Hedged to Fixed Price without AOG by $28/acre (about $1/bushel), Fixed Price with AOG by $28/acre, Min/Max by $36/acre, Minimum $8.50 by $39/acre, Minimum $8.00 by $43/acre, Durum unpriced by $54/acre and durum fixed spread by $61/acre.

These results indicate the value to growers of different pricing and AOG provisions. Here they are evaluated relative to growing HRS that is hedged. Durum is more risky as noted above. For moderately risk averse growers results indicate:

1) A durum grower without any pricing provisions would prefer growing HRS Hedged over durum by about $43/acre. i.e. for growers to be indifferent between durum unpriced and HRS Hedged, the certainty equivalent for unpriced durum would have to increase by $43/acre which would likely require some combination of increased durum spot prices relative to HRS, increased probability of meeting quality specs, increased yields and/or reduced level of price discounts for not meeting specifications, and/or reduced variability in durum prices, durum discounts and yields.

2) A durum fixed price contract without AOG would be most valuable of the durum contract alternatives, but would still be less preferred than HRS Hedged by $21/acre. Very close would be a fixed price durum contract with AOG, which would be less preferred than HRS Hedged by $21/acre. Hence, the value of the AOG provisions here is negative. In other words, the value of eliminating effects of yield shortages are overwhelmed by other effects (durum discounts, etc.).

3) Each of the remaining durum contracts are more risky and hence are less valuable to a grower than the fixed price without AOG. Interestingly, contracts with minimum prices and/or min/max provisions and durum unpriced would have greater value than a fixed spread contract.

4) The minimum contracts limit the lower portions of the price distribution, but retain higher prices to growers. As such, these limit the negative variability of prices, but retain the positive price moves. Since the method utilized to estimate certainty equivalents penalizes both positive and negative deviations of returns, these contracts may be viewed less favorably than if analyzed with alternative methods. However, these types of contracts would also have to be viewed favorably by agents extending the contracts who would view the retained positive price variability as increased procurement cost risks.

Summary

A motivation for contracting in durum is that it reduces the risk premium envisioned by a grower necessary to justify durum production. As example, a moderately risk averse grower without a contract would require an additional risk premium of $43/a for durum production over HRS Hedged to be indifferent between the two. The same grower with a fixed price contract would require a risk premium of only $21/a to be indifferent between durum and HRS Hedged. Thus, by offering a pre-plant contract, the growers risk premium for planting durum is reduced from $43/a to $21/a.

The values derived in the analysis are in $/ac due in part to the multitude of computations that are acre dependent. Nevertheless, these can be be translated to $/bushel for illustration. The results imply that the fixed price contract would have to be $3.00 to $3.50/bu. over HRS futures to be competitive with the alternative of HRS Hedged. With a fixed spread contract with a concurrent hedge (equivalent to a fixed price contract), that risk premium would be reduced to $31/a. Therefore, offering contracts is one of the strong motivations for buyers to offer pre-plant contracts for durum as it lowers the growers preference for growing HRS Hedged over durum which likely would increase planted area to some extent over that with no contract.

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