

# 10. Price Risk Management

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## Section 1: The nature and management of price risk

### Learning objectives

On completion of this section you should have an understanding of:

- Why price risk arises
- The importance of price risk
- The different types of approaches to price risk adopted by different types of market participants
- The different types of price risk to which market participants may be exposed
- The tools and techniques that can be employed to manage price risk.

### Key terms and concepts

Risk management, price risk, forward contracts, futures, options, derivatives and basis risk.

### Introduction

This lecture describes the nature of price risk and how it is managed. It starts by looking at how price risk arises, why it exists and why it needs to be managed. The different attitudes to price risk are also considered in the context of the different types of participants that are typically exposed to market price fluctuations.

Different types of price risk are then discussed along with how these risks can be managed. The examples are drawn from a variety of markets including both commodity and financial markets. The management of price risk in the wool industry will be examined more specifically in section 2.

## 10.1 The nature of price risk

### What is risk?

The Oxford Dictionary defines Risk as 'Hazard, chance of bad consequences, loss etc'. As such there are many types of risk in business. For example:

- Farmers are exposed to the risk of drought or flood resulting in crop failure;
- A company that borrows money is exposed to the risk that interest rates rise;
- Exporters who sell goods in foreign currencies are exposed to the risk of exchange rates falling and reducing the amount of local currency that they finally receive;
- A company that has assets is exposed to the risk of the value of those assets declining; and
- A company that produces electricity from coal is exposed to the risk of coal prices rising and/or electricity prices falling.

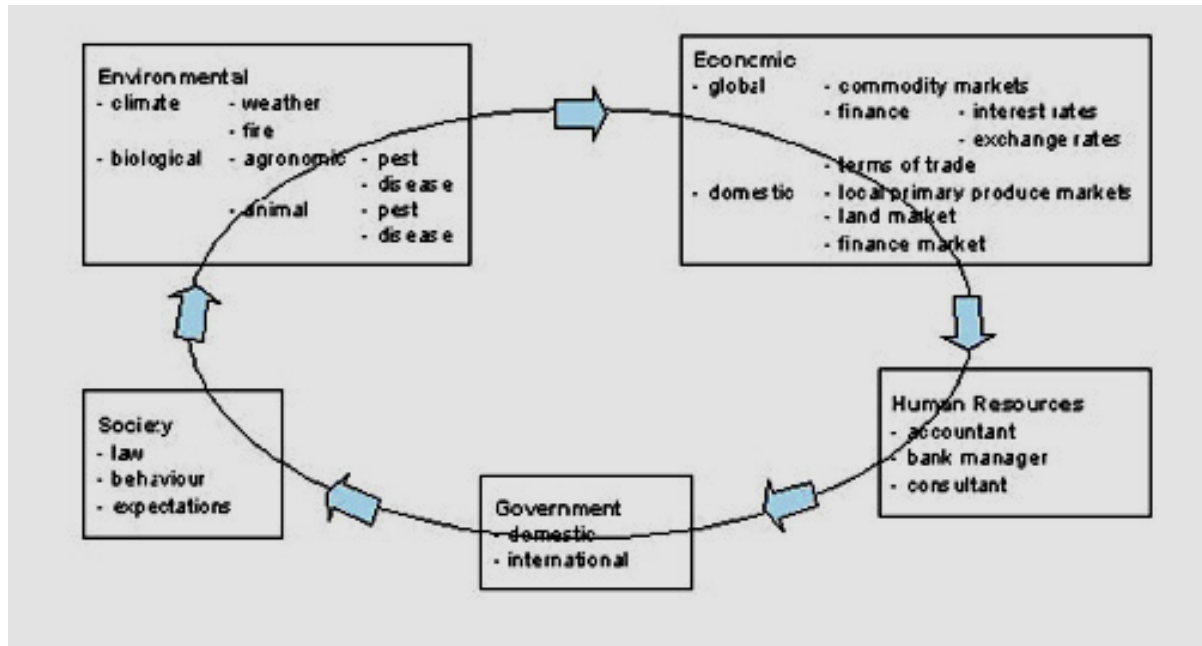
Table 10.1 shows the various types of risks and the relevant importance of these for a mixed farm operation. The analysis was conducted for an operation on South Australia's York Peninsula and analysed the consequences of a 5% change in each of the risk factors on the property's net profit. In the table each factor has been changed independently of the other factors by 5% and the impact on net profit calculated. From this analysis the risk factors were then ranked in descending order of importance. For example, the exchange rate between Australian and United States dollars was the most important factor with a 5% change from 0.74 to 0.70 impacting net profit by \$5,311.

While this analysis provides a useful example for the types of risks faced it does take into account differences in the likely change in each of the factors from year to year. For example, grain prices are likely to change by 20% or more, whereas expenses associated with insurance would not be likely to move by this amount.

**Table 10.1 Sensitivity Analysis: Effect on Net Profit of a Five Percent change in value for risk factors associated with a mixed farm. Source: Krause, Richardson and Bowey (1994).**

		Original Value	New Value	Change in Value	Net Profit	Ranking
Exchange rate	\$AUD/\$USD	0.74	0.7	0.04	5311	1
Feed barley yield	t/ha	2.58	2.71	0.13	2430	2
Feed barley prices	\$/ha	105	110.25	5.25	2411	3
Wheat price	\$/ha	130	136.5	6.5	1620	4
Wheat yield	t/ha	2.8	2.94	0.14	1620	5
Interest rates	%	11.75	11.16	0.59	1479	6
Machinery ownership cost	\$	25022	23771	1251	1251	7
Living expenses	\$	20000	19000	1000	1000	8
Wool production	Kg	5293	5557.65	265	925	9
Wool price	c/kg	3.5	3.68	0.18	884	10
Pea price	\$/ha	200	210	10	640	11
Pea yield	t/ha	2	2.1	0.1	640	12
Lambing %	%	64.2	67.4	3.2	635	13
Fuel costs	\$	9659	9176	483	483	14
Fat lamb prices	\$/hd	22.5	23.63	1.13	470	15
Livestock costs	\$	8426	8005	421	421	16
Fertiliser prices	\$	7937	7540	397	397	17
Repairs & maintenance	\$	5384	5115	269	269	18
Chemical costs	\$	3488	3314	174	174	19
Insurance	\$	816	775	41	41	20

All business will be exposed to a certain set of external risk factors. The farm enterprise again provides a familiar example for grouping the types or risks to which a business might be subject as illustrated in Figure 10.1.



**Figure 10.1 External Sources of Risk. Source: Krause, Richardson and Bowey (1994).**

Figure 10.1 demonstrates the way in which a business can group risks to facilitate the process of understanding total enterprise risk. From this point the extent of potential negative impact of each risk needs to be assessed in order to develop a risk management plan.

For a business that is involved in the wool production one of the key risks is price risk.

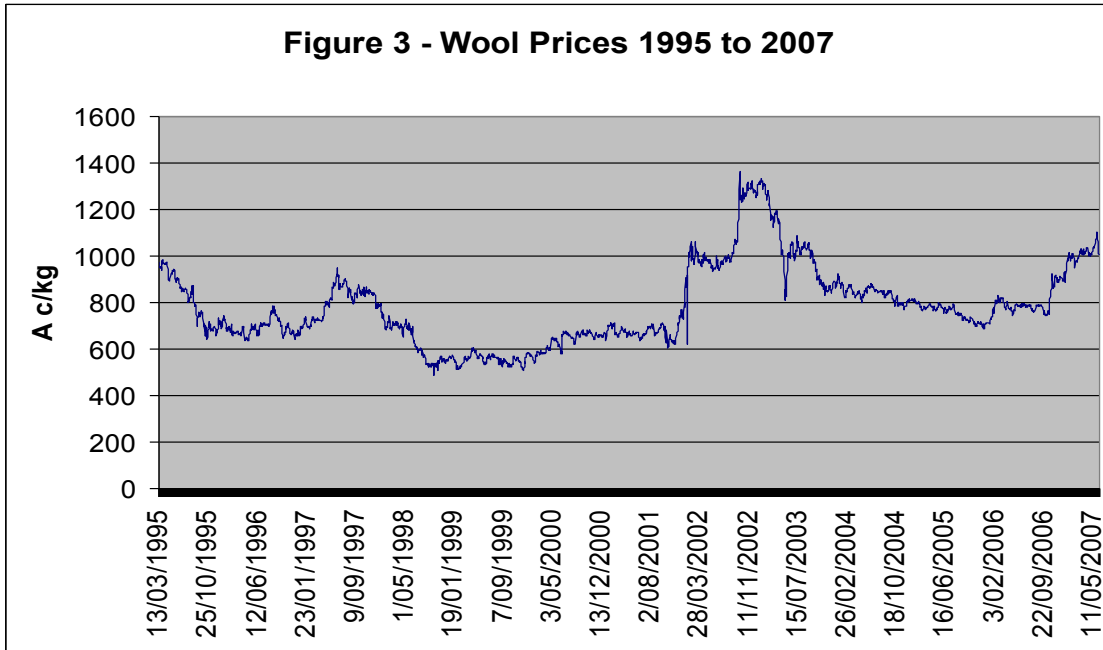
## 10.2 Why wool price risk arises

The market price for any commodity is a function of the quantity of a good supplied relative to the quantity of a good demanded. Prices change so that markets are cleared. See topic 13 for more detail on the drivers of demand and supply.

In general if the quantity of a supplied good increases then its price will fall and conversely if the quantity of a good decreases then its price will increase. In the short run the quantities of goods are relatively fixed; however, in the long run producers can adjust volumes of goods supplied. For instance, if the wool price were to suddenly increase then some farmers might be able to sell stored wool and others could bring their shearing forward to increase supply but the quantity of wool available cannot be increased rapidly. Alternatively in the long run producers can retain more ewes and produce more lambs which increase the sheep stock and thereby increase the wool supply.

In the wool market the price changes with changing levels of demand which is affected by world economic conditions and the demand for wool compared to other fibres. Supply principally changes with changes in price, profitability of alternative enterprises, and seasonal conditions.

Accordingly, the price of wool varies significantly as shown in Figure 10.2. The extent of the price changes (volatility) is high due to the long time taken for supply to change (since sheep must be bred and the fleece takes 12 months to grow) and the long time between supply of greasy wool and production of garments (6 to 12 months).



**Figure 10.2 Wool Prices 1995-2005.**  
 Source: Sydney Futures Exchange (1995-2005) (unpub).

### 10.3 Approaches to price risk

Within the wool supply chain the various participants adopt different approaches to price risk depending on whether they supply wool or process wool. Producers of wool want to minimize decreases in prices whereas processors of wool want to minimize increases in prices.

### 10.4 Producers and end-users

At either end of the supply chain producers and end-users of commodities are exposed to price risk. Producers cannot readily change their production profile and input costs are largely fixed so short term fluctuations in price can have a significant impact on profitability. Wool processors and manufacturers are generally not able to pass on price changes to consumers and so are also impacted by short term price changes. Accordingly, both of these types of market participants largely accept price risk as part of being in business.

### 10.5 Traders and processors

In the middle of the marketing chain the traders and processors of commodities adopt different approaches to price risk. Some participants seek to avoid price risk by always ensuring that they buy and sell at the same time or by structuring their business to service other parties for a throughput fee or commission. Other businesses actively accept price risk and in doing so play a valuable role in evening out short-term changes in supply and demand.

By being prepared to take risk the trading company is removing extra volume in times when supply is higher than demand and returning it to market when demand is higher than supply. If events transpire as in this example the trader will make a profit. If not they will make a loss. In all commodity markets such traders (including some who also act as processors or manufacturers) perform a valuable role and if they do it well they can make attractive returns. For a trading company, doing it well involves having a sound understanding of the supply and demand balance for the market and being prepared to accept losses from time to time when

prices do not move as expected. For the industry as a whole the activity of the traders helps to prevent prices moving to the extreme highs or lows that might negatively impact the long-term stability of the industry.

## 10.6 The wool industry reserve price scheme

The Australian Wool Corporation (AWC) attempted to manage supply and price risk on behalf of the entire industry in the period 1971 to 1991. When price fell below pre-determined levels (known as the minimum reserve price) the AWC would buy wool with the idea that this would support price and with the expectation that the price would subsequently rise at which time the wool would be sold, thus generating a profit which could be used to fund the scheme. Another aim was to prevent prices from going too high and stifling demand.

While the Reserve Price Scheme had merits in theory its application suffered from being removed from the commercial pressure to which trading companies are subject. Hindsight showed that in the late 1980's in response to high demand and strong economic growth the AWC set the minimum price too high. This level encouraged production to rise in an environment when demand had started to fall. When the Russian market collapsed they were not able to sustain the price level and the scheme collapsed. A private company would have reduced its buying prices as the economic environment changed; however, the AWC was precluded from doing so by political pressures. Since the scheme had encouraged production beyond demand the industry was left with huge stocks (more than 12 months production) which contributed to a further collapse in price.

### Types of price risk

Risk occurs where there is volatility in a market.

Farmers who supply commodities face **supply** risk. That is, if you intend to produce 1000 tonnes of wheat and only produce 500 tonnes then your income may fall.

If the quality of the product that is produced changes then there is a **quality** risk. A producer may end up marketing tender wool after a drought and therefore receive a price reduction.

**Price** risk occurs where market prices fall unexpectedly.

**Exchange rate** risk occurs when the value of the Australian Dollar versus the currency of the trading country increases.

**Basis** risk occurs where the commodity in a contract is different to specification or the costs to deliver a product to the contract specification changes.

## 10.7 Management of price risk

**Physical or cash sale** – delivery and sale of a product via auction or trading centre.

**Forward contract** – delivery of a commodity at a pre determined time in the future at a fixed price receivable when the commodity is supplied.

**Futures contract** – contract to sell a commodity at some time in the future at a fixed price

**Options contract** – right to buy a futures contract at some time in the future at a fixed price.

The trading options increase in complexity moving from physical sales to options contracts. The definitions above provide the producers side of the trade. In a forward contract a trader or processor would receive the commodity at some time in the future at a fixed price. For a futures contract the processor would contract to buy a commodity at some time in the future and for an option the processor would also want the right to buy a futures contract at some time in the future.

Producers and end-users of commodities will generally use simple products such as physical sale and purchase contracts and adopt simple strategies. Traders and processors are more likely to use the more complex products such as future and options contracts.

## Physical or Cash contracts

Cash contracts are the oldest and simplest type of commodity contract and involve the transfer of ownership of the physical commodity in exchange for cash. They are also the easiest to transact and provide a quick and efficient means of changing exposure to price risk. For example, if a trader is holding a physical stock then the most efficient means of reducing exposure to price risk is to sell the stock. One of the main advantages of the cash market is the high level of liquidity (a large number of buyers and sellers at any point in time).

Cash contracts are often negotiated through structured processes such as auction or tender markets. For example, in the livestock industries buyers and sellers come together at local auction markets where each lot of cattle or sheep are auctioned and sold to the highest bidder. In this way prices can easily be discovered and the needs of buyers and sellers met.

Many commodity markets no longer use auction markets, particularly those such as grains where the quality can be easily described and transactions affected by telephone.

## Forward physical purchase and sale contracts

A physical forward contract is a contract negotiated between a buyer and seller for the future delivery of a specific grade of commodity at a specified price. As such the contract structure is a simple means of establishing a price for a producer to sell a commodity that has not yet been produced or for an end user to secure supply to cover known future requirements.

For the trader, forward contracts provide a useful means of taking a position in the market without having to own the physical commodity. In this way the capital requirement and interest costs associated with holding the commodity are avoided. However, both the buyer and seller remain subject to the risk that the other party does not honour their contractual obligations, potentially resulting in a loss if the market price has moved adversely.

### Definition: Long position

If a trading company buys a physical commodity they will be exposed to the movement in the price of that commodity. If the price rises they will profit, but if it falls they will lose. The trader is said to have a 'long' position.

### Definition: Short position

Alternatively the trading company may enter into a contract for delivery of a commodity at some time in the future without yet having bought the physical commodity required to fill the contract. In this case the trader is said to be 'short' and may enter into such a position if they feel that prices are very high now but will fall later. For the example let's say they contract for delivery of wool at 700 cents for next December. If the price does fall to say 500 cents in December then they will buy the wool in the physical market for 500 cents and use that wool to supply their contract at a rate of 700 cents and thereby make a profit of 200 cents on the trade. Alternatively if the physical market price moved up to 800 cents in December then the trader would still need to buy wool in the physical market at that 800 cent price but they would only receive 700 cents when they supplied their contract and therefore make a 100 cent loss on the trade.

## Futures contracts

A futures contract is a legally binding agreement to buy or sell a specified amount of a commodity or financial instrument at a fixed price at sometime in the future.

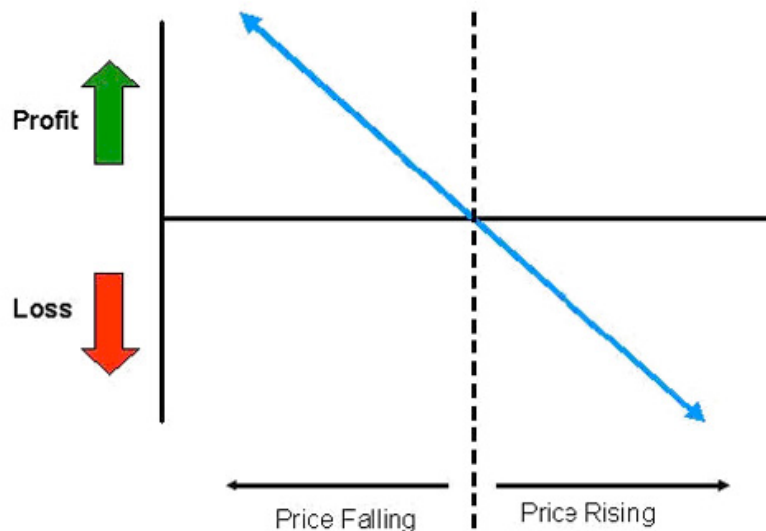
There are two types of futures contracts: exchange traded and over-the-counter (OTC).

## Exchange traded futures

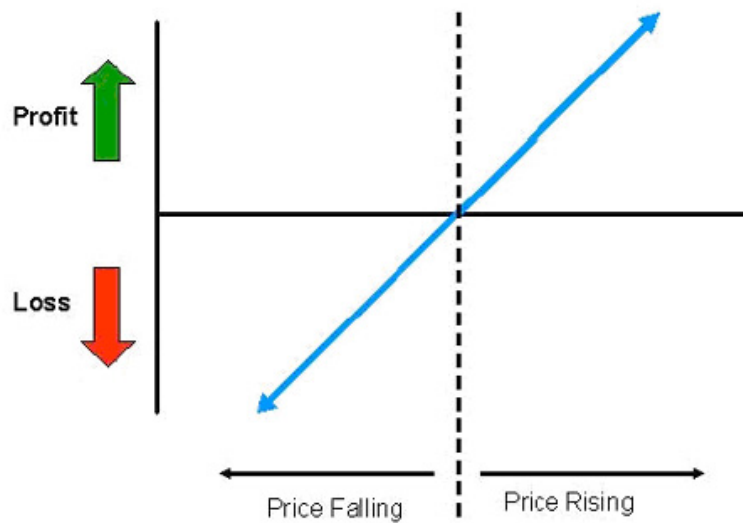
The most significant feature of exchange traded futures contracts compared to other commodity contracts is that the quantity and quality of the goods are specified and the delivery date is set in the contract. The price is determined at the time the contract is opened.

In addition there is a process of 'novation' through which a recognised futures exchange effectively stands in the middle of all transactions. This means that when a buyer and seller agree on a certain price for the transaction they both have a contract with the futures exchange, one bought (long) and one sold (short). This process of novation means that if either party wishes to exit from their position prior to the maturity date they do not have to negotiate with the party that was originally on the other side of the transaction; they simply have to find another party to take over their position. By organising the trading in an exchange environment this process of finding other parties to trade with is made relatively easy.

In fact, the vast majority of futures contracts are not held until expiry. Instead they are closed out through the process of taking the opposing position to that already held. For example, someone holding a sold (short) contract would need to buy a contract to close their position. If the market price had fallen in the meantime they would make a profit, if it had risen they would make a loss as per Figure 10.3. Likewise if the holder of a bought (long) position wished to close out they would have to sell and would profit if the market had risen or lose if it had fallen as per Figure 10.4.



**Figure 10.3 Profit/Loss Associated with a Short Position.**  
Source: Platinum Agribusiness, (2006).



**Figure 10.4 Profit/Loss Associated with a Long Position.**  
**Source: Platinum Agribusiness, (2006).**

Depending on the structure of the individual futures market if a position is not closed out prior to expiry it will either go to delivery or be cash settled. Both mechanisms are designed to ensure that futures prices ultimately converge with those in the underlying physical commodity market. In deliverable contracts the holder of sold positions are required to deliver the physical commodity specified in the contract to the holders of the bought positions.

### Margin Calls

The futures exchange also guarantees the performance of all contractual obligations through a process known as **margining**. This involves participants in the market being required to have an account with the Exchange (through a futures broker). The balance in this account must be kept above a certain minimum required level after adjustment to take into account daily market movements.

Traders do not need to receive or pay the full value of a contract when they sell or buy a futures contract. In many cases the trader is only responsible for the difference in the value of the contract and the physical market. If the margin on the contract changes against the trader then the trader has to make up the difference. Alternatively if the value of the margin of a contract moves against a buyer then they will need to make up the difference. This daily requirement to make up the difference in contract value is a “margin call”. The point of margins calls is to ensure that any difference in contract value is paid so that if the trader defaults on the contract then the only loss is the amount that is incurred on the previous day’s trading. In this case losses cannot be carried for the duration of the contracts life.

Example: if a trader wished to take a short position in wheat futures they may be required to lodge an amount of say USD1,000 (termed the Initial Margin). Should the market rise by an amount equating to a loss of USD250 the next day then they would be required to deposit an additional USD250 (termed a Variation Margin). The amount of the Initial Margin is set by the exchange to be more than the likely amount of market movement in any one day. If the trader does not deposit additional funds as required the position will be closed out and neither the broker nor the exchange should suffer loss, thus ensuring the stability of the market.

The differences between futures contracts and forward contracts are summarised in Table 10.2.

**Table 10.2 Differences between forward and futures markets.**

Source: Sydney Futures Exchange (unpub.).

Forward Contracts	Futures Contracts
Non standardised contract (tailored to client's needs)	Standardised contracts (expiry, quantity, grade)
Counter-party risk	Minimal counterparty risk (exchange guarantee)
Must trade with original counter-party	Novation (substitute one contracting party for another)
Non regulated market	Regulated market
Delivery always occurs	Delivery seldom occurs
No cash flow before maturity	Initial and variation margins
Price only available to counter-party	Price available to the market and published in papers
Price negotiable (depending on bargaining power)	Market price available to all users
Low liquidity	Liquidity

Exchange traded futures contracts provide a valuable mechanism for managing price risk. Essentially they allow market participants to take either long or short positions as required without having to enter into contracts with anyone in particular or own the physical commodity. For example, if a trader wishes to take a long position they can do so without having to buy the commodity. They can close the position at any time they wish (subject to there being a buyer in the futures market at that time, which there normally is) and the final settlement amount is simply the difference between the purchase price and the sale price.

The key to understanding the role of futures markets is to think of the producer of a physical commodity. Their planned production is subject to the risk that prices will fall and they want to negate this risk. Futures contracts allow the producer to take a sold (short) position for some date in the future (say November) after the product is harvested. If the physical market price falls by harvest then they will have a cash profit from the contract to offset the decline in the value of their physical production. See the example in the table below.

**Table 10.3 Trading position with a price fall in the physical market.**

Month	Physical (Cash)	Futures Contract (short)
March	700 market value only	Sell 700 cents
May		Value 650 (-50 cents)
July		Value 720 (+20 cents)
Sept		Value 750 (+50 cents)
Nov	Sell 600	Buy 600 cents
Net position	-100 cents loss	+100 cents gain

Alternatively, if the physical market price increases then the farmer's loss on futures (since they will be buying back at a higher price than which they sold) will be offset by an increase in the value of the production which would be sold into a physical cash market. See the example below.

**Table 10.4 Trading position with a price increase in the physical market.**

Month	Physical (Cash)	Futures Contract (short)
March	700 market value only	Sell 700 cents
May		Value 750 (+50 cents)
July		Value 720 (+20 cents)
Sept		Value 650 (-50 cents)
Nov	Sell 800 cents	Buy 800 cents
Net position	+100 cents gain	-100 cents loss

Futures markets exist in many types of commodities and financial instruments such as interest rates, foreign exchange rates, oil, gold, wheat, cotton, sugar, wool and many others. Positions can generally be taken for periods of up to 1-3 years in the future.

## Over the counter futures

Over the counter futures markets are similar to exchange traded futures except that instead of being traded on an exchange they are traded privately. Typically an investment bank or similar financial institution will operate an OTC market. They will offer futures products to clients, generally to be settled against an index or market quotation at a future point in time.

Such contracts are generally more tailored to the needs of users in terms of expiry dates and quantities, however, do not benefit from having a liquid market through which traders can readily enter and exit positions.

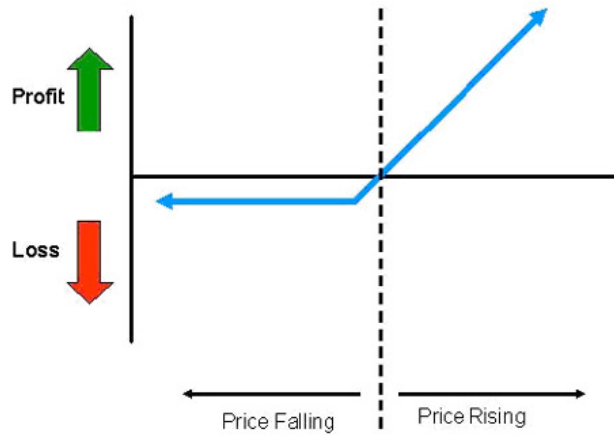
Examples of OTC futures markets include Forward Rate Agreements (FRAs) in interest rate markets and the wool futures markets operated by Commonwealth Bank (CBA) and National Australia Bank (NAB).

## Options contracts

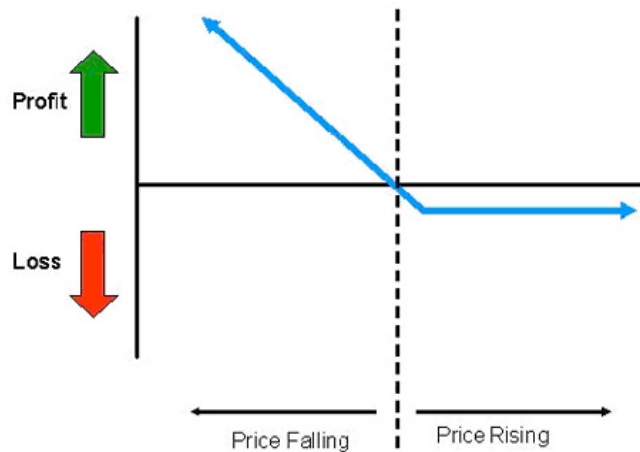
Options contracts give the holder of the contract the right but not the obligation to acquire a futures contract at a future point in time. Consequently they are like a form of price risk insurance. Producers can lock out downward price movements and take advantage of upward price movements. Alternatively, processors can lockout upward price movement but take advantage of downward price movements. There is an up-front premium that the buyer of the option is paying the right to have either a sold or a bought futures position at a certain price. The premium has to be paid regardless of whether the futures contract is engaged or not.

**Call options** allow the buyer the right to a bought futures contract. This minimizes downward price risk and enables upward price gains. This option would be used by producers, see Figure 10.5.

**Put options** allow the buyer the right to a sold futures position. This minimizes upward price risk and enables downward price gains. This option would be used by processors, see Figure 10.6.



**Figure 10.5 Profit/Loss Associated with a Call Option. Source: Platinum Agribusiness, (2006).**



**Figure 10.6 Profit/Loss Associated with a Put Option. Source: Platinum Agribusiness, (2006).**

Options are traded both on futures exchanges and in OTC environments. In general the longer the time to maturity and the more volatile the market the higher will be the cost of the premium, reflecting the higher risk to the seller of the option being hedged.

Options are variously used at all levels of supply chains. They are particularly useful in commodity markets where producers are not able to reliably sell forward due to production uncertainty. If wheat producers have a crop failure and have sold futures contracts they will not benefit from a higher crop value to offset the loss on the futures (since they have no crop). Options contracts in this situation would mean that they would not suffer the same extent of loss.

## 10.8 Strategies employed in the management of price risk

The types of strategies employed in the management of price risk are closely related to the type of activity being conducted and the attitude to price risk.

### Producers and end-users

Producers and end-users are exposed to a significant amount of price risk and typically adopt simple risk negation strategies when they wish to protect against adverse movements.

Producers, for example, are most likely to use a physical forward sale contract if they wish to protect against prices falling prior to the commodity being ready for delivery and sale. Likewise end-users are most likely to enter into forward physical purchase contracts. In both situations, the choice of product types is dictated by the need to be simple and to negate flat price risk, quality risk and time-spread risk. When these market participants take the decision to remove risk for all or part of their production or consumption in a certain year they generally wish to negate all aspects of price risk.

Such market participants are also likely to use the OTC futures and options in instances where they meet the needs of removing flat price risk, quality risk and time-spread risk, thus acting like a physical forward contract but with settlement by way of cash adjustment rather than the physical delivery of the commodity. A good example of this is found in the wool market where the CBA and NAB wool futures product can be tailored to meet the volume and maturity required while quality risk is reduced by having contracts for every micron category from 18 to 28. These products are used quite extensively by producers and to a lesser extent by end-users and will be examined more closely later.

### Traders and processors

Traders and processors choice of products depends on their attitude to risk. As mentioned earlier these can be grouped into two categories: those that wish to avoid risk and to generate returns on a fee-for-service basis and those that actively take on risk with a view to profiting from market movements.

Those that wish to avoid risk are inclined to manage price risk in a similar manner to the producers and end-users. They will typically use forward physical contracts and tailored OTC products and once positions have been established they will be held until expiry.

Those that accept market risk need to take an active role in managing it and will generally utilise all types of risk management products available (and hence will be the heaviest users of the futures markets). They will also create risk management products for other market participants in the way that Louis Dreyfus

(see <http://www.louisdreyfus.com/content.cfm?page=index.cfm&gbus=5>) does in a number of commodity markets. In so doing they will often have large amounts of quality risk and time-spread risk and varying amounts of flat price risk. In general, they will trade futures to ensure that flat price risk is kept within limits and have larger positions in the mismatch between qualities and maturities. This strategy is based on the theory that flat price moves are more volatile and unpredictable than quality or time-spread differentials.

Such traders are particularly conscious of their exposure to risk, especially those that do not have any processing or other similar fee-based function. The more advanced companies use statistical measures of volatility and correlations to calculate their theoretical risk exposure, a technique used widely in financial markets and known as calculation of Value-at-Risk (VaR).

## **Section 2: Price risk management in the wool industry**

### **Learning objectives**

On completion of this section you should have an understanding of:

- The nature and extent of price risk in the wool market
- The types of risk management products that exist
- How they can be grouped together based on particular features
- How they work
- The advantages and disadvantages of each
- How various market participants use risk management products.

### **Key terms and concepts**

Risk management, price risk, basis risk, futures contracts, options contracts, put options, call options, forward contracts, supply chain, over-the-counter (OTC), liquidity.

### **Introduction**

This section takes the concepts of price risk management and examines how these are applied in the wool industry. It starts by reviewing the nature of price risk in the wool industry followed by a description of the various risk management products that are available to participants in the supply chain. It then goes on to examine how these products are used by the various types of industry participants.

## **10.9 The nature of price risk in the wool market**

### **The extent of price risk**

The wool market has always been regarded as being quite volatile. Some of the highs and lows that are illustrated in Figure 10.7 have included:

- The highs of the 1950's driven by high levels of wool demand
- The lows of the 1970's leading to the implementation of the industry reserve price scheme
- The highs of the late 1980's as the high levels of demand stimulated by strong world economic conditions were coupled with support from the reserve price scheme
- The lows of the 1990's following the collapse in both world demand and the Reserve Price Scheme
- The recovery in 2002/2003 stimulated by the end of the wool stockpile combined with supply falling to 50 year lows.

In the existence of price volatility the wool market is no different to any other financial or commodity market. Nevertheless the extent of that volatility is higher than in some other markets due to the lag periods associated with supply and demand adjusting to meet each other. Changes in supply cannot happen quickly due to the time taken to produce sheep and to grow the fleece and the time required for wool to be converted from a fleece on the sheep's back to a finished garment.

Accordingly, wool market participants must be able to manage their businesses in an environment where the price can vary markedly from year to year. Long term historical volatility analysis indicates that the market price will change by more than 35-40% in an adverse direction over a twelve month period on about 5% of occasions. In a number of instances, 10% moves in a single day (both up and down) have been seen.



**Figure 10.7 Wool Prices 1900–2003. Source: Man Financial (unpub.).**

In addition to the changes in the general market price there is also a significant amount of volatility associated with the differentials between the various grades of wool. For example, the difference in price between 19 and 23 micron wool has ranged from 0 c/kg in 1993 to around 800 c/kg in 2001 and back to 0 in 2003.

## The impact of price risk

The impact of price changes on all participants in the wool supply chain is very significant.

For the specialist wool producer a 50% fall in wool prices can equate to a 50% fall in gross income. With costs largely fixed the impact on net profit in percentage terms is much higher. Accordingly, the producer must understand the risk associated with wool prices and be able to withstand poor years from time to time. Recent research has indicated that approximately 80% of business risk associated with wool growing can be attributed to price risk (Counsell & Vizard 1997).

The impact for processors and end-users of wool is also very significant. The ability to vary garment prices in response to changes in wool prices is limited, so if price rises after a quotation has been made to a customer then the processor may actually make a loss. For example, say early in the year 2000 a spinning and weaving company wanted to make a fabric from 19 micron wool. They did their sums to calculate the price at which they have to be able to buy wool tops in order to meet price points that would in turn ensure the ultimate garment would be competitively priced and attract consumer demand. This figure translated into a greasy wool price for 19 micron of 1000 c/kg. At the time when prices were hovering around this mark and traders' expectations were that they would not rise significantly it might have seemed reasonable to commit to a production program based on buying at 1000 c/kg. As can be seen from the charts prices subsequently rose dramatically. If the company had committed to the

production program they would be left filling orders based on buying the wool for 1000 c/kg compared to the actual prices they would have had to pay of up to 1500 c/kg - thus creating a significant loss that would be unlikely to be recovered.

Exporters, traders and early stage processors are faced with similar situations. Buying the wool and making a sale of that wool on the same day is rarely possible. The buying pattern of later stage processors is often to place orders for large amounts of wool at a single time. This means that the supplier must either take stock in order to have something to sell and risk the market falling or sell 'short' with a view to filling the order later and risk the market rising. Given that such participants may be only making gross margins of 25 to 50 c/kg the price movements of up to 100 c/kg in a couple of weeks obviously will have an enormous impact on profitability and the business has to be very carefully managed around this issue.

## **10.10 Price risk management products in the wool industry**

Just as in other commodity and financial markets there is a wide range of price risk management products available in the wool industry.

One of the commonly touted mistruths by some sectors within and outside the industry is that there are fewer risk management products available to wool growers and traders than there are to producers and traders of other commodities. Such a view probably relates to the lack of products in the period immediately following the demise of the Reserve Price Scheme since during its existence there had been no need for risk management products (the AWC effectively managed risk on behalf of the whole industry). This situation is certainly no longer the case and the range of products is just as extensive (albeit not as liquid) as that in cotton and grain markets.

Section 1 of this topic listed the following types of price risk management products as being common across many types of commodity and financial markets:

- Cash contracts
- Forward physical purchase and sale contracts
- Futures contracts
- Options contracts.

All such products are available in the wool industry and a summary of the various products within each group is shown in Figure 10.8.

## **10.11 Cash contracts**

Due to their simplicity and liquidity cash contracts are the main form of wool selling used by growers and are generally regarded in the industry to account for between 90 and 95% of first hand wool sales.

To facilitate these cash contracts the industry still uses an auction system extensively. Numerous alternatives do exist such as tender sales and electronic offer-board structures, however, they do not account for significant volume at this point in time. Cash sales to private buyers are estimated to account for around 10% of grower sales and these are done via private negotiation between the grower and the buyer.

Beyond the sale by growers most cash contracts are conducted by private negotiation between the parties (for example, between a private buyer and exporter).

## 10.12 Forward physical purchase and sale contracts

A number of different types of forward physical purchase and sale contracts exist within the industry ranging from those used in the supply of processors and end users to those used to provide producers with a risk management alternative to selling at auction.

### Summary of Risk Management Products in the Wool Industry

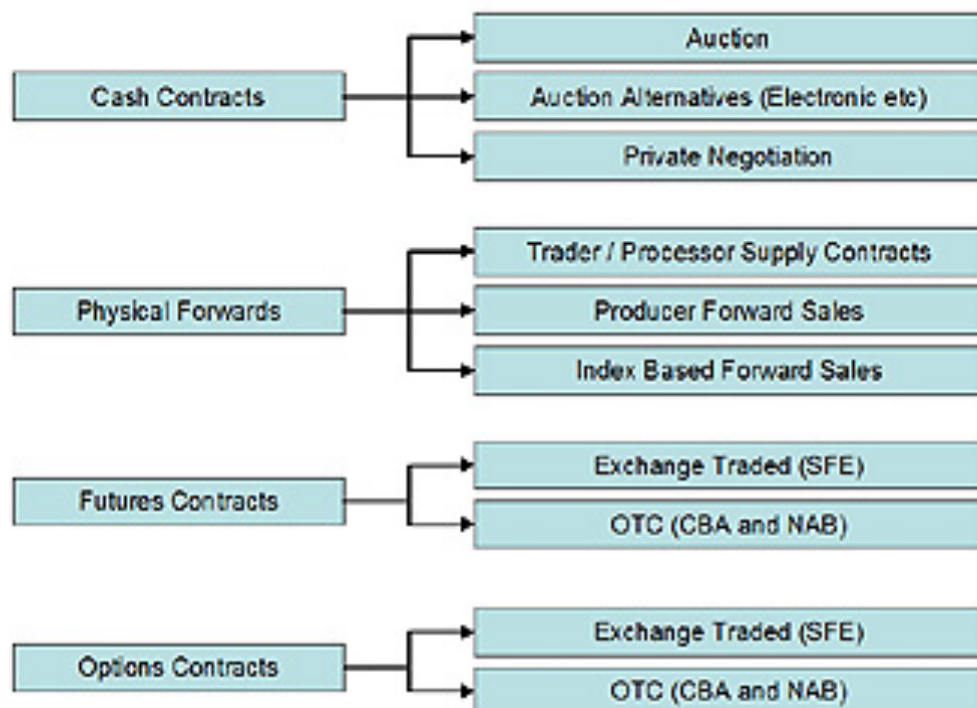


Figure 10.8 Summary of Risk Management Products in the Wool Industry.  
Source: Platinum Agribusiness, (2006).

### Forward supply of processors and end-users

Contracts to supply wool in either a greasy or semi-processed state to processors or end-users are generally negotiated prior to delivery. This is often necessary just to allow for the time taken to ship and deliver the wool, however such contracts are also used as a means to manage price risk.

Such contracts are characterised by the fact that the quality is specified and a lower quality will not be accepted. The price is fixed based on the quality specified and if a higher quality is delivered there will be no premium paid. If a lower quality is delivered the buyer will either reject the consignment and demand a replacement or a discount will be negotiated between the parties.

The parameters specified in such contracts include:

- For greasy wool contracts
  - Micron (average and maximum for any individual sub-lot)
  - Vegetable matter percentage (average and maximum for any individual sub-lot)
  - Length (average and minimum and maximum for individual sub-lot)
  - Strength (average and minimum for any individual sub-lot)
  - Yield (average)
  - Predicted fibre length and coefficient of variation of fibre length after processing.
- For wool tops contracts
  - Micron
  - Average fibre length after processing
  - Coefficient of variation of fibre length after processing
  - Percentage of short fibres
  - Dark and coloured fibre content

Both greasy wool and wool tops contracts will also include details regarding:

- Price
- Time for delivery
- Place for delivery
- Payment terms
- Dispute resolution procedures.

## Forward sales by producers

Forward sales contracts have traditionally been the domain of the private wool buyer and evolved as an extension of their on-farm buying activities. Rather than wait until shearing the buyer might price the clip while still on the sheep's back. Such contracts have taken on a new relevance since the demise of the reserve price scheme and are now offered by all the major buyers and brokers and may be for up to 2-3 years in advance of delivery.

Nevertheless, the style of contract has change little, being a price based on expected clip characteristics and accompanied by a schedule of price adjustments for variation from the specified quality as shown in Figure 10.9.

**Figure 10.9 Typical Layout of Forward Contract Specifications.**  
**Source: Platinum Agribusiness, (2006).**

### General Information

Grower trading name and address  
 Time and place for delivery  
 Wool preparation instructions  
 Details of deductions for freights, testing, etc

### Contract Details

Number of bales and weight 25 (4,000 kg)  
 Price 700c/kg greasy  
 Clip components (Fleece, Pieces, Bellies, etc) Fleece (85%) PCS (10%) BLS (5%)

Specifications Grid	Micron	Yield	Vegetable Matter	Strength	Length
Base Specifications	19.5	70%	1%	35n/kt	85mm
Variations +	10c/kg per 0.1	5 c/kg per 1%	10c/kg per 0.5%	None	- 15c/kg every 10mm over 90
Variations -	8 c/kg per 0.1	5 c/kg per 1%	None	20c/kg per 5 n/kt	- 15c/kg every 5mm under 75

The price adjustment schedule is a necessary component of the contract since the producer is not able to know exactly what the quality characteristics of the wool will be once shorn. Micron, for example can vary by up to 2 microns from year to year in some production areas, a difference that could equate to hundreds of cents per kilogram.

The process for negotiation of a forward contract will normally be conducted along the following lines:

1. Producer provides historical clips performance figures and requests a price, specifying the number of bales and time for delivery;
2. The buyer will prepare a quotation showing both price and premiums/discounts for quality differences;
3. The producer will have a certain time period for reply (normally within 12 or 24 hours);
4. If the producer accepts he signs the contract and faxes back to the buyer;
5. The buyer will specify wool preparation requirements for the clip;
6. After shearing the wool will be delivered to the buyer's warehouse where it will be sampled, tested and inspected;
7. The buyer will calculate the final price based on the test results;
8. The producer will be paid a net price after deduction of the wool R&D levy and any other deductions such as testing charges and freight that may have been specified in the contract; and
9. The buyer will on-sell the wool either to export, to another trader or back through the auction system.

## Index based forward sales by producers

In recent years a new style of forward contract has evolved to better meet the needs of producers and to be complimentary with the auction system. While it has been developed specifically to suit the wool industry it is essentially similar to some of the more advanced cotton and grain marketing products known variously as 'On-Call Contracts', 'Basis Contracts' and 'Hedged to Arrive Contracts'. For an example of the equivalent product in the cotton industry look under the On-Call Contract section at

<http://www.namocotton.com.au/growerinfo/growerinfomarketing.htm> and in the grain industry go to <http://www.graincorp.com.au>.

The first such product developed was the Wesfarmers Landmark Basis Contract [see [http://www.landmark.com.au/bm\\_wrm.asp](http://www.landmark.com.au/bm_wrm.asp)] and it has since been used as the model from which the others being offered in the industry have been derived. Similar products include the Elders Auction Forward Contract and the Platinum Agribusiness Wool Indicator Contract [See <http://www.platinumagribusiness.com.au>].

The Landmark Basis Contract was developed to make forward selling more readily accessible to growers and in a manner that still allowed participation in the auction system (growers generally like to sell at auction because of the competitive market place). This was able to be achieved by using reference to an index to break price up into two components: Base Price and Basis.

The Base Price is set according to the wool price indicators (Micron Price Guides) published by the Australian Wool Exchange (AWEX). This can be done up to 2-3 years in advance of shearing for any micron category from 18 to 28. The price secured will be a function of the current auction quote for that micron category plus or minus a premium or discount associated with market conditions and the time until delivery. For example, if the current AWEX quote for 19 micron is 1000c/kg and the sentiment in the market is that prices will fall then a grower may only be able to receive 970c/kg for delivery in six months time. This price of 970c/kg will become the Base Price for the Contract.

When the wool is delivered it will be sold at auction. The difference between the average sale price at auction and the relevant AWEX quotation (in this case for 19 micron as that is the grade on which the contract is based) is termed the Basis. For example, if the market price for 19 micron wool had fallen to 900c/kg and the average sale price for the wool was 890c/kg the Basis would be -10c/kg.

The final price for the wool is simply the sum of the Base Price and the Basis. In this example it would be 970 - 10 = 960 c/kg.

Such contracts would generally be hedged by the buyer through the use of futures contracts. If the buyer sold futures at 970 c/kg and when the market had fallen bought them back at 900 c/kg they would have a cash profit of 70c/kg. If this amount was added to the sale price of the wool of 890c/kg the combined amounts equate to the final price paid to the grower of 960c/kg. Examples of Basis Contract transactions are contained in Figures 10.10 to 10.13.

**Basis Contract Example 1**

- ✦ Market falls over contract life.
- ✦ Grower has wool that performs slightly better than the indicator.
- ✦ Grower delivers more wool than contracted.

	Grower Perspective	Buyer Perspective
<b>Original Basis Contract</b>	Has locked in the following: Base Contract: AWEX 23 Base Price (c/kg): 675 Kg: 4000	Takes a short (sold) position in OTC Futures equivalent to that which grower has locked in: 4000 kg of 23 Micron Futures @ 675 c/kg
<b>Delivery and Auction Sale</b>	Kg delivered by grower: 4150 Total auction proceeds: \$25,108 Average auction price c/kg: 605	Sold position in OTC market is bought back at 590 c/kg (the settlement price based on the AWEX 23 micron price guide at auction on the same day).  Difference between sale and purchase (settlement) price is 675 - 590 = 85 c/kg on 4000 kg. Therefore, OTC market pays the buyer \$3,400.
<b>Basis Adjustment</b>	Basis must be adjusted by difference between amounts contracted and delivered multiplied by change in market price over life of contract giving a value of:  (4150-4000)/4150 + 590 - 675 = -3.1	
<b>Final Price Determination</b>	Base: 675 + Basis: 15 + Basis Adjustment: -3.1 = Final Price: 686.9	The buyer adds the \$3,400 to the sale proceeds of \$25,108 to give total proceeds of \$28,508.  On 4150 kg this is an average price of 686.9 c/kg.

The basis adjustment is negative because the profit of \$3,400 is spread over the 4150 kg delivered rather than the 4000 kg which was contracted.

NB: All prices are in c/kg Clean.

Figure 10.10 Basis Contract Example 1. Source: Platinum Agribusiness, (2006).

**Basis Contract Example 2**

- ↺ Market rises over contract life.
- ↺ Grower has wool that performs slightly better than the indicator.
- ↺ Grower delivers more wool than contracted

	Grower Perspective	Buyer Perspective
<b>Original Basis Contract</b>	Has locked in the following: Base Contract: AWEX 23 Base Price (c/kg): 675 Kg: 4000	Takes a short (sold) position in OTC market equivalent to that which grower has locked in: 4000 kg of 23 Micron Futures @ 675 c/kg
<b>Delivery and Auction Sale</b>	Kg delivered by grower: 4150 Total auction proceeds: \$29,258 Average auction price c/kg: 705	Sold position in OTC market is bought back at 699 c/kg (the settlement price based on the AWEX 23 micron price guide at auction on the same day).
<b>Basis Adjustment</b>	Basis is determined as difference between auction price: 705 - and AWEX price guide: 699 giving: +6  Basis must be adjusted by difference between amounts contracted and delivered multiplied by change in market price over life of contract giving a value of: $(4150-4000)/4150 \times 699 - 675 = 0.9$	Difference between sale and purchase (settlement) price is 675 - 699 = -24 c/kg on 4000 kg. Therefore, the buyer pays OTC market \$960.
<b>Final Price Determination</b>	Base: 675 + Basis: 6 + Basis Adjustment: 0.9 = Final Price: 681.9	The buyer deducts the \$960 from the sale proceeds of \$29,258 to give total proceeds of \$28,298.  On 4150 kg this is an average price of 681.9 c/kg.

The basis adjustment is positive because the loss of \$960 is spread over the 4150 kg delivered rather than the 4000 kg which was contracted.

Note how the final price to the grower has only been altered by the change in Basis and Basis Adjustment

NB: All prices are in c/kg Clean.

Figure 10.11 Basis Contract Example 2. Source: Platinum Agribusiness, (2006).

**Basis Contract Example 3**

- ↺ Market falls over contract life.
- ↺ Grower has wool that performs slightly worse than the indicator.
- ↺ Grower delivers less wool than contracted

	Grower Perspective	Buyer Perspective
<b>Original Basis Contract</b>	Has locked in the following: Base Contract: AWEX 23 Base Price (c/kg): 675 Kg: 4000	Takes a short (sold) position in OTC market equivalent to that which grower has locked in: 4000 kg of 23 Micron Futures @ 675 c/kg
<b>Delivery and Auction Sale</b>	Kg delivered by grower: 3900 Total auction proceeds: \$25,701 Average auction price c/kg: 659	Sold position in OTC market is bought back at 610 c/kg (the settlement price based on the AWEX 20 micron price guide at auction on the same day).
<b>Basis Adjustment</b>	Basis is determined as difference between auction price: 659 - and AWEX price guide: 667 giving: -8  Basis must be adjusted by difference between amounts contracted and delivered multiplied by change in market price over life of contract giving a value of: $(3900-4000)/3900 \times 667 - 675 = +0.2$	Difference between sale and purchase (settlement) price is 675 - 667 = 8 c/kg on 4000 kg. Therefore, OTC market pays the buyer \$320.
<b>Final Price Determination</b>	Base: 675 + Basis: -8 + Basis Adjustment: +0.2 = Final Price: 667.2	The buyer adds the \$320 to the sale proceeds of \$25,701 to give total proceeds of \$26,021.  On 3900 kg this is an average price of 667.2 c/kg.

The basis adjustment is positive because the profit of \$320 is spread over the 3900 kg delivered rather than the 4000 kg which was contracted.

Note how the end price is lower because the basis is lower.

NB: All prices are in c/kg Clean.

Figure 10.12 Basis Contract Example 3. Source: Platinum Agribusiness, (2006).

**Basis Contract Example 4**

- ☛ Market rises over contract life.
- ☛ Grower has wool that performs slightly worse than the indicator.
- ☛ Grower delivers less wool than contracted.

	Grower Perspective	Buyer Perspective
<b>Original Basis Contract</b>	Has locked in the following: Base Contract: AWEX 23 Base Price (c/kg): 675 Kg: 4000	Takes a short (sold) position in OTC market equivalent to that which grower has locked in: 4000 kg of 23 Micron Futures @ 675 c/kg
<b>Delivery and Auction Sale</b>	Kg delivered by grower: 3900 Total auction proceeds: \$26,988 Average auction price c/kg: 692.0	Sold position in OTC market is bought back at 970 c/kg (the settlement price based on the AWEX 20 micron price guide at auction on the same day).
	Basis is determined as difference between auction price: 692 and AWEX price guide: 702 giving: -10	Difference between sale and purchase (settlement) price is 675 - 702 = -27 c/kg on 4000 kg. Therefore, the buyer pays OTC market \$1080.
<b>Basis Adjustment</b>	Basis must be adjusted by difference between amounts contracted and delivered multiplied by change in market price over life of contract giving a value of: $(3900-4000)/3900 \times 702 - 675 = -0.7$	
<b>Final Price Determination</b>	Base: 675 + Basis: -10 + Basis Adjustment: -0.7 = Final Price: 664.3	The buyer deducts the \$1080 from the sale proceeds of \$26988 to give total proceeds of \$25908. On 3900 kg this is an average price of 664.3 c/kg.

The basis adjustment is negative because the loss of \$1080 is spread over the 3900 kg delivered rather than the 4000 kg which was contracted.

Note how the final price to the grower has only been altered by the change in Basis and Basis Adjustment

NB: All prices are in c/kg Clean.

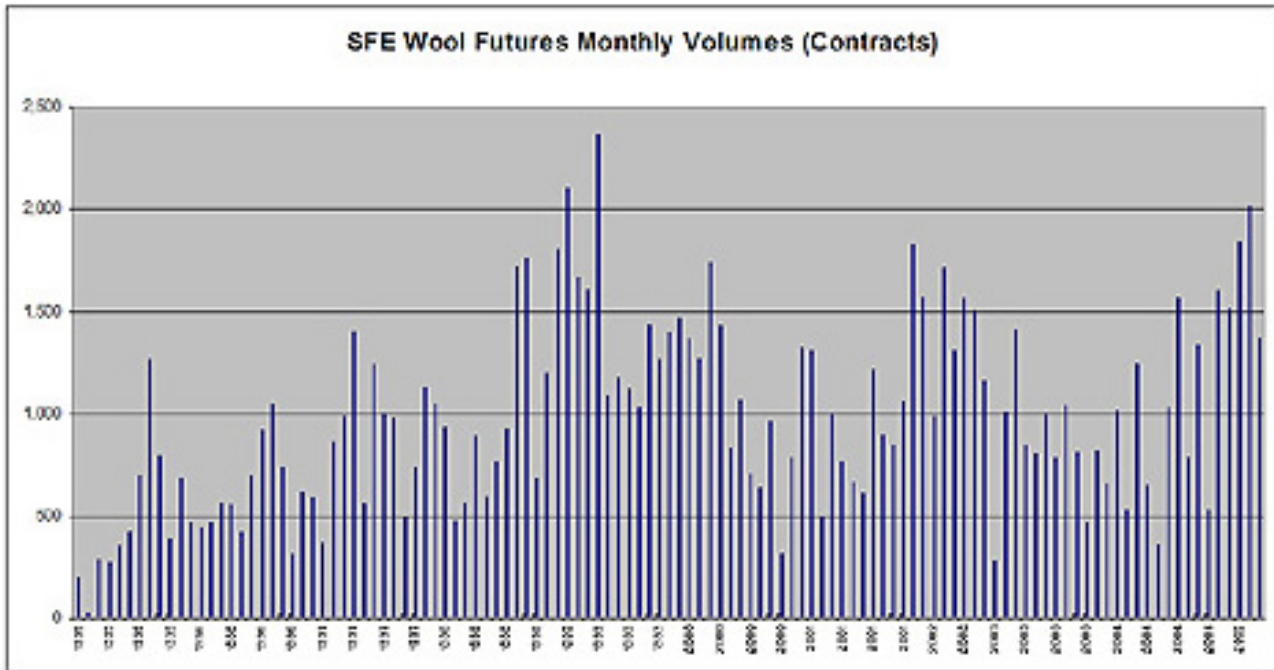
Figure 10.13 Basis Contract Example 4. Source: Platinum Agribusiness, (2006).

## 10.13 Futures contracts

### Exchange traded futures contracts

Wool futures contracts have been listed on the Sydney Futures Exchange since the early 1960's. In fact, the greasy wool contract was the first futures contract listed in Australia and used to trade in significant volumes. During the period of the Reserve Price Scheme trade basically stopped since there was no price risk and the contract was de-listed for a period. It was re-listed in the early 1990s with a 22 micron cash settled followed by conversion to a 21 micron deliverable contract in 1995 and the addition of 19 micron and 23 micron cash settled contracts in 1998.

Figure 10.14 shows the monthly volumes of trade in SFE wool futures. While these volumes are small compared to other futures contracts (that may trade many thousands of lots per day) the quantity of wool represented is not insignificant and the market plays a key role in industry price discovery. The average of around 50 lots per day represents 5,000 bales per week, roughly between 5 and 10% of the amount of wool sold at auction each week. Much of this volume is traded by the traders and exporters that are buying wool at auction and the movement in futures prices generally provides a good indicator of future changes in auction prices. If futures prices are trading at higher levels than physical prices then it generally follows that the latter will rise and vice-versa.



**Figure 10.14 SFE Wool Futures Monthly Volumes (Contracts).**  
**Source: Sydney Futures Exchange (1995-2005) (unpub.).**

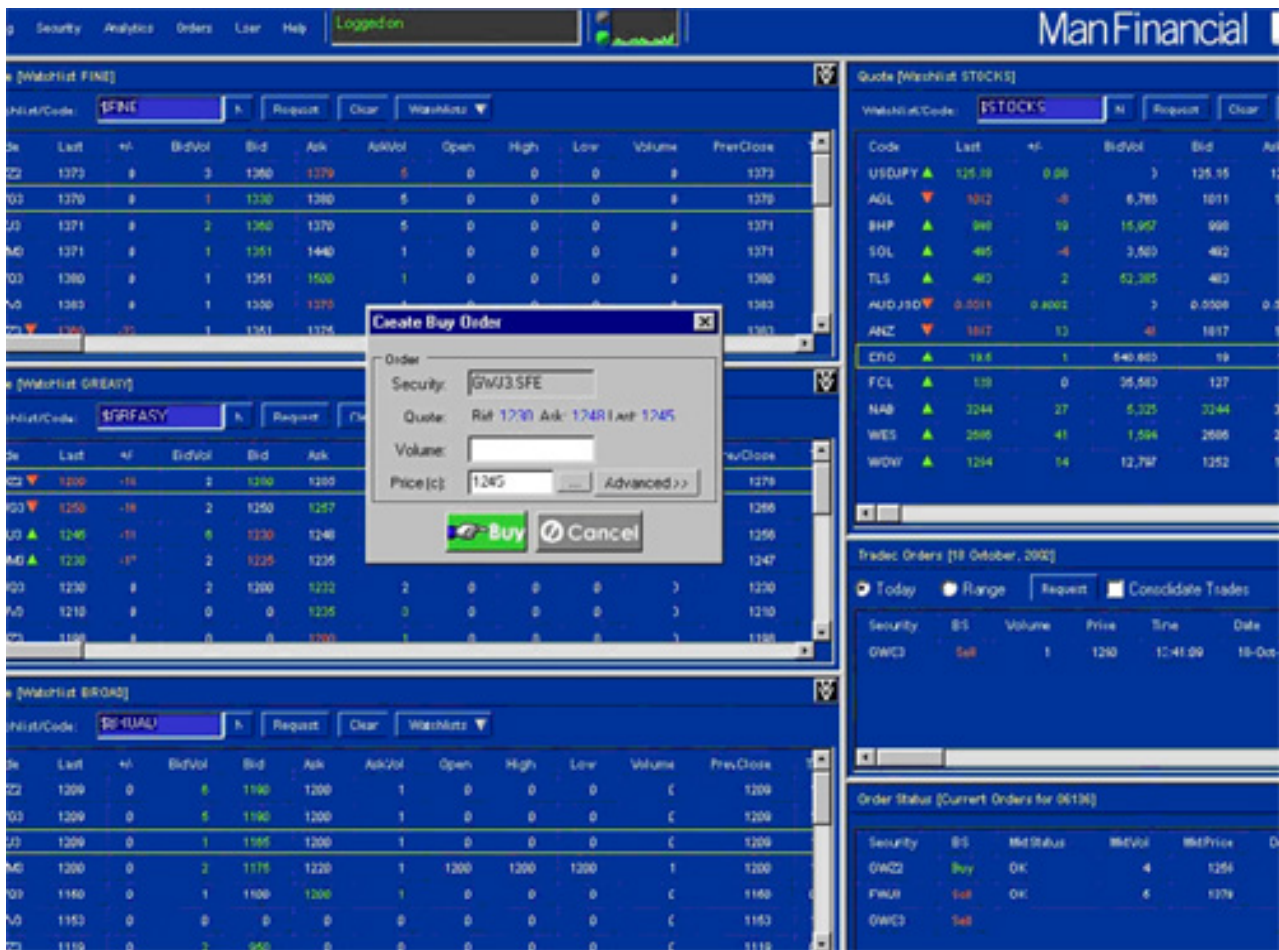
The 21 micron contract has the following features:

- Contract size is 2,500 clean kilograms (approximately 20 bales)
- It is a deliverable contract (based on 21 micron fleece wool)
- Contract months are February, April, June, August, October and December up to 18 months in advance
- Price quotations are in c/kg clean (a one cent move for a single contract equates to \$25).

The 19 and 23 micron contracts are similar except that they are cash settled contracts using indices produced by AWEX for 19 and 23 micron wool respectively.

More details on SFE wool futures are contained in two guides for wool growers from the Sydney Futures Exchange.

Trading in SFE wool futures is conducted through brokers. All trade is now conducted electronically and many brokers offer direct internet access to the SFE trading system as well as personal order placement (normally via telephone). Figure 10.15 shows an example of an internet trading system provided by the broker Man Financial. The three panels on the left show prices for the three wool contracts and a 'Buy' order is in the process of being placed.



Figures 10.15 Internet Futures Trading Systems. Source: Man Financial (unpub.).

## OTC futures contracts

Between 1995 and 2004 the main OTC Futures Market in the wool industry was operated by Macquarie Bank under the name Macquarie Wool Futures. In late 2004 Macquarie Bank sold this business to Commonwealth Bank of Australia (CBA). Around the same time one of the ex-Macquarie staff was recruited to National Australia Bank (NAB) to increase their presence in this market.

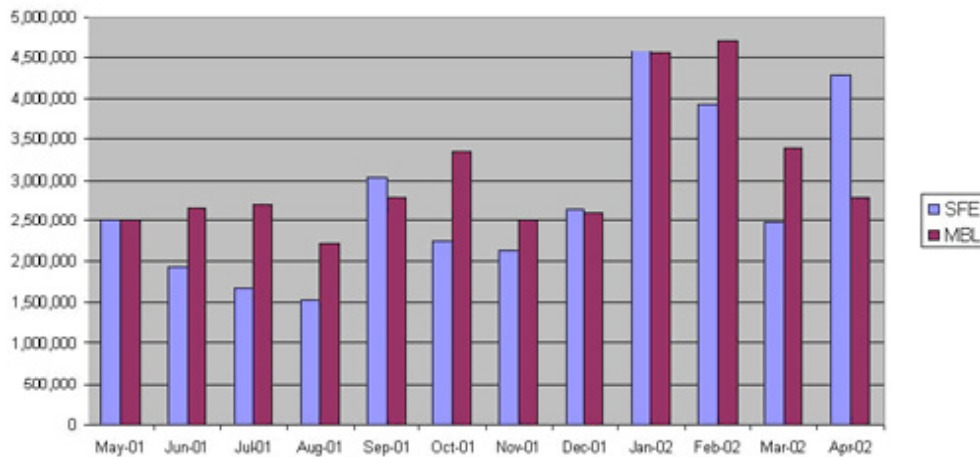
Both CBA and NAB futures contracts (which are also referred to as “Swaps”) have the following features:

- There are nine contracts based on each AWEX micron price guide from 18 to 25 and 28;
- Contracts are cash settled;
- Any quantity can be traded (under 2,000kg incurs an administration charge);
- Any maturity date can be specified (even up to four/five years ahead); and
- The banks will generally quote a price to a buyer or seller, even if they do not already have a party to take the other side of the transaction.

To view a daily quote sheet see [MWFdaily\\_20030718\\_1632.pdf](#). Alternatively, prices for the CBA market can be found at <http://commodities.combank.com.au> and quotes for the NAB market can be found at <http://www.nabmarkets.com> (both sites require registration as a user).

Apart from CBA quotes on their web-site, the prices quoted are indicative ‘mid-points’. The bank will generally buy at prices around 10-15c/kg lower than the mid-point and sell at prices around 10-15c/kg higher than the mid-point. This ‘bid/offer spread’ of 30-40c/kg essentially represents the bank’s margin and goes towards both profit and managing the risk that they cannot always (or in fact rarely) find both a buyer and a seller at the same time. In managing their risk the bank will be exposed to all of Flat Price Risk, Quality Risk and Time-Spread Risk.

Volumes traded in the Macquarie Wool Futures (MBL) market were reasonably similar to those of the SFE up until 2002 as shown in Figure 10.16. Later data is not available but the relativities are not thought to have changed significantly.



**Figure 10.16 Wool Futures Volumes (kg) May 01 to Apr 02.**  
**Source: Sydney Futures Exchange (2001-2002).**

From a regulatory perspective CBA and NAB wool contracts are classified as an Exempt Futures Market. While they do not have to have the same protocols in place as regular futures exchange in terms of things such as Novation, Margins and the use of Brokers they do have to adhere to certain constraints. Such constraints have included the involvement of a licensed futures adviser when dealing with counterparties that have less than \$10 million in business assets. Rather than the use of margins to guarantee contract performance both banks use other forms of security such as would be required when borrowing from them.

A similar product to Macquarie Wool Futures is offered by the National Australia Bank (NAB). The mechanics of the product are very similar, however volumes are much lower and NAB primarily deal with their lending customers.


## Options contracts

Both the SFE (exchange traded) and CBA/NAB (OTC) markets also have options contracts available. While their uptake is quite limited it has increased substantially over the past two years. Part of the problem with options contracts in wool is that the seller of options contracts needs a liquid (high number of transactions) market in which to manage their risk. With the wool futures contracts being relatively illiquid the premiums charged for options are quite high, thus deterring potential buyers.

Figure 10.17 shows an example of a daily options quote list from Macquarie Bank for Put Options (right to a Sold futures position, thus generating a profit if the market falls).

From this figure the cost of options can be seen. For example, in 19 micron the current market price is 996c/kg. The three left-most columns in the 19 micron section show that a put option at 996c/kg for maturity in 12 months time (June 04) will cost around 123c/kg. This means that the market must fall below 873 c/kg (996-123) before a profit will be generated.

Figures 10.17 Example of daily options quote list. Source: Macquarie Bank Ltd. (unpub.).

<h1>Macquarie WOOL FUTURES</h1> <h2>Put Option Offers</h2>			

19 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 996										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		50 cents	100 cents	150 cents	90 cents	90 cents	
996	40	31-Aug-03	1040	63	990	38	940	20	890	9
996	67	31-Oct-03	1040	91	990	64	940	43	890	27
996	87	31-Dec-03	1040	110	990	84	940	61	890	43
996	98	29-Feb-04	1050	127	1000	100	950	77	900	57
996	112	30-Apr-04	1050	141	1000	114	950	90	900	69
996	123	30-Jun-04	1050	153	1000	125	950	101	900	79

20 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 999										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		30 cents	60 cents	90 cents	90 cents	90 cents	
999	47	31-Aug-03	1015	56	985	40	955	27	925	17
999	74	31-Oct-03	1010	80	980	64	950	50	920	38
999	91	31-Dec-03	1010	97	980	81	950	66	920	53
999	104	29-Feb-04	1010	110	980	94	950	79	920	66
999	116	30-Apr-04	1010	122	980	106	950	91	920	77
999	131	30-Jun-04	1000	131	970	115	940	100	910	85

21 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 1005										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		25 cents	50 cents	75 cents	60 cents	60 cents	
1005	46	31-Aug-03	1010	49	985	36	960	25	935	17
1005	73	31-Oct-03	1000	70	975	57	950	45	925	35
1005	94	31-Dec-03	990	85	965	72	940	60	915	49
1005	106	29-Feb-04	990	97	965	84	940	71	915	60
1005	116	30-Apr-04	990	108	965	94	940	82	915	70
1005	130	30-Jun-04	980	116	955	102	930	90	905	78

22 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 1013										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		20 cents	40 cents	60 cents	60 cents	60 cents	
1013	51	31-Aug-03	1010	49	990	39	970	29	950	22
1013	81	31-Oct-03	995	70	975	59	955	50	935	41
1013	101	31-Dec-03	985	85	965	74	945	64	925	55
1013	113	29-Feb-04	985	97	965	86	945	76	925	66
1013	123	30-Apr-04	985	107	965	96	945	86	925	77
1013	142	30-Jun-04	965	114	945	103	925	93	905	83

23 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 1010										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		20 cents	40 cents	60 cents	60 cents	60 cents	
1010	49	31-Aug-03	1010	49	990	39	970	29	950	22
1010	82	31-Oct-03	990	70	970	59	950	49	930	41
1010	102	31-Dec-03	980	84	960	74	940	64	920	54
1010	114	29-Feb-04	980	96	960	85	940	75	920	66
1010	127	30-Apr-04	975	106	955	95	935	85	915	76
1010	146	30-Jun-04	955	113	935	102	915	92	895	82

24 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 990										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		20 cents	40 cents	60 cents	60 cents	60 cents	
990	43	31-Aug-03	1000	49	980	38	960	29	940	21
990	75	31-Oct-03	980	69	960	58	940	49	920	40
990	95	31-Dec-03	970	84	950	73	930	63	910	54
990	107	29-Feb-04	970	95	950	85	930	74	910	65
990	120	30-Apr-04	965	105	945	94	925	84	905	75
990	141	30-Jun-04	940	111	920	101	900	90	880	81

25 MICRON										
AVERAGE NORTH AND SOUTH AWEX MFG'S 939										
Strike	Premium	Maturity	Strike	Premium	fw d price less	fw d price less	fw d price less	fw d price less	fw d price less	
Spot			Fwd Price		20 cents	40 cents	60 cents	60 cents	60 cents	
939	41	31-Aug-03	945	44	925	33	905	24	885	17
939	70	31-Oct-03	925	62	905	51	885	42	865	33
939	89	31-Dec-03	915	74	895	64	875	54	855	45
939	99	29-Feb-04	915	85	895	74	875	64	855	55
939	110	30-Apr-04	910	93	890	83	870	73	850	63
939	131	30-Jun-04	885	99	865	88	845	78	825	68

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## 10.14 Use of wool risk management products

### Wool producers (growers)

As discussed in Section 1 of this topic, wool producers are most likely to use simple products that are oriented towards delivery of the physical wool. Estimates of the amount of wool sold at auction by producers with no form of risk management are in the order of 80 to 90%.

Many participants in the industry have been frustrated at the lack of uptake of risk management products by growers. Many educational programs have been developed to address the lack of understanding; however, there are some other reasons such as:

1. The fact that production costs are quite low (compared to those associated with commodities such as cotton where production costs are very high requiring large amounts of seasonal finance and thus creating risk that must be managed)
2. Some wool producers have become adept at managing price risk by varying expenditure to match income (deferring some costs such as those associated with property maintenance and pasture improvement from years of poor prices to years of good prices).

Of the wool that is forward sold it is estimated that index based forward sales account for the largest share followed by physical forward contracts and then direct futures trading (there is not sufficient data available to quantify the extent of use of each by producers). The index based forward contracts are the most popular because of their simplicity combined with their ability to have quality adjustments determined by sale at auction. Direct futures trading is the least popular because of the requirement to fund margins along with the extra level of skill needed to participate and requirement to monitor the market regularly. Notwithstanding, producer use of the OTCs products has been quite high compared to the SFE, largely because it can be tailored to an individual micron and for a specific quantity and maturity.

Producer use of options (or the minimum price physical contracts that can be constructed using options) is quite low. This can largely be attributed to the high cost of the options.

## **Wool traders and exporters**

Wool traders and exporters conduct most of their business by buying wool in the spot cash market and selling via physical forward supply contract. In addition, they are also the heaviest users of the futures markets (both exchange traded and OTC) as they seek to manage the risk associated with timing differences between purchase and sale. They do not have the same ability as the producer to manage risk internally so must seek all avenues to ensure that their exposure to price fluctuations is kept within acceptable limits.

The advantages of futures contracts for these types of market participants is the ability to change their risk profile quite quickly. Even though liquidity of the contracts is low it is possible to effectively manage price risk, particularly if a strategy of using both SFE and OTC contracts is adopted.

It is also these participants who trade in the futures and options contracts in order to construct and manage the risk associated with the index based forward contracts offered to producers. For example, a wool trader may offer a producer a forward index contract that has a minimum price and potential for upside if the market rises. To manage the risk associated with providing such a product that trader will most likely take a futures and/or options position.

## **Processors and end-users**

Processors and (in particular) end users are not big users of risk management products in the wool industry other than physical forward supply contracts. Even though they are subject to a large degree of price risk they have largely not yet adapted to regular participation in futures markets. This may partly be due to the fact that they feel there is insufficient liquidity to cover the extent of exposures to which they are subject (which can be significant).

While their use of futures is expected to increase as they become more familiar with the products and liquidity improves they are not expected to replace the role of the physical forward. The latter type of transaction has distinct advantages for processors and end-users in purchasing since they are able to exactly specify their requirements and legally commit their supplier to delivering these.

## Summary

All businesses are exposed to a wide range of risks that must be understood and managed. For participants in financial markets and commodity markets (such as the wool market) price risk is a very significant component of overall risk.

Price risk arises because market prices change over time in response to the change in the balance between supply and demand. Since supply and demand can never automatically adjust to meet each other prices are always changing and such changes impact all businesses in the supply chain. Some participants in the supply chain (such as producers and end-users) accept price risk as part of being in business. Other participants seek to avoid price risk (some processors) while a third category (traders) actively seek to profit by taking and managing price risk. These traders perform a valuable role in helping to even out imbalances between supply and demand.

There are three types of price risk, being flat price risk (risk associated with prices going up or down), quality risk (risk associated with mismatches between the type of the commodity bought and the type sold) and time-spread risk (risk associated with having bought and sold positions for differing maturities). Participants in commodity and financial markets have four basic types of products available to manage price risk:

1. Cash contracts - which negate all risk
2. Forward physical purchase and sale contracts, which will generally negate flat price, quality and time-spread risk
3. Futures contracts, which will generally only negate flat price risk (except for OTC futures that can be tailored for specific qualities and maturities)
4. Options contracts, which provide an insurance style protection for flat price risk.

Producers, end-users and processors who do not wish to take price risk will generally use cash and forward physical contracts. Traders will use all products (particularly futures and options) to both manage their own risk and to create tailored risk management products for other parties.

The wool market has always been regarded as being reasonably volatile, evidenced by some of the significant price changes that have been seen over the past 20 years.

Such changes in price have a significant impact on the various types of participants in the market. For producers a 50% change in gross proceeds is not uncommon and this can have an even greater relative impact on net returns. For processors and end-users the management of price risk is important to ensure that they do not end up producing goods at a loss. And for traders in wool the week to week price changes can be more than their budgeted profit margin, thus being the most significant risk of all for such participants.

There are four main types of wool risk management products.

1. Cash contracts include auctions sales (and the various alternatives including electronic systems and tenders) and private negotiation. They are simple and account for most grower sales but do not allow price risk to be managed other than by the purchase and sale of physical stock.
2. Forward physical contracts include forward supply contracts to processors and end-users and two variants of grower contracts being a standard forward sale and index-based forward sale. The difference between all three largely relates to the issue of quality variation (in the first it is fixed at the specified quality, in the second a grid of adjustments is used and in the third the performance to an index or other benchmark is used).
3. Futures contracts, both exchange traded (SFE) and OTC (CBA and NAB).
4. Options contracts, exchange traded (SFE) and OTC (CBA/NAB). In terms of managing the risk associated with upcoming production producers are most likely to use index-based forward sales followed by standard forward sales. Processors and end-users use forward supply contracts extensively while the futures contracts are largely the domain of the traders.

## References

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## Glossary of terms

Call option	the right to enter into a bought futures contract
Cash settlement	the process of settling futures contracts by closing all positions at expiry against an indicator or benchmark
Deliverable	a futures contract that has a settlement process involving delivery of the physical commodity
Derivatives	Future, options and the like
Exchange traded	derivatives that are traded on a recognised futures or financial markets exchange
Flat price risk	the risk associate with market price rising or falling
Futures contract	a legally binding agreement to buy or sell a specified amount of a commodity or financial instrument at a fixed price some time in the future
Liquidity	the amount of trading activity in a market
Options contract	the right but not the obligation to enter into a futures contract at a specified price and time in the future
Over-the-Counter (OTC)	derivatives products that are not traded on a recognised exchange
Price risk	the risk associated with changes in the price of a commodity or financial instrument.
Put option	the right to enter into a sold futures contact.
Quality risk	the risk associated with mismatches in grade.
Time-Spread risk	the risk associated with mismatches in maturities.