A PRACTICAL GUIDE TO MANAGING FINANCIAL MARKET RISK ACROSS THE RED MEAT SUPPLY CHAIN

PROJECT CODE:	**2018-1142**
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DATE SUBMITTED:	**June 30, 2019**
DATE PUBLISHED:	**TBA**
PUBLISHED BY:	**Jacaranda Capital Partners Pty Ltd**

The Australian Meat Processor Corporation acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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1.0 EXECUTIVE SUMMARY

The red meat sector is exposed to significant financial market risks across the supply chain:

- **Foreign exchange** related to direct and indirect exports;
- **Interest rate risk** from current and future funding requirements;
- **Commodity price** risk related to live cattle, processed meat and costs of production such as transportation, electricity, and packing.

This report identifies and analyses the major financial market risks and trends within the Australian red meat supply chain.

It outlines the importance of risk management on key stakeholders, structural considerations in measuring and quantifying risk, as well as describing common risk management instruments and techniques.

Sections 3 and 4 outline the main sources of financial market risk and provide examples of typical risk management strategies.

While there are active and efficient markets to manage foreign exchange, interest rate, and some commodity market risks, there are no liquid, efficient market to mitigate Australian live cattle, sheep or processed meat products. This opaqueness exposes the sector to significant risk, impacting decision-making, the ability to expand and build market share in key growth markets, and attract domestic and international investment capital.

The report also outlines modern developments in the financial markets for digital assets, venture capital and insurance innovations.

Section 5 introduces the concept of a "synthetic processor" where historical price volatility of various cattle type inputs, product outputs and costs of production for a typical processor are reviewed to illustrate interrelationships between price and supply, economics of processing and sensitivities.

Section 6 provides insights into best practices in risk management from various international industries and peer groups, such as the New Zealand Dairy sector and other Australian agricultural sectors.

Finally, the report will provide recommendations as to how the industry can work together with key stakeholders to improve price transparency allowing participants to better measure and mitigate risks at the key latter stages of the cattle supply chain.

The report is designed to be a general reference for the industry, further and more specific analysis and recommendations will be available through the AMPC.

2.0 INDUSTRY OVERVIEW - RISK PROFILE

- **Risk Profile**
  - Long life (depreciating) fixed assets
  - High barriers to entry – large capital, regulatory
  - Margin risk – e.g. live animal vs processed products
  - Geography- product arbitrage
- **Challenges**
  - Procuring consistent quality feedstock
  - Margin management
  - Seasonal impact
  - Transparency of prices
  - Lack of liquid markets to mitigate any meat price risk
- **FX & Counterparty Risk**
  - Export sales – currency mix
  - Supply contracts and terms
  - Capex
- **Commodity Price Risk**
  - Live cattle
  - Processed products – prime, trimmings, bi products
  - Cost of production – energy (electricity, transport)
  - Other – carbon, rainfall
- **Interest Rate Risk**
  - Fix/floating mix
  - Vulnerability to rising interest rates

Figure 1: Industry Risk Profile

While the risk profile of individual participants varies across the supply chain (Figure 1) they are exposed, directly or indirectly, to multiple financial market risks such as foreign exchange, interest rate and commodity price risk.

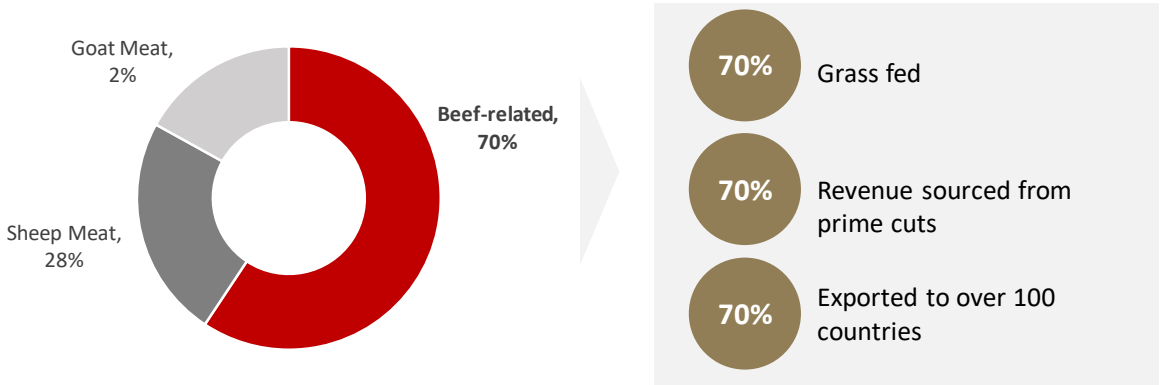


Figure 2: Industry Structure

Australia's meat and livestock industry turns over $65 billion per annum with the red meat processing sector contributing $20 billion, making it one of the largest trade-oriented manufacturing activities in Australia.[1]

[1] Red Meat Advisory Council. (2019, February). Towards a Better Red Meat Future.

The notional value of the red meat industry in Australia is significant, with national cattle notional value approximately double the combined notional value of Australia's wheat, cotton and sugar crop.

Figure 2 highlights the key elements of the structure of the industry:

- 70% of the value of the red meat industry is beef related, 28% sheep meat and 2% goat meat;
- 70% of the Australian beef industry is grass fed, exposing the industry to significant weather-related risk. This is in contrast to the US market which is predominately grain fed and benefits from transparent benchmarks and risk transfer mechanisms;
- 70% of beef carcass revenue is derived from prime cuts, but there are no industry accepted benchmarks for prime cuts that are used in physical contracts;
- 70% of red meat is exported to over 100 countries with the top 4 countries accounting for 70% of total exports. This exposes the sector to significant foreign exchange and counterparty credit risk;
- 70% of domestic market is captured by two major retailers;

Multi-generational relationships between processors, producers, lot feeders and key export markets, however, the existence of long-term purchase and supply contracts is rare, due to:

- Lack of physical benchmarks to separate pricing and supply;
- Lack of price transparency;
- Fear of missing out on the upside should market conditions change;
- Industry reluctance to change historical ways of negotiating contracts.

The lack of price transparency and industry accepted benchmarks will cause significant risk management challenges and unnecessary market inefficiencies. This was highlighted by a recent ACCC report [2]into the sector stating that "transparency of price and other key market information is a prerequisite for functional markets and effective competition, which results in greater industry efficiency."

The growing trend of "paddock to plate" with more producers tolling livestock through processors and going direct to the export market makes it critical for participants to fully understand their risk profile and how to manage risk effectively.

Industry Accepted Benchmarks

- There are several international benchmarks and broker markets used by the international meat trade for live cattle and processed meat:
  - US futures – CME live cattle, CME feeder cattle;
  - Industry Publications- e.g. Urner Barry "Yellow sheet" data for trimmings e.g. 90CL;
  - Broker Markets- e.g. South American physical broker market for grass fed prime cuts.
- In Australia, the lack of industry accepted benchmarks for live cattle and produced meat is a significant challenge for the sector, coupled with the high comparative costs to operate processing plants;
- The Eastern Young Cattle Indicator (EYCI) has historically been the industry benchmark for live cattle, however, the EYCI is focused on earlier stage cattle types where there is still reasonable sale yard activity. The EYCI has been losing relevance in recent years as the volume of latter

[2] The Australian Competition and Consumer Commission. (2018, May). ACCC Cattle and Beef Market Study.

stage cattle sold via the sale yards has been steadily decreasing; reportedly, 90% of cattle sold 10 years ago versus 30% (and declining) today.[3]

- There are no industry accepted benchmark for latter stage cattle which are increasingly being sold on a bilateral basis or are part of a vertically integrated production system.
- Sheep sale yard numbers are significantly higher than cattle, so there is less of a need for new benchmarks in the lamb and sheep industry;
- The Sydney Futures Exchange (now ASX) once offered a cash settled futures contract based on the EYCI; however, the contract was delisted in 2009 due to lack of activity.
- Recent attempts to establish new benchmarks for the sector have not been successful due to lack of industry coordination, incomplete data and a lack of mandatory transaction reporting.

The establishment of industry accepted benchmarks is critical for the sector to be more effective in measuring and managing risk, maintaining sector wide international competitiveness.

[3] Industry sources

3.0 IMPORTANCE OF RISK MANAGEMENT

3.1 Volatility of Prices and Impact on Stakeholders

Financial markets are extremely volatile.

Figure 3 below illustrates the volatility of the major financial asset classes (equities, interest rate, currencies) against the EYCI. Commodities are generally more volatile than foreign exchange, interest rate, and equity markets mainly due to the impact of event risk such as weather, industrial activity, and geopolitical events that have an immediate impact on demand & supply.

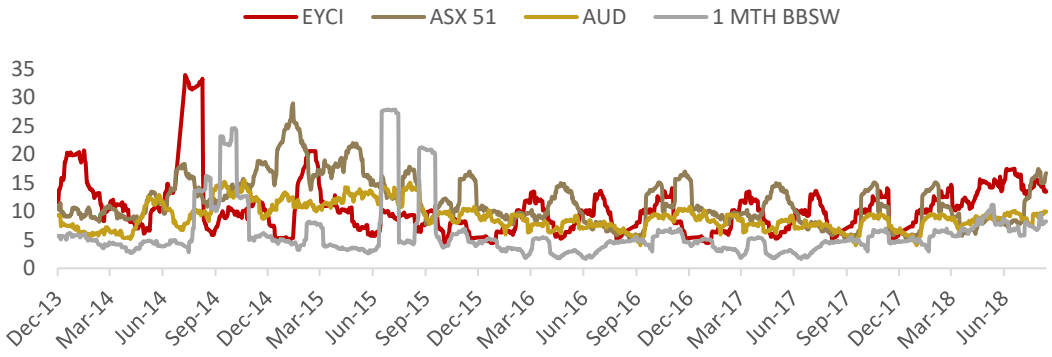


Figure 3: Historical Volatility of Financial Assets

The impact of volatile prices and the cyclical nature of commodity markets have wide-ranging consequences:

- Gain/loss of business & market share;
- Business rationalization (divestures/impairments, capex);
- Lower profits - reduced revenue/increased costs;
- Depressed stock prices and erosion of financial ratios leading to liquidation or takeover;
- Limits access to capital on optimal terms;
- Difficulties in attracting and retaining staff.

Academic studies[4] on the benefits of risk management concluded:

- It lowers the likelihood that a firm will face financial distress;
- Cash flow volatility is negatively valued by investors;
- It allows top management to focus on the operations of their business.

An example where the presence of hedging benefited a corporate acquisition was when Long Term Asset Partners (LTAP), a US-based PE form bid for Graincorp in late 2018. The purchase price included

[4] Academic Studies:

- Carter, David A. and Rogers, Daniel A. and Simkins, Betty J. (2006, Fall). Journal of Applied Corporate Finance.
- Alex Wolf, Richard Cobbs. (2004, Spring). Hedging Strategies.

financial instruments to stabilize throughput linked cashflows, resulting in Graincorp's share price appreciating 30%, or ~AUD500 million in market capitalization.

Prudent risk management is key to insulating businesses from adverse price movements and protecting the enterprise value of a firm.

3.2 Basic Principles of Risk Management

Best practices in risk management involve constant and routine review of the risks associated with the changing external market forces on a business. Figure 4 below highlights the basic principles of risk management:

1. Identify the Risk;
2. Quantify the Risk;
3. Evaluate the Risk;
4. Manage the Risk.

Figure 4: Cycle of Risk Management

Despite having similar risk profiles corporations in the same industry manage their risks in different ways. This can be attributed to multiple factors:

- ✓ Risk tolerance (Figure 5 below);
- ✓ Management policy;
- ✓ Levels of staff experience and sophistication;
- ✓ Geographic location;
- ✓ Access to credit facilities on optimal terms (e.g. margining);
- ✓ Availability (or lack) of benchmarks and markets to mitigate risk e.g. Australian latter stage cattle and processed meats;
- ✓ Competitive pressures;
- ✓ Ratings agencies and shareholders expectations;
- ✓ Historical activities.

Figure 5: Risk Tolerance Spectrum

3.3 Common Techniques to Manage Risk

There are 3 commonly used techniques to manage market risk (Figure 6):

1. Physical - bilateral agreements embedded in commercial contracts;
2. Regulate futures exchanges;
3. Over-the-counter derivatives (OTC).

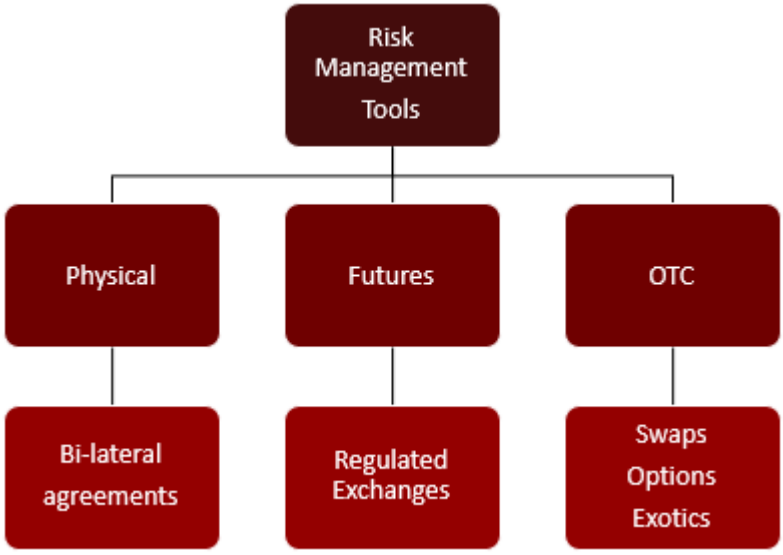


Figure 6: Common Risk Techniques

1. PHYSICAL

Companies often manage price risk via existing commercial (physical) contracts, where parties agree price, quality, volume and terms for the commercial purchase or sale of a specific good or service.

Industry accepted, transparent and reliable indices are often used as a price reference, which provides for the separation of physical price risk from financial price risk where the actual physical price is negotiated as a premium or discount (known as basis) to the defined benchmark while price risk is managed via futures (where relevant) and/or OTC markets.

Examples include:

- Fixed rate loan agreements;
- Fixed price cattle purchases;
- Fixed price export sales of boxed beef in AUD or foreign currency.

The main benefit of physical agreements is that they are simple and easy to execute.

The disadvantages of physical agreements:

- Counterparty credit risk – the risk of one party failing to honour their commercial commitments. This is a key risk when the market prices change significantly from the originally agreed price;
- Lack of flexibility with regards to timing of price fixing, volume, tenor, and pricing/hedge alternatives (e.g. swaps, options, etc);
- Transparency of pricing with no readily available data for other market participants;
- Competitive pricing is limited and restricted to physical counterpart, whose price may differ significantly from fair value market rates.

Since the Global Financial Crisis (GFC) there have been widespread losses incurred across multiple industries (e.g. energy, metals & mining, agriculture) due to counterparties defaulting on, or renegotiating, commercial terms on existing contracts due to changes in market prices or other external factors.

Losses were exasperated in markets where there were little or no futures or OTC markets and/or lacked a transparent, industry accepted index used to establish a fair market price.

Iron ore is an example of a market where, historically, term physical contracts were often negotiated on a fixed price, fixed volume basis. The sharp drop in prices during the GFC caused significant counterparty defaults. Rather than continuing with this practice the industry responded by establishing a round table forum to discuss creating a new benchmark that would be used to define future physical contracts, thereby converting fixed term and counterparty risk to short term index-based risk.

This index formed the basis of new physical contracts and led to the establishment of an iron ore futures contract listed by the Singapore Exchange (SGX), allowing participants to manage their financial risk separately from their physical contracts.

SGX Iron Ore- Creation of New Industry Benchmark
Launched by the Singapore Exchange (SGX) in 2007, the Iron Ore futures contract is an excellent example of newly created regional benchmark created in response to counterparty credit risk and price discovery issues: ✓ Created a transparent index for physical purchases and sales; ✓ Created a pool of liquidity for participants to trade or manage price risk associated with commercial contracts; ✓ Separated price risk from counterparty credit risk ***The SGX iron ore futures contract has been one of the most successful contracts launched in Asia, turning over three times the seaborn trade, giving industry participants the ability to manage or trade iron ore prices.***

There is limited use of industry benchmarks in physical contracts in the red meat sector, rather each contract tends to be negotiated separately on a short term basis. This exposes the sector to significant market and counterparty risk.

2. FUTURES EXCHANGES

A futures exchange is an organised central marketplace to facilitate the trading of a variety of instruments such as fixed income, equities and commodity products.

Relevant futures exchanges for the red meat sector include:

- Chicago Mercantile Exchange (CME) - grain and cattle futures;
- Australian Stock Exchange (ASX) Commodity (grain & electricity) and interest rates (bank bill and government bonds)

Futures contracts are an agreement to buy or sell an specific commodity or instrument at a specified future date and price.

Futures contracts are standardized, with all trading activity governed by the rules of the issuing exchange. Characteristics of typical futures contracts include:

- Specific commodity e.g. US Live Cattle;
- Standardized contract size – 1 lot = 40,000 lb;
- Standardized instruments – forwards, options (puts and calls);
- Specific expiration schedule – e.g. 3rd Wednesday;
- Physical delivery and quality specifications;
- Margin requirement – initial and variation;
- Trades executed via futures broker

Futures markets create transparency and price discovery for the term structure of specific commodities that form the basis of risk management and/or investment decisions.

The chart below highlights the term structure for the CME Live and Feeder Cattle futures contracts. This gives participants an overview of price expectations in the future.

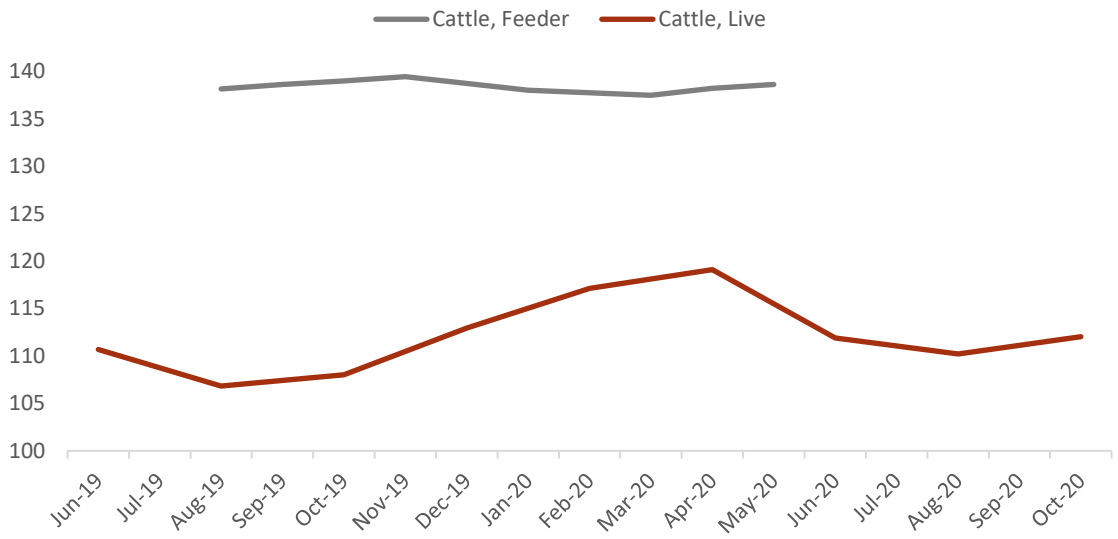


Figure 7: Term Structure of CME Live and Feeder Cattle Futures

3. OVER-THE-COUNTER DERIVATIVES (OTC)

Over-the-counter (OTC) derivatives are bilateral agreements between two parties.

They can be used to manage all financial market risks - foreign exchange, interest rate, commodity, and credit.

Unlike futures, OTC derivatives are financially settled, hence do not impact any existing physical commercial obligations or lending facilities. In some cases, such as in the Queensland sugar industry, OTC derivatives are settled via Exchange For Physical (EFP), where the OTC market maker settles with the hedging corporate by 'giving up' futures that either are matched off against a physical buyer or the short futures can be delivered against physically.

Providers of OTC derivatives are generally banks and financial institutions and offered under a credit facility.

OTC derivatives are customized and extremely flexible with regards to:

- Specific commodity, loan amount or currency;
- Quantity/Volume;
- Maturity;
- Timing;
- Instruments - fixed rate swaps and options;
- All trades are generally documented under generic industry documentation standards such as "ISDA".

4.0 SOURCES OF MARKET RISK

The Red Meat Industry is exposed to multiple financial market risks, all of which contribute to earnings volatility and the competitiveness of each company.

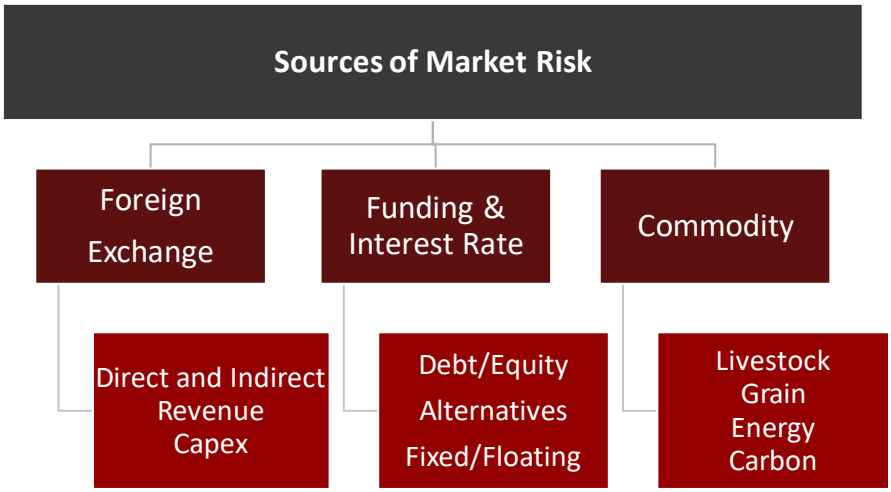


Figure 8: Sources of Financial Market Risk

4.1 Foreign Exchange Risk

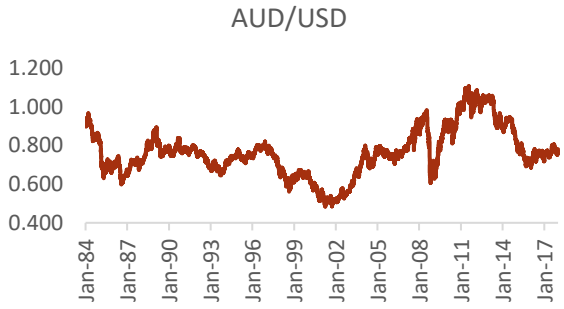
The Red Meat sector is exposed to significant direct and indirect foreign exchange rate risk:

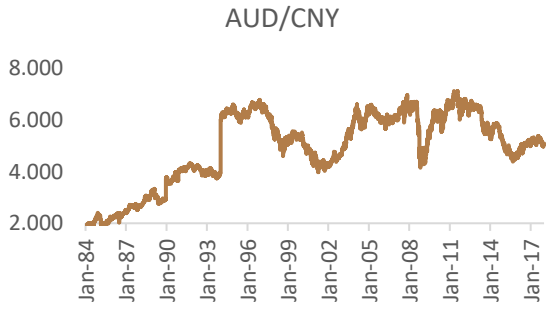
- Transactional
  - Revenue and expenses
  - Purchase of inputs and capital equipment in foreign currency
- Translation
  - Foreign currency loans
  - Foreign currency assets and equity

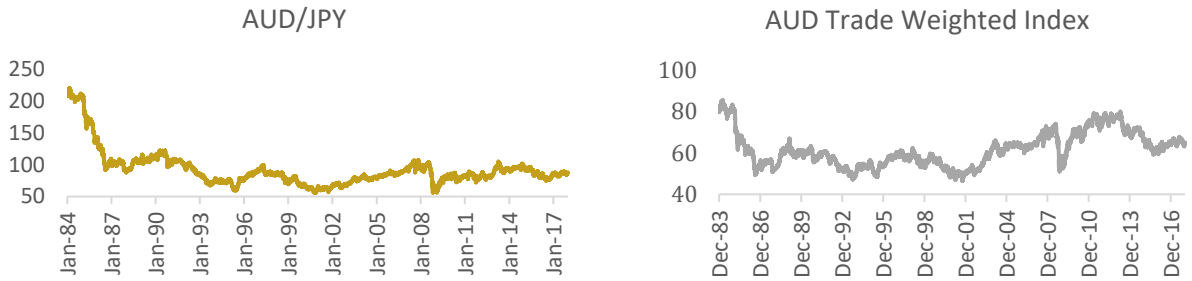
Australia exports approximately 70% of total red meat produced to over 100 countries such as the US, Japan, Korea, Taiwan, Malaysia and (increasingly) China, exposing the sector to multiple currency risks.

While the majority of export contracts are denominated in USD, some sales are in Japanese Yen (JPY), Euro (EUR) and increasingly, in Chinese Renminbi (CNY).

Since it was floated in 1983, the AUD has been as been as high as $1.108 in 2011 and as low as $0.4775 in April 2001.







Figures 9-A, B, C, D: AUD Exchange Rate with Selected Currencies and Trade Weighted Index[5]

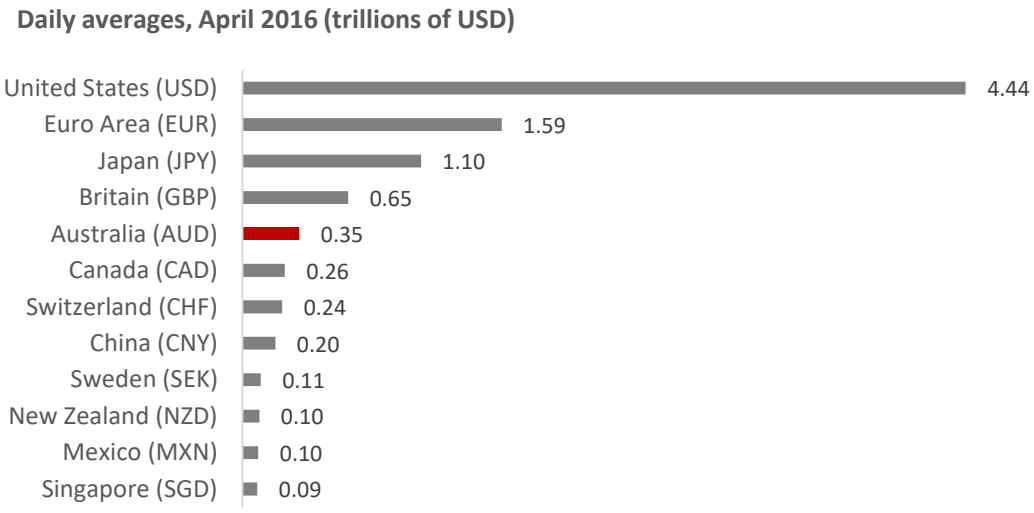
Managing Foreign Exchange Rate Risk

Despite having long-term relationships with customers in key export markets, most of the commercial terms are negotiated on a short-term basis (e.g. monthly), causing the sector to be exposed to market fluctuations and creating volatility in monthly revenues.

There can also be timing mismatches between purchases and sales giving rise to market risk. For example, physical purchases of livestock can often be undertaken up to fourteen weeks in advance with negotiated sales of processed meat only four weeks in advance, thereby leaving a ten-week risk exposure.

The short-term nature of the contractual obligations, potential timing mis-matches and the volatility of the market has significant impact on the profit margin of processors and the competitiveness of the sector in our key export markets.

The Global Foreign Exchange Market is extremely large and liquid, turning over USD5.1 trillion daily. The Australian dollar is one of the top 5 traded currencies by turnover (Figure 10), meaning it is a highly liquid and cost-effective market to manage risk.

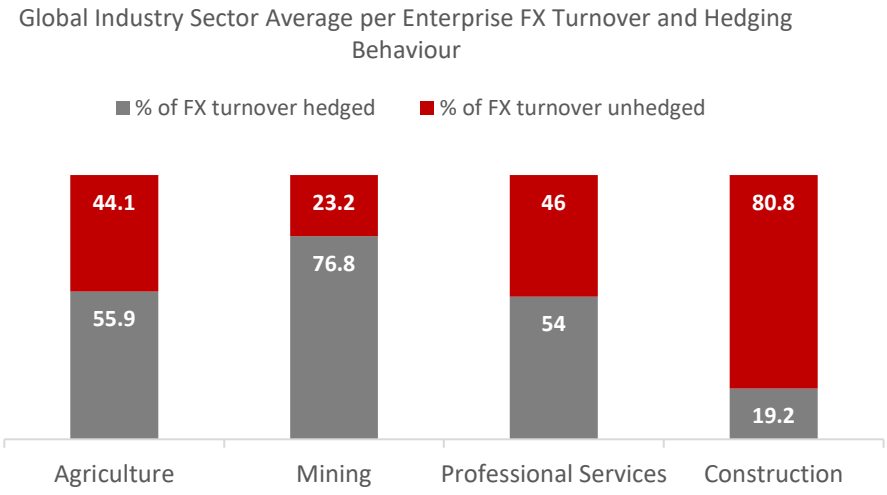


[5] Reserve Bank of Australia (RBA)

Figure 10: Global Foreign Exchange Daily Turnover[6]

FX Risk Management Tools

The Australian foreign exchange market is a sophisticated, actively traded, highly liquid market making it cost-effective hedge currency risk in multiple currencies.



Forecast FX Turnover	US $38.8mm	US$70.5mm	US$16mm	US$16.9mm

Figure 11: Foreign Exchange Hedging Activity[7]

Figure 11 highlights the foreign exchange hedge activity of various industry groups demonstrating that the agriculture in general is very active hedging foreign exchange risk.

Processors generally do not hedge foreign exchange risk for long tenors, rather, they tend to convert foreign currency revenues into AUD on a spot basis against specific invoices or export documents at the prevailing market rate.

Participants rarely, if ever, pool or aggregate amounts, nor do they participate in long term hedging of forecasted sales or revenues.

This practice exposes the sector to significant foreign exchange risk.

Foreign Exchange Hedge Example

Company has been exporting boxed beef to the US market for 10 years.

It ships on average 5 containers per month and has budgeted revenues of USD 1million per month for the current financial year.

Company is concerned that the Australian Dollar will appreciate over the next 6 months thereby impacting the potential AUD sales revenue.

[6] Bank for International Settlements. (2017). Annual Report 2017.
[7] East and Partners. (2018). Global Foreign Exchange Report 2018.

The current spot exchange rate is AUD$0.700.

Company can manage this exposure in any of the following ways:

1. **Remain Unhedged**
   - Company ships the goods each month and converts the USD receipts when paid to AUD at the prevailing AUD/USD exchange rate each month
   - The monthly AUD revenues is unknown as it is subject to the prevailing exchange rate each month as per the table below

Expected Monthly Revenue		
USD	RATE	AUD
$1,000,000	$0.5000	$2,000,000
$1,000,000	$0.6000	$1,666,667
$1,000,000	$0.7000	$1,428,571
$1,000,000	$0.8000	$1,250,000
$1,000,000	$0.9000	$1,111,111

2. **Buy AUD Forward**
   - Company can choose to hedge all or a portion of their expected USD receipts by selling USD/ buying AUD each month for 6 months
   - They forward AUD each month at the prevailing monthly price
   - Benefits are that Company has locked in a fixed rate for future sales, mitigating the risk of an appreciating AUD and subsequently lower revenues, and locking in budgeted revenues
   - However, Company does not benefit should the AUD fall or depreciate

Monthly Revenue						
Revenue	1 month	2 months	3 months	4 months	5 months	6 months
Revenue USD	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000
Forward FX Rate	$ 0.7180	$ 0.7220	$ 0.7112	$ 0.7115	$ 0.7120	$ 0.7125
AUD Revenue	$ 1,392,758	$ 1,385,042	$ 1,406,074	$ 1,405,481	$ 1,404,494	$ 1,403,509

3. **Par Forward**
   - Rather than hedge monthly USD revenues at the individual monthly forward foreign exchange rates, Company can hedge at a fixed AUD/USD exchange rate for each month
   - This allows monthly USD revenues to be locked in at a single fixed AUD/USD foreign exchange rate
   - It has protected monthly revenues from an appreciating AUD, but does not enjoy any benefits should the AUD depreciate
   - Company can choose to hedge all or any portion of budget sales, subject to their risk appetite

Monthly Revenue						
Revenue	1 month	2 months	3 months	4 months	5 months	6 months
Revenue USD	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000
Forward FX Rate	$0.7180	$0.7220	$0.7112	$0.7115	$0.7120	$0.7125
AUD Revenue	$ 1,392,758	$ 1,385,042	$ 1,406,074	$ 1,405,481	$ 1,404,494	$ 1,403,509
Par Forward	$ 0.7145	$ 0.7145	$ 0.7145	$ 0.7145	$ 0.7145	$ 0.7145
AUD Revenue	$ 1,399,515	$ 1,399,515	$ 1,399,515	$ 1,399,515	$ 1,399,515	$ 1,399,515

4. Options

(a) AUD Calls

- Company can buy a strip of monthly call options to buy AUD at a predetermined fixed strike price, say $0.7300
- Call options give the owner the right but not the obligation to purchase AUD
- Each month if the AUD rises above the strike price, Company will exercise its option and buy AUD at the strike price thereby locking in a profit
- Should the AUD depreciate (fall), Company will allow the option to lapse and convert the USD revenue at a better price than the strike
- Options therefore give protection to the company of a rising AUD, while allowing the company to benefit should the currency fall/depreciate.
- For this benefit, there is an upfront premium payable
- Premiums vary depending on the tenor, strike, and volatility associated with the currency at the time of purchase
- Options are very flexible and cater for flexible amounts, tenors, and strikes

(b) AUD Collars

- Rather than purchasing call options for the payment of an upfront fee, Company can also execute a foreign exchange collar
- This requires buying a AUD Call and selling a AUD Put on the same USD value for the same term
- For instance, Company can buy an AUD call at $0.7400 and sell an AUD Put at $0.6950
- If the AUD rises above the strike of the call, Company exercises, any buys AUD at $0.7400
- If the AUD falls below the strike, the owner of the option exercises its right, locking Company into a rate of the put strike at $0.6950
- If the AUD is between the Put and Call strike, no exercise occurs on ether option and Company transacts at the prevalent market rate
- Collars are attractive as they are typically zero cost and protects exporters from a rising AUD, whilst allowing for some limited benefits should the AUD fall

The chart below highlights the outcomes of the various hedge strategies outlines above.

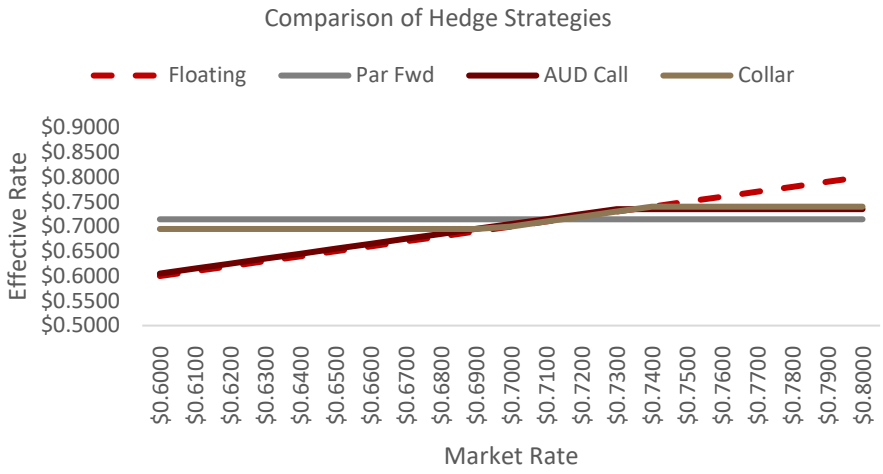


Figure 12: Comparison of Hedge Strategies

Spotlight on the China Foreign Exchange Market

- China is Australian's largest trading partner and is one of the fastest growing foreign exchange markets;
- Given the rapid emergence of China as a structural net importer of beef in the last seven years (Figure 13), there is an increasing notional value of Australian red meat products ultimately being sold in CNY at a retail level;

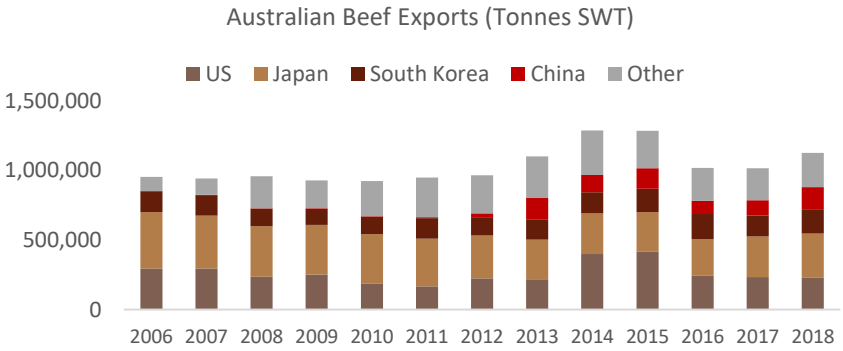


Figure 13: Exports of Beef to Key Countries

- The financial market in China has developed rapidly over the past 5 years such that it is efficient and cost-effective to hedge CNY currency risk for trade for up to 5 years;
- Despite strong currency controls, China's share of global payments has been rising rapidly (Figure 14) with 25% of China's cross border trade now done in CNY.

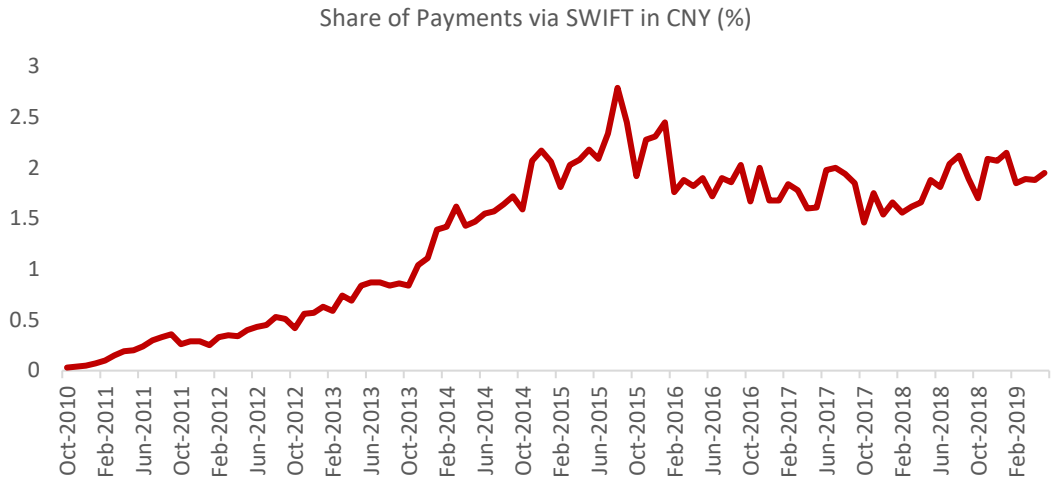


Figure 14: China's Share of Global Payments[8]

Given the importance of the China market, there is a potential marketing opportunity to negotiate new physical contracts with Chinese customers in CNY as this risk can be readily converted to Australian dollars in an efficient, cost-effective way. Other international competitors may not have the same efficient local currency market.

Structural Considerations

Companies should analyze the impact of both direct and indirect foreign exchange risk. They should implement risk policies to:

- ✓ Identify key currencies;
- ✓ Review liquidity and cost effectiveness of all foreign currency exposures;
- ✓ Identify any structural or regulatory impediments to converting;
- ✓ Analyze if offering local currency terms to foreign buyers improves international competitiveness;
- ✓ Determine hedge objective- budget vs forecast sales;
- ✓ Analyze most effective hedge strategy- forwards, par forwards, options.

4.2 Funding and Interest Rate Risk

Interest rate risk generally takes the form of:

- Short-term or overdraft borrowings;
- Long-term borrowings typically secured by land, plant & equipment;
- Cash deposits;
- Credit terms on contractual purchases and sales.

While Australia has enjoyed an extended period of low interest since the GFC (Figure 15), rates have been as high as 21% in the late 1980's which, combined with a high Australian Dollar, caused

[8] SWIFT

significant distress across the meat and agriculture sector. Rising interest rates will impact the sector and erode profit margins.

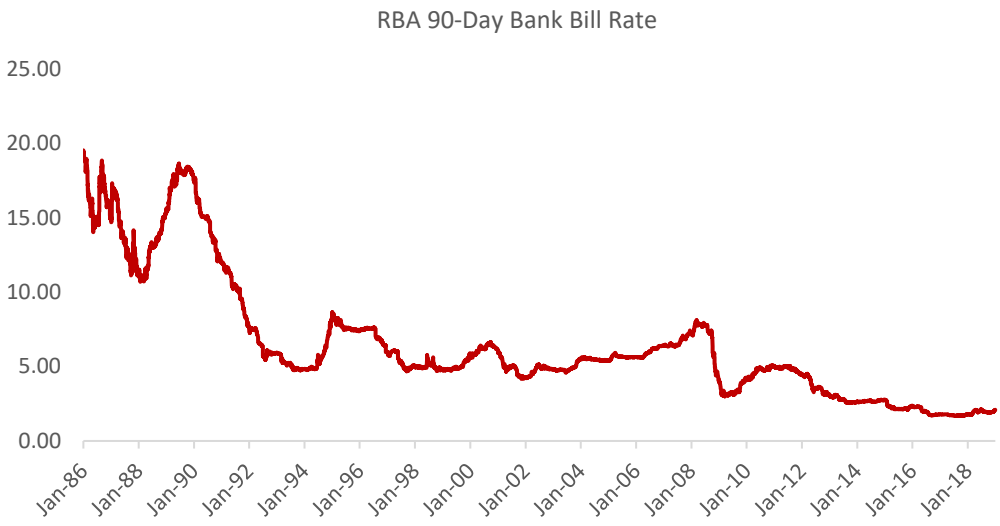


Figure 15: Australian 90-Day Bank Bill Rate[9]

Managing Interest Rate Risk

Funding across the supply chain is dominated by major Australian banks, specialist agriculture banks and regional financial institutions. There is a growing trend for specialist alternative sources of capital such as Private Equity or Specialist Commodity Funds supporting the sector via various funding techniques used in other sectors.

Investment and innovation across the supply chain will continue to evolve at a rapid pace, as access to venture capital, often linked with support networks (e.g. Accelerators) will increase, as global consumption of animal protein rises and consumer demands change.

Bank facilities are generally a combination of long-term facilities secured by land, plant and equipment and short-term overdraft facilities. The interest rate on most of these facilities are based on short-term (floating) rates of interest indexed to the local Bank Bill Reference Rate published by AFMA (generally the 90-day bank bill swap rate (BBSW)) or the specific banks cost of funds plus a credit margin.

Borrowers can mitigate interest rate risk via various techniques:

- Directly with their lending bank or non-bank capital providers;
- Futures - 90-day bank bill, 3-year and 10-year bond;
- Over-the-counter (OTC) derivatives.

Directly with Lenders

Borrowers with floating rate loans who are concerned about rising interest rates can discuss fixing their interest rates with their existing lender.

[9] Reserve Bank of Australia

The lender modifies their loan agreement to accommodate the fixed rate.

While this achieves the objective of locking interest rates, there are several pitfalls associated with this approach:

- The lender may not be willing to amend existing loan agreements;
- The lender may not be willing to increase credit exposure to the borrower associated with fixing the interest rate;
- The borrower is limited to the lending bank's price which may not be competitive;
- The borrower could lack flexibility with regards to amount hedged, tenor and timing.

Futures

The Australian Stock Exchange (ASX) offers 90-day Bank Bills as well as 3-year and 10-year government bond futures contracts.

Like all futures contracts, the specifications are standardized with regards to type, amount, expiration and are subject to the exchange rules on margin requirements- initial and variation.

The use of futures to manage interest rate risk is primarily used by banks, financial institutions and traders, and less by corporations.

Over-the-counter (OTC) Interest Rate Derivatives

The interest rate derivatives market is a very liquid market with annual turnover of AUD 1 trillion.

The Australian OTC interest rate market has been in existence since the mid 1980's and is one of the most developed and traded markets globally offering a range of risk management tools for borrowers and investors to manage their interest rate risk.

Commonly used OTC derivatives used to manage interest rate risk include:

- Forward Rate Agreements;
- Interest Rate Swaps;
- Interest Rate options- e.g. caps, collars

Figure 16 below highlights the historical use and turnover of various interest rate derivatives.

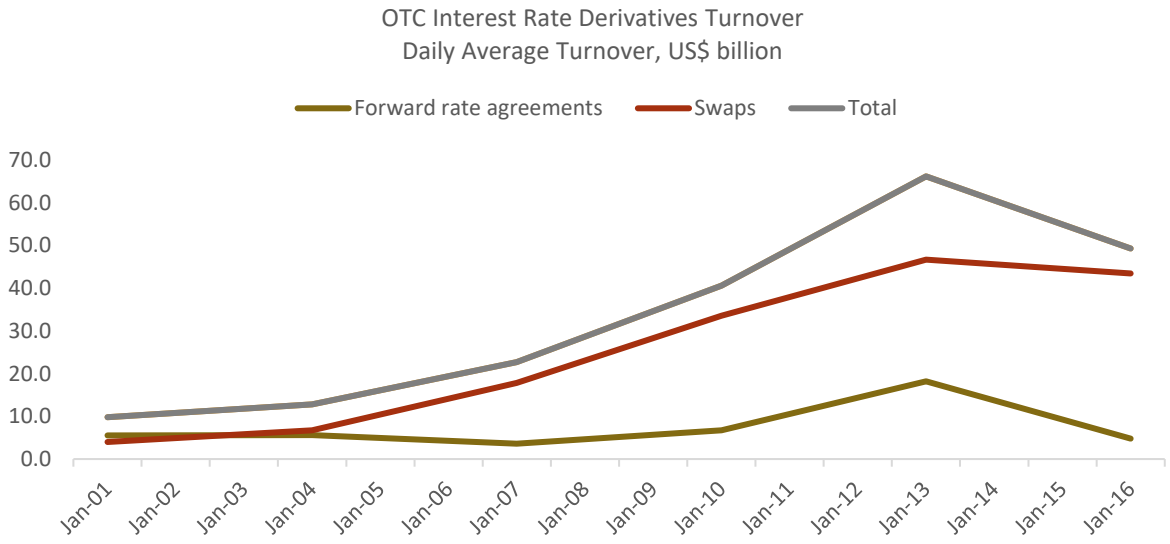


Figure 16: Interest Rate Derivative Turnover

Forward Rate Agreements (FRA)

Forward Rate Agreements (FRA's) are short-term tools providing borrowers the ability of locking in interest rates for tenors generally up to 12-18 months.

Unlike interest rate swaps which cover multiple periods, FRA's are generally used for single periods.

The forward period is defined by specifying the start and end of any borrowing term.

FRA's are priced referencing the prevailing yield curve.

Interest Rate Swaps

An interest rate swap is an agreement between two parties to exchange interest commitments on a notional (loan) principal over a fixed period of time. The swap is based on a notional principal and hence can be done with multiple banks other than the lending bank, subject to approved credit terms and documentation.

Interest rate swaps are used to mitigate the risk of rising interest rates on longer term debt facilities.

Interest Rate Swap Example

Company has AUD10 million 3-year loan with one of their relationship banks.

Interest rate is payable quarterly referenced against the 90-day BBSW rate plus a credit margin.

The company is concerned rising interest rates and the impact this will have on their net profit margin and wants to fix the interest rate for 3 years.

Company enters into an interest rate swap to fix their interest rates for the next 3 years at the prevailing 3-year market rate (2.50%).

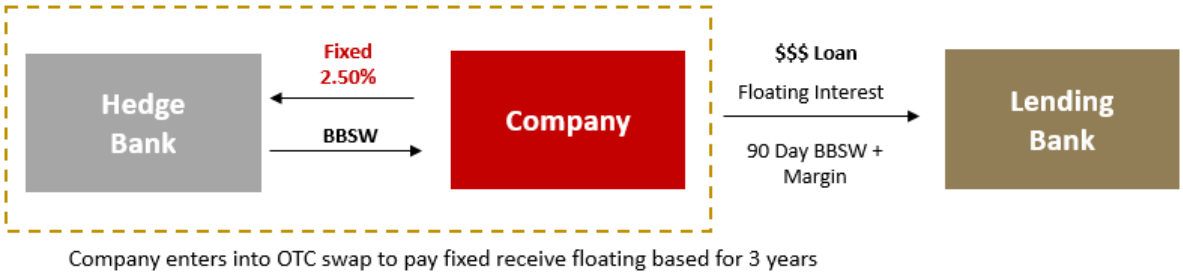


Figure 17: Cash Flows for Interest Rate Swap

On each settlement date (quarterly in the above example), the bank and Company will net settle for the difference between the then floating rate and the fixed swap rate.

If rates rise and the BBSW is higher than the swap rate the hedge, the bank will pay Company the difference between the swap rate and BBSW, as illustrated in Figure 18.

Conversely, if BBSW is below the fixed rate, Company will pay the hedge bank an amount equal to the difference between the swap rate (2.50 %) and BBSW.

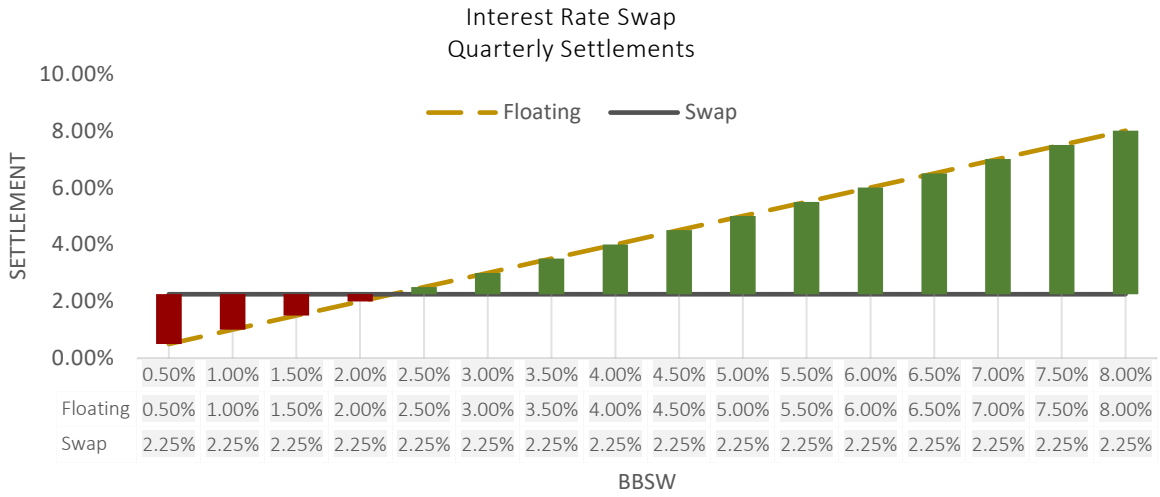


Figure 18: Settlements for Interest Rate Swaps

The benefits of the interest rate swaps are:

- Protect borrowers from rising rates but do not participate from falling interest rates;
- They do not impact any underlying loan transaction;
- They are flexible with regards to amount, tenor and timing;
- There are no upfront costs and are generally documented under standard documentation (ISDA).

Interest Rate Caps (Ceilings)

Rather than transacting an interest rate swap, the borrow can enter into an interest rate cap.

Figure 18 below illustrates the settlements of interest rate ceiling at 3% for 3 years with a premium of 0.50% payable upfront.

Key benefits of interest rate caps are that they provide borrowers with protection against rising rates and full participation to falling rates. They have no impact on the existing loan agreement and provide flexibility with regards to amount hedged, strike price and tenor.

Interest Rate Collars

A variation to an interest rate cap is where the borrow purchases an interest rate collar.

Here the borrower is fully protected against rising rates but has limited participation to falling rates. Often these structures are done such there is zero premium payable.

Like swaps and caps, interest rate collars can be executed independently on underlying loans and are flexible with regards to amount, tenor and strikes.

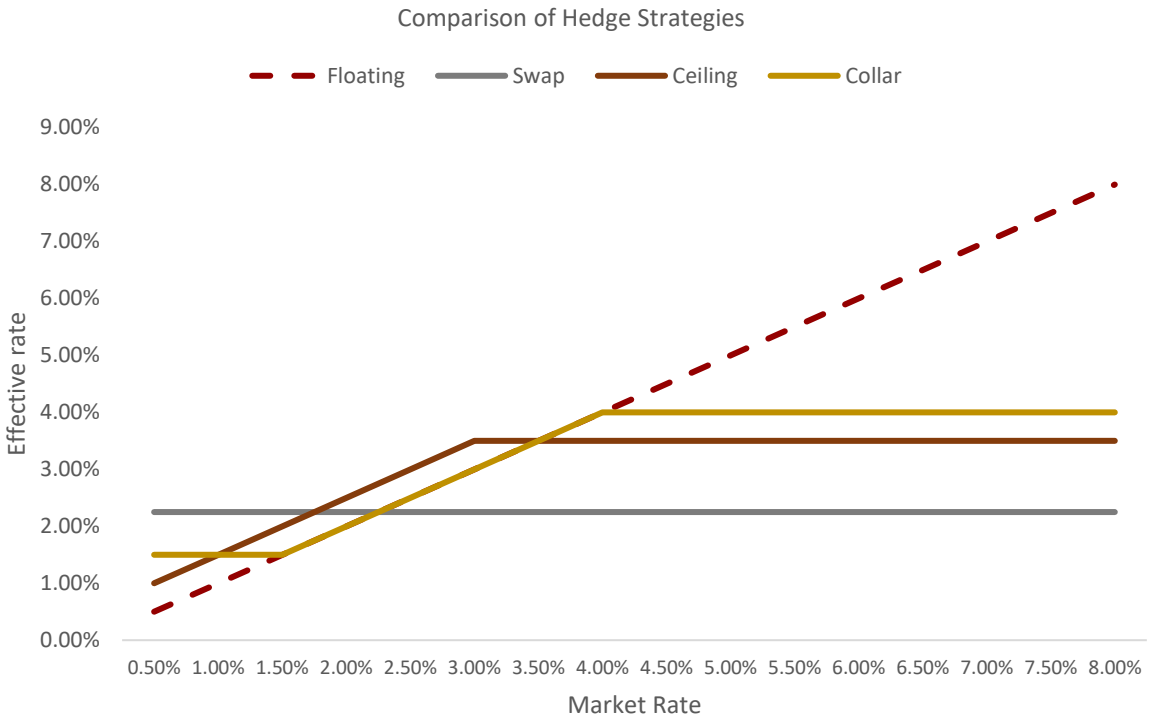


Figure 19: Comparison of Interest Rate Risk Strategies

Alternative Sources of Capital

Non-bank lenders and private equity have increased their presence in the sector providing an alternative source of capital. Financing structures include debt, equity and combinations secured by plant & equipment as well as livestock.

Investment, innovation and funding will continue to evolve at a rapid pace across the supply chain along three broad verticals highlighted in Figure 20 below. One deterrent to increased investment activity is the lack of accurate data on which to base investment decisions and the ability to mitigate risk.

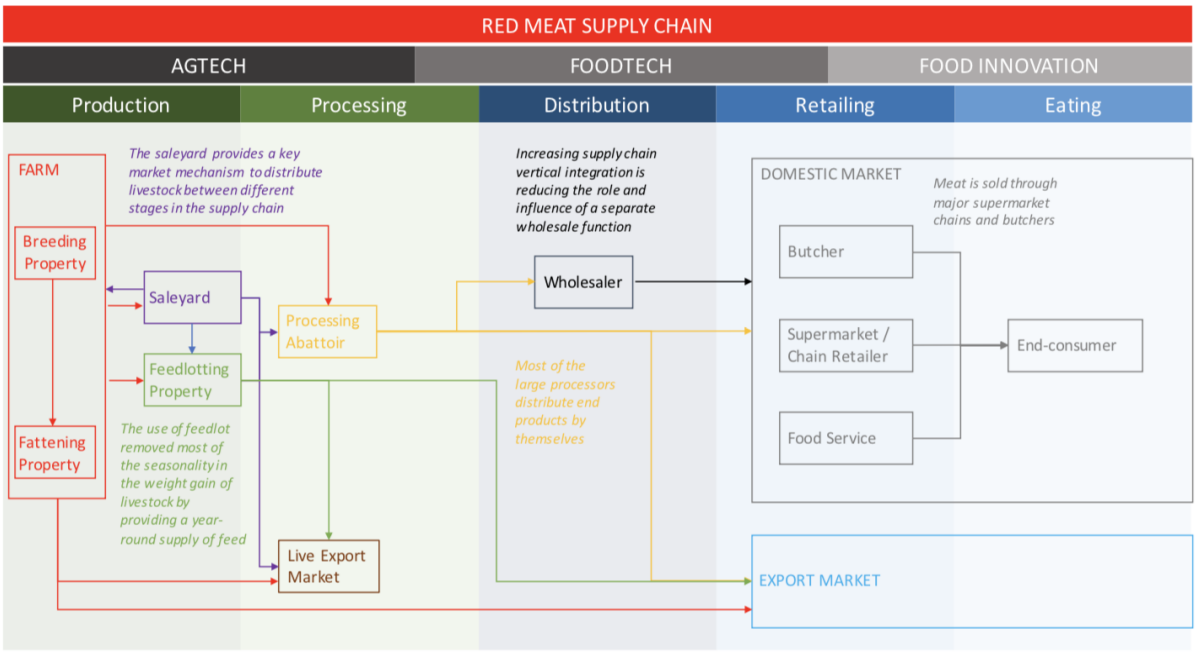


Figure 20: Financing Across the Red Meat Supply Chain[10]

Structural Considerations

Ensure risk policies are in place to:

- ✓ Determine optimal fix/floating mix;
- ✓ Ensure hedge term does not to exceed loan maturities or amounts (i.e. prevent over hedging);
- ✓ Allow alternative risk management strategies;
- ✓ Regularly review status of funding and rates exposures.

[10] Artesian Capital. (2018). Decode.

4.3 Commodity Price Risk

The Red Meat sector is exposed to multiple commodity price risks.

Each commodity has its own industry defined benchmark for establishing price transparency which forms the basis for physical contract pricing and risk management activity:

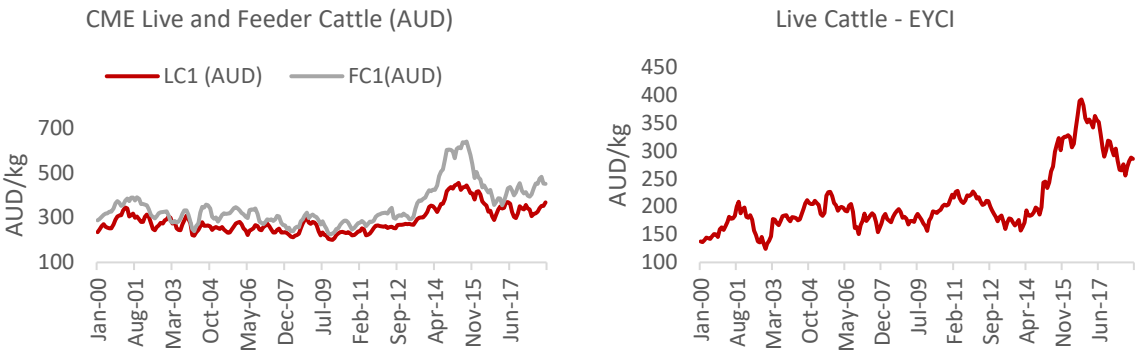
Processor **Commodity Exposures**		
Type	Use	Market Benchmark
Beef/Cattle ***Sheep/Lamb*** ***Goat***	Purchases of livestock Sales of meat products	EYCI WYCI EYSTLI CME Live and Feeder Trimmings-90CL
Grain	Feedlot	ASX Wheat CME Wheat
Diesel	Freight/Transport	Aust Terminal Gate Platts Gas Oil
Packaging	Cost of Production	RISI Kraft Linerboard
Electricity	Cost of Production	ASX Electricity Futures
Carbon	Potential costs relating to emissions	Under review- establishing formal market to trade credits

Figure 21 below highlights some of the common global industry benchmarks across various commodities.

Figure 21: Global Benchmarks for Commodities

Livestock/meat product hedging:

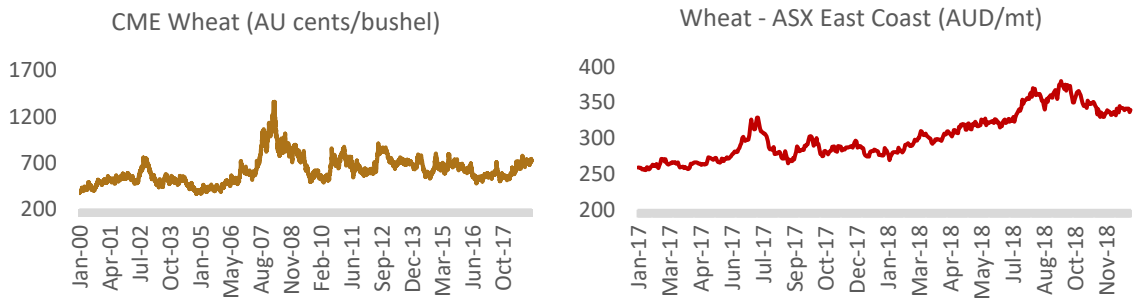
- The processing industry is highly complex with over several hundred price references for international livestock, processed meat and co products;
- Prices are influenced by multiple factors including breed & animal type, weight, location for livestock and specific produced meat (e.g. prime & trimmings) and co-products;
- Prices are reported by multiple government agencies (e.g. USDA, ABS) and industry sources (e.g. MLA);
- There are no globally industry accepted benchmarks for any livestock and/or produced meat and co-products;
- There are, however, established futures contracts in the US for live and feeder cattle;
- These contracts were designed to cater for the US beef industry, hence have little relevance for the Australian live cattle market;
- There are no futures contracts for sheep/lamb, goats;
- The EYCI has been the traditional benchmark for live cattle in the Australian market but is diminishing in relevance to the physical trade;
- ESTLI is a reliable index for sheep given the continued active use of sale yards in the sheep industry;
- There are no domestic or offshore futures contracts for produced beef, mutton, lamb, or goat, however there is limited OTC activity in 90CL trimmings;
- Following government (USDA) mandating of price reporting in 1999, there are now reportedly 20-30 data points daily, including meat products, available to allow transparency and efficiency in the US red meat industry;
- There are no listed futures contracts for live cattle or produced meat in the Australian market, and only negligible activity in the OTC market;
- Recent attempts to relaunch an industry accepted benchmark for live cattle were unsuccessful.



Figures 22 A, B: Common Cattle Reference Prices[11]

Grain Hedging

- In Australia most grains are traded via bilateral physical contracts, such as track contracts;
- There are active grain futures available in Australia and international exchanges;
- Some local contracts, such as ASX Barley, have limited liquidity;
- This range of products are used to varying degrees across feedlot operators, typically via a combination of ASX futures and physical track grain contracts. The volumes of these contracts will increase if the output (cattle) could also be hedged.



Figures 23 A, B: Grain Price Benchmarks[12]

Energy risk

The sector is exposed to multiple energy price risks:

- **Utilities**
  - Utility costs represents approximately 6 % of the total cost of production
  - Given Australian costs are substantially higher than our global competitors such as the US (4.2%) and Argentina (1.1%), this will impact the international competitiveness of the industry[13]

[11] Meat and Livestock Australia, Chicago Mercantile Exchange.

[12] Chicago Mercantile Exchange, Australian Stock Exchange.

[13] Heilbron SG. (2018). Cost to operate and processing cost competitiveness — *a combined report*, including reports for AMPC 2017-1062 and 2018-1011.

- The Australian energy industry is undergoing significant change with a trend away from traditional coal sourced power towards renewable and alternative sources of energy with costs more aligned to global market prices
- As shown in Figure 24, this has resulted in a sharp rise in wholesale power costs, representing a significant risk for processors
- Most power contracts are negotiated directly with suppliers
- In Australia, there are futures and OTC market in electricity with the ASX NSW electricity futures contract offering the best liquidity (Figure 24)

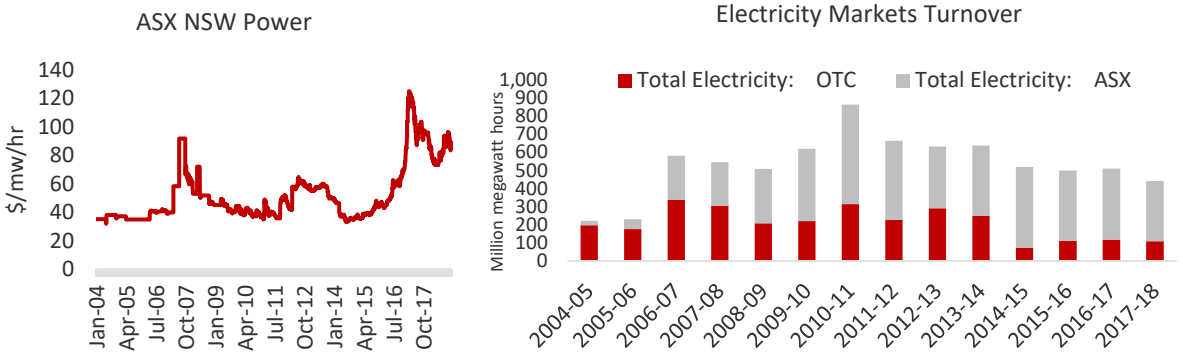


Figure 24: ASX NSW Electricity Futures Prices and Turnover

- **Transportation**
  - Transportation represents 15% of processors cost[14]
  - Costs include transportation of animals from the farm to the processor, plus any offshore shipping costs
  - Diesel costs represent less than 1% of total costs and are generally included in commercial contracts. Relevant price references for diesel are:
    - Australian Terminal Gate Diesel
    - Singapore Gasoil Price
  - No listed futures for Singapore gas oil or Australian diesel prices
  - Active OTC market for Singapore refined products

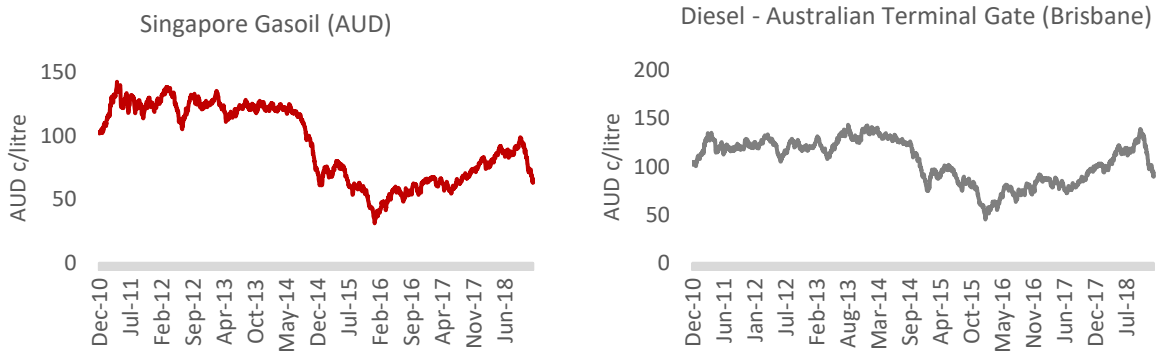


Figure 25 A, B: Diesel Fuel Benchmarks[15]

[14] Heilbron SG. (2018). Cost to operate and processing cost competitiveness — *a combined report*, including reports for AMPC 2017-1062 and 2018-1011.

[15] S&P Platts, Australian Petroleum Industry

- **Others - Packaging and Carbon**
  - Packing contributes 7.4%–9% of operating costs (cattle and sheep/lamb respectively)
    - Industry publications such as RISI provide spot physical prices
    - There are no listed futures for pulp and paper products in Asia
    - There is some OTC activity, but market liquidity is poor
  - Carbon
    - The introduction of a domestic carbon market will create a new, different risk profile for the industry
    - Numerous Government, academic, and industry studies have advocated for the re-introduction of a carbon trading scheme
    - No formal scheme has been approved, however will evolve in the ensuing years

Managing Commodity Risk

The techniques to manage commodity price risk are the same as foreign exchange and interest rate risk:

- Physical bilateral agreements
- Futures - where applicable, noting the basis risk that exists between the Australian market and the listed contracts
- OTC - Fixed price swaps and options

While there are active futures and OTC markets to mitigate risk in some commodities (e.g. oil and grains), other commodities such as cattle, sheep, goats, and meat products have limited, if any, liquidity or direct relevance to the Australian market.

The absence of any liquid transparent benchmarks for the Australian red meat industry restricts any ability to mitigate any risk other than via bilateral physical contracts. US processors can trade spreads between live and feeder cattle as well as incorporating the cost of feedstock (corn), known as the "cattle crush". This will be described in Section 6.

Processors generally buy livestock three months forward and sell processed meat one month forward, leaving them exposed to market volatility during this period.

5.0 THE SYNTHETIC PROCESSOR

Aim

To highlight the impact of market volatility on profit margins, we created an artificial, "synthetic" processor margin model.

The model has the capacity and flexibility to incorporate multiple livestock inputs, costs of production and produced meat yields that:

- ✓ Illustrates the historical volatility of processor profit margin assuming various inputs, yields, and cost of production;
- ✓ Estimates future processor margins based on the historical volatility the respective inputs, yields and costs of production;
- ✓ Illustrates lack of correlation and unusual lags between key inputs and output prices e.g. AUD cattle (input) prices are surprisingly uncorrelated to AUD denominated meat output prices;
- ✓ Incorporates the ability to overlay risk mitigants to limit the impact of adverse market movements.

Assumptions

- ✓ A single use plant that processes a mixture of grain and grass-fed cattle representative of the current ratios in the industry;
- ✓ Has total capacity of 10,000 head per week and operates at a utilization rate of 80% consistent with the national average annual utilization of 78%;
- ✓ Sells beef and all associated co-products in USD to export markets;
- ✓ Yield and quality price differentials vary between cattle categories and weight.

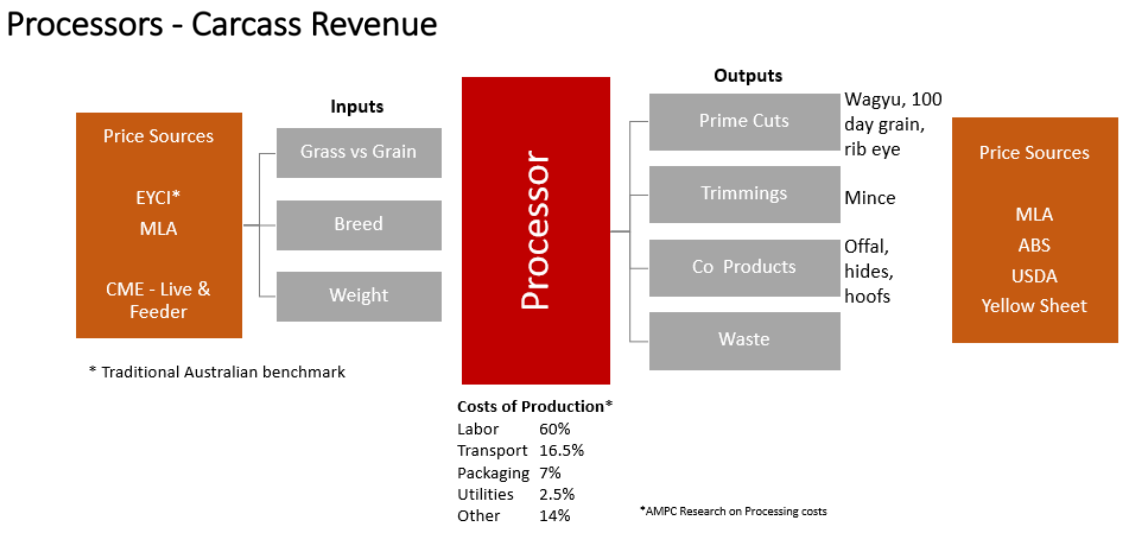


Figure 26: Synthetic Processor Inputs and Outputs

Benchmarks/Data Points - The Key Challenge

Given the complexity and variability associated with the inputs of live cattle (breed, grain vs grass, weights, condition, season and location) and their respective carcass yields, one of the challenges associated with this analysis was to utilize data from consistent, uniform sources that is commonly used by the industry.

Data was sourced from multiple locations including:

- ✓ US futures market for live and feeder cattle
- ✓ US Department of Agriculture (USDA)
- ✓ Industry publication e.g. Rieman and Urner Barry "Yellow sheet"
- ✓ Meat and Livestock Australia (MLA)
- ✓ AMPC Cost to Operate report

Despite the existence of these data sets there is no strong evidence they are actively utilized in physical contractual negotiations, particularly as some of the data is only voluntarily provided.

Inputs

The model has been designed to accommodate multiple variables of cattle category inputs which can be customized to match for specific processors actual inputs, assuming readily available data:

- **EYCI**- historical MLA data back to 2000
- **NEW-Model Cattle Index-** customized live cattle index weighted by various cattle types
  - ✓ A customized live cattle index weighted by various cattle types
  - ✓ Index weights can be modified to match specific processor needs
  - ✓ MLA data for NSW cattle types and 100-day Grain data has been used

Live Cattle Inputs	Ref	Type	Weight
Heavy Steer	MLA-NSW	500-600kg	**20%**
Medium Cow	MLA-NSW	400-520kg	**5%**
Medium Steer	MLA-NSW	400-500kg	**25%**
Trade Steer	MLA-NSW	330-400kg	**5%**
Vealer Steer	MLA-NSW	280-330kg	**5%**
100-day Grain	MLA Qld OTH	300-320kg	**40%**

Figure 27: Data References and Weights for Live Cattle Index

Outputs/Revenue

Given that there are multiple types of beef and co-products processed at a typical processor, we have simplified outputs into 3 broad output categories:

1. **Prime** – various prime cuts such as rump, sirloin, fillet, cube roll, blade, etc;
2. **Trimmings** – 85CL as out based case as published by the MLA data base and compared this to US export and import prices of various trimmings grades;
3. **Co-products** – offal, hides and other co-products as published by MLA.

We have allocated estimated revenue yields relative to the cattle type and allocated a weighting to each individual components of each category in accordance with industry guidelines.[16]

	Cattle Input					
	Heavy Steer	Medium Cow	Medium Steer	Trade Steer	Vealer Steer	100 day Grain
Output % Revenue	20%	5%	25%	5%	5%	40%
Prime	25%	10%	10%	20%	20%	25%
Trimmings	15%	30%	25%	15%	15%	15%
By Products	20%	20%	25%	25%	25%	20%
Waste	40%	40%	40%	40%	40%	40%
Total	100%	100%	100%	100%	100%	100%

Figure 28: Cattle Yields by Input

There is a lack of transparency for direct contract prices for the above categories. i.e. only saleyard and some over-the-hook (OTH) data is reported and available. This is discussed in the conclusions and recommendations section, with reference to similar issues in the US in 1999.

Given that exports represent approximately 70% of a processor's output, we have used US, and Japanese import data for the basis of our analysis for Prime and Trimmings and MLA data on co-products noting that this is indicative only and not representative of actual commercial contracts.

Like the cattle inputs, the model can accommodate different product yields and prices based on specific cattle feedstock.

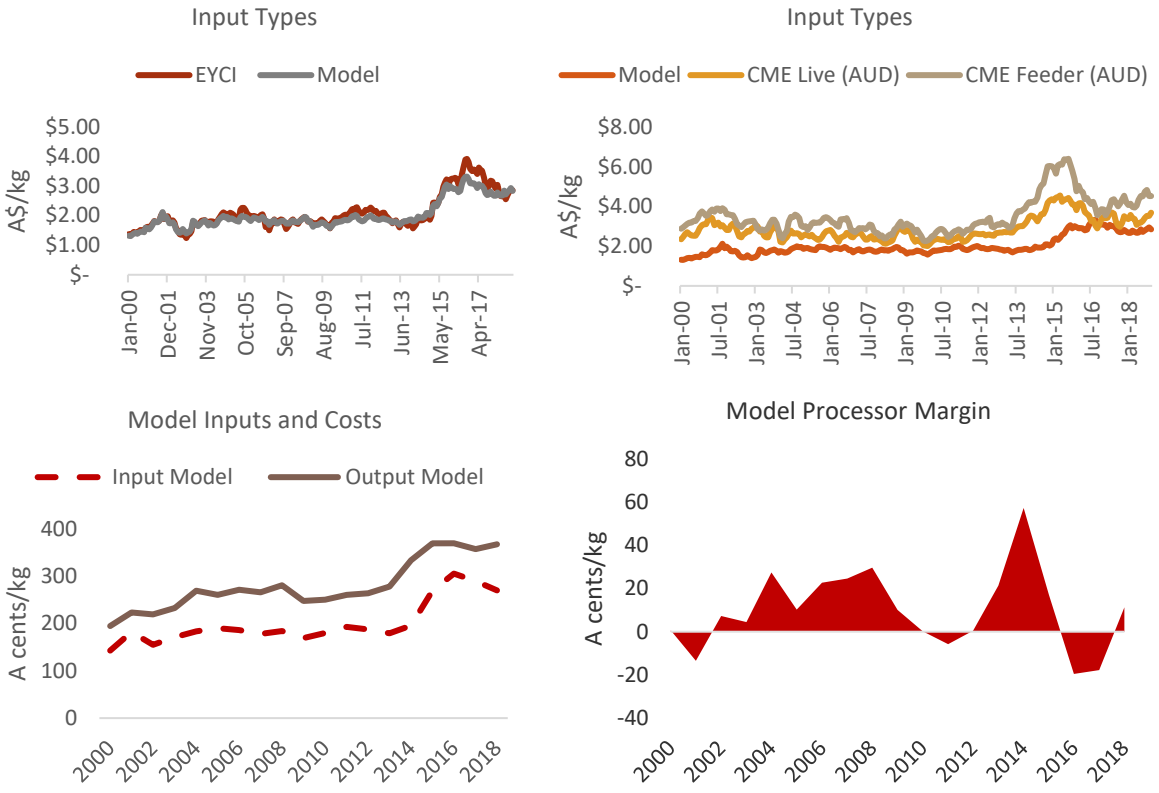
Cost of Production

The model incorporates other costs of production such as labour, funding, power and transportation and have assumed costs as per the recent AMPC study on "Costs to Operate".[17]

Costs have been adjusted for inflation using the CPI or industry data sources from the ABS such as 'Meat Processing" and "Meat and Meat product Manufacturing".[18]

[16] Gary Griffith. (2009). The Aggregate Economic Benefits to 2007/08 from the Adoption of Meat Standards Australia.
[17] Australian Meat Processor Corporation. (2018). Cost to Operate Report.
[18] Australian Bureau of Statistics. A2307125T A2307143W.

Summary of Data



Figures 29 A, B, C, D: Summary of Synthetic Processor Margin Model

Analysis of Data

Regression analysis completed on the Synthetic Processor Model considered the following benchmarks:

- Model Cattle Index - live cattle inputs, as described above;
- EYCI - Eastern Young Cattle Indicator, an established Industry benchmark for young cattle;
- CME Index - 50/50 ratio of Chicago Mercantile Exchange nearby live and feeder cattle futures;
- Product (Model) Output Index - associated outputs of Cattle Inputs i.e. Prime, Trimmings and Co-Product Index;
- ESTLI - Eastern States Trade Lamb Indicator;
- Rainfall - Qld, NSW and combined Qld/NSW.

Key findings based on monthly data in quarterly periods from the regression analysis: -

- The correlation of the CME Index to the EYCI is 0.40 improving to 0.50, when the CME data is lagged;
- The Model Cattle Index has a better correlation to the CME Index, with correlations up to 0.66, again better when CME data is lagged;
- CME Index versus Product Output Index showed a correlation of 0.4694;

- EYCI versus Product Output Index showed a correlation of 0.70, improving to 0.75 with EYCI lagged for 6 months;
- Model Cattle Index versus Product Output Index showed a correlation of 0.79, improving to 0.82 when lagged for 6 months.

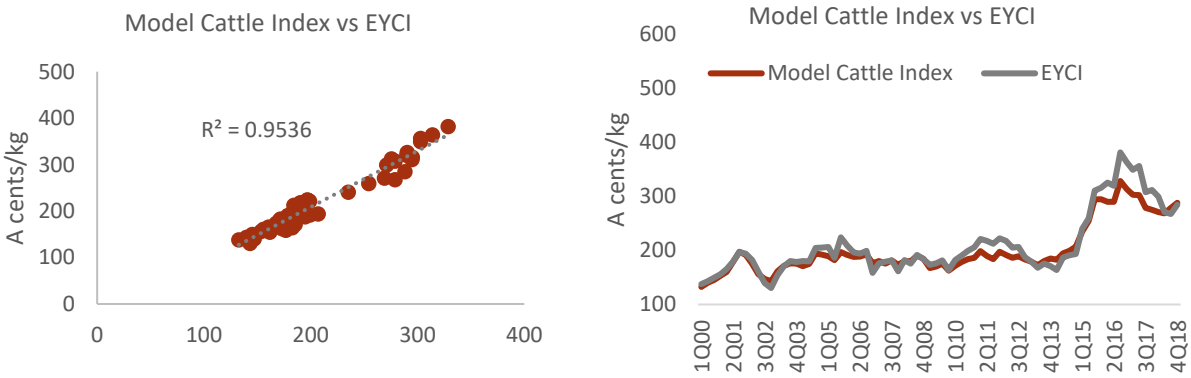
Correlations and Hedge effectiveness

It is generally accepted that an R-squared parameter (a measure of correlation) equal to or greater than 0.80 is considered highly effective. The regression analysis, summarised above, demonstrates that there is no existing global or domestic benchmark that serves the later stage / finishing and processing segment of the Australian beef cattle sector in a highly effective manner.

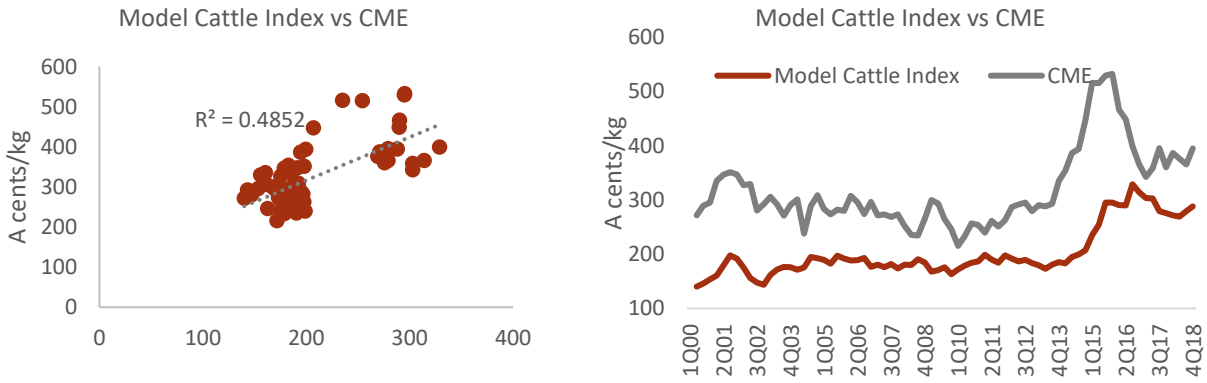
Rarely are there perfect correlations, and rarely is there a perfect hedge. Specifically, in Australian agricultural commodities, where global benchmarks such as US based futures contracts are often used to determine pricing, there can be significant periods where correlation is low, meaning they may be too risky to use for pricing physical or hedging.

The construction of the Model Cattle Index demonstrates it is possible to achieve a more relevant benchmark for the pre and post processing stage in the supply chain.

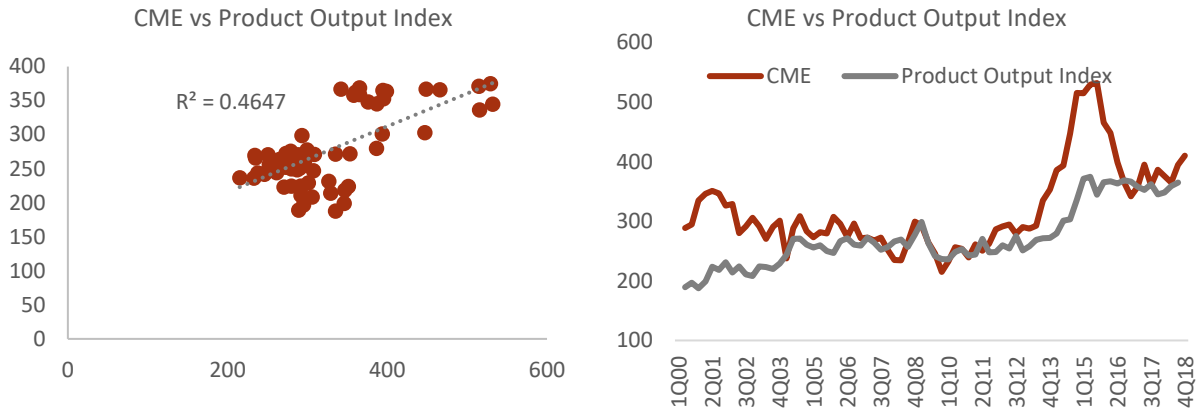
The core recommendations of this report are to improve data collection and to create more effective benchmarks, see summary and recommendations.



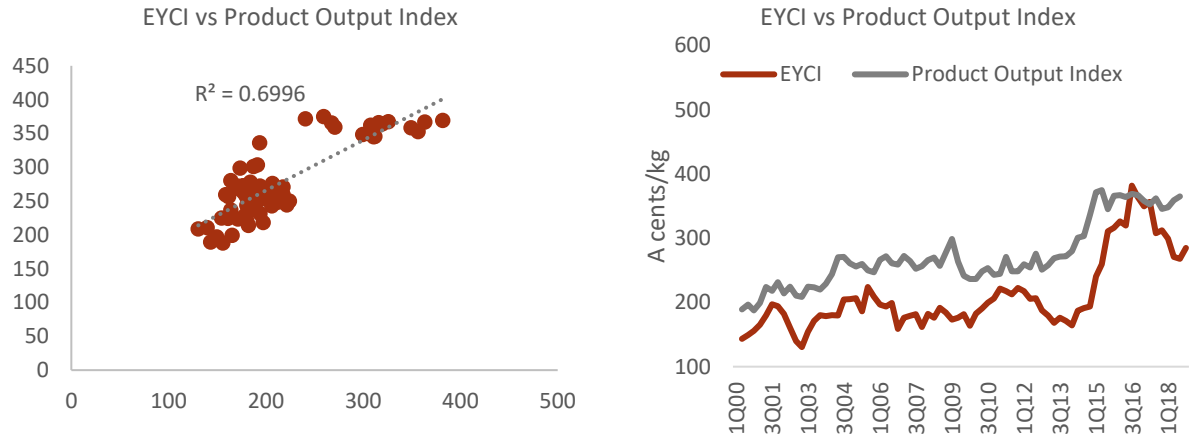
Figures 30 A, B: Model Cattle Index vs EYCI



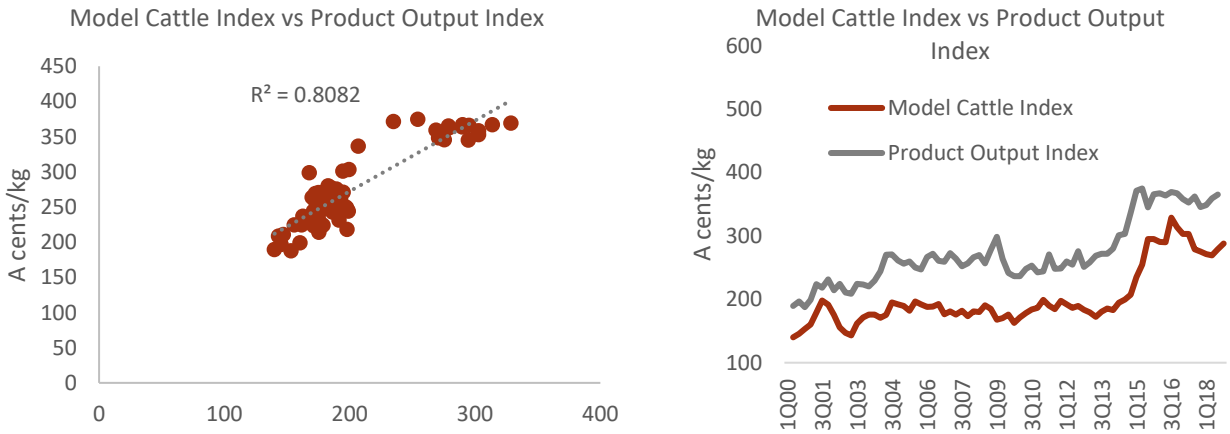
Figures 31 A, B: Model Cattle Index vs CME (3 months lag)



Figures 32 A, B: CME vs Product Output Index (3 months lag)



Figures 33 A, B: EYCI vs Product Output Index (3 months lag)



Figures 34 A, B: Cattle Index vs Product Output Index (3 months lag)

Impact of Hedging

Market volatility has a major impact on the enterprise value of a firm, where adverse price movements jeopardize the ability for corporations to grow and/or maintain profitability.

Hedge strategies can be designed to meet specific financial objectives- e.g. budgets, dividend payout, capex, etc., or those that impact strategic plans/competitive position.

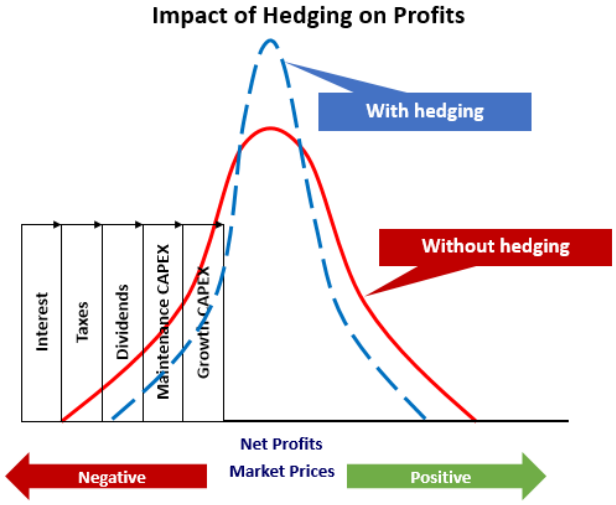


Figure 35: Impact of Hedging

Figure 35 demonstrates how hedging can reduce the risk of adverse price movements while providing certainty of cash flow to meet ongoing requirements.

While processors can readily mitigate foreign exchange, interest rate, energy and grain risks there are no established or efficient markets to hedge Australian live cattle or produced beef products. The CME US live cattle and feeder cattle futures have limited application for the Australian market due to their low correlation to Australian cattle prices.

To enable the industry to effectively mitigate livestock and produced meat, there needs to be industry accepted benchmarks. These benchmarks will form the basis of physical contractual prices leading to the establishment of transparent and liquid exchanged traded and over-the-counter products to mitigate price volatility.

Without industry accepted benchmarks, the sector remains exposed and vulnerable to market volatility, compromising its competitiveness.

6.0 PEER GROUP COMPARISIONS

6.1 US Meat Industry

In the US there are 2 listed cattle futures contracts that trade on the CME:

- Live cattle
- Feeder cattle

These contracts have been in existence since the 1970's and are actively used by multiple participants across the supply chain:

- Producers hedging outprice risk for cattle sales
- Feed lot operators
- Processors & packers
- End users locking in costs and profit margins
- Managed Money or Institutional investors
- Speculators

Figure 36 highlights the growing activity and liquidity in these contracts since inception. For example, in 2018 these contracts traded on average approximately 63,000 contracts per day or USD 3.0 billion. This compares to US crude oil futures, which averaged 1.5 million contracts or USD 85 billion notional value per day.

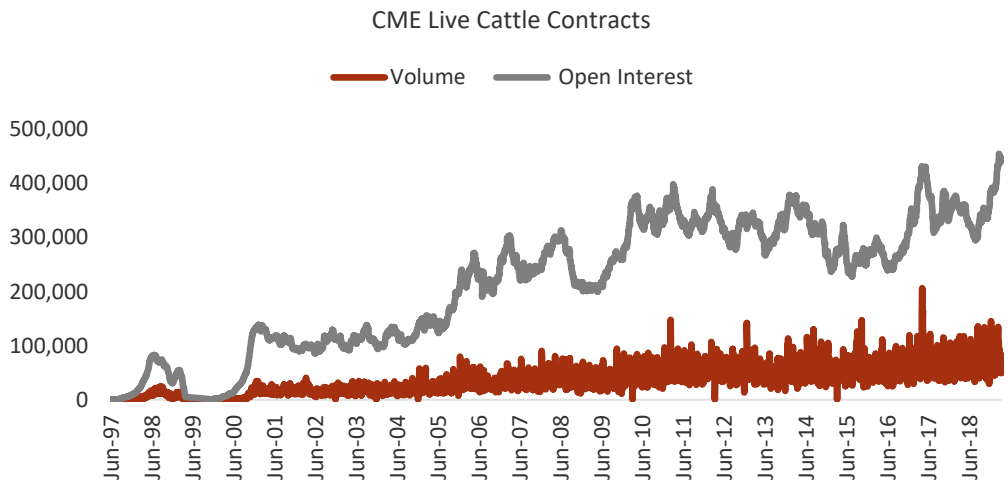


Figure 36: CME Futures Data

Figure 37 highlights the primary users of these contracts with corporations (producer/merchant/processor/user) representing one third of all activity, while managed money and swap dealers represent 33% and 15% respectively.

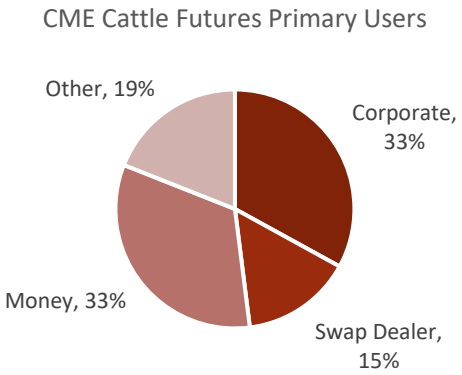


Figure 37: Break down of Users of CME Futures

Managed money or institutional investors typically gain access to these contracts via broad-based commodity indices such as the GSCI.

Figure 38 below shows the composition of the GSCI index by commodity with cattle contracts representing over 6% of the total index, meaning it attracts natural interest from a diversified pool of investors.

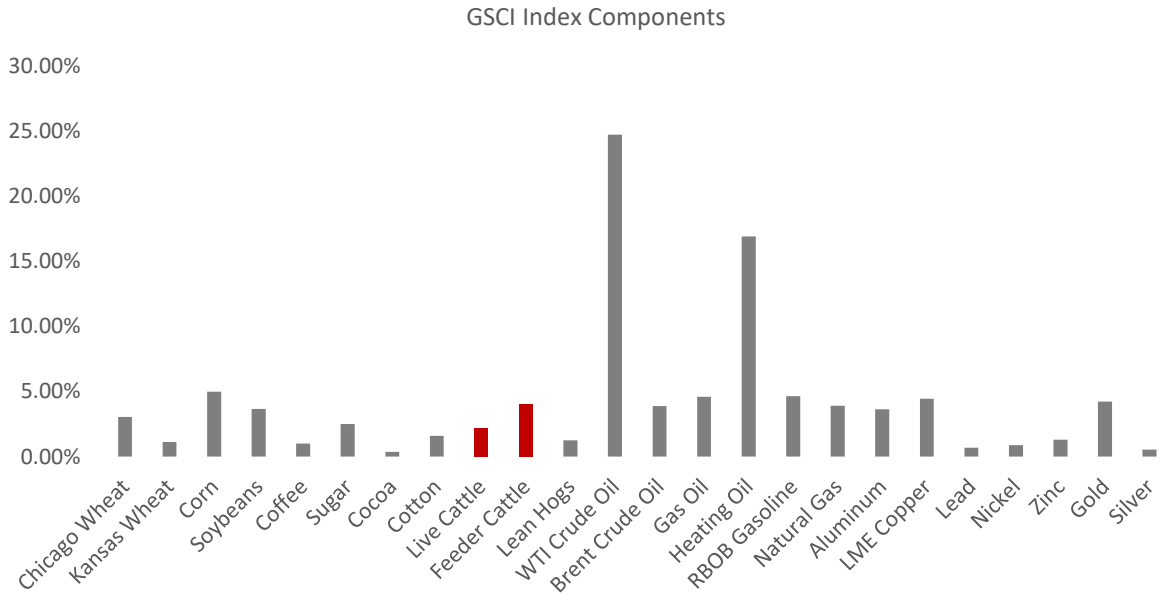


Figure 38: Components of GSCI Commodity Index

While the predominant market to hedge risk in the US are the listed CME futures, there is some small activity in the OTC market for trimmings, with 90CL being a commonly used benchmark referenced by the USDA or the Urner Barry "Yellow sheet".

CME Hedge Strategy - Cattle Crush

The cattle crush is a hedging strategy designed for feed lot operators in the US and is used by some of the more sophisticated risk managers and traders.

In essence, the cattle crush attempts to replicate the gross margin of a typical feedlot operator by calculating the spread or margin (crush) between typical inputs (feeder cattle and corn) and the output sale price (live cattle).

Traders implement this strategy by simultaneously executing a ratio of the components via the futures listed on the CME. For example:

Cattle Crush = (6 * Live Cattle contracts) – (3 * Feed Cattle contracts) – (3 * Corn contracts)

The resulting cash settlement of this structure is intended to hedge any adverse movements in the physical sales of finished 'live cattle'.

While this is a US-focused strategy, the relevance to the Australian industry can be linked to corn prices, given the large impact this has on crush margins. In contrast to the Australian beef industry, the US is primarily a grain fed industry with exports representing only 12% of total domestic production.

When corn prices are low, US feedlot operators will ultimately increase the supply of quality live cattle and US grain fed beef products. Should US exports increase, this will compete directly with Australian products in key markets such as Japan and Korea, and increasingly China.

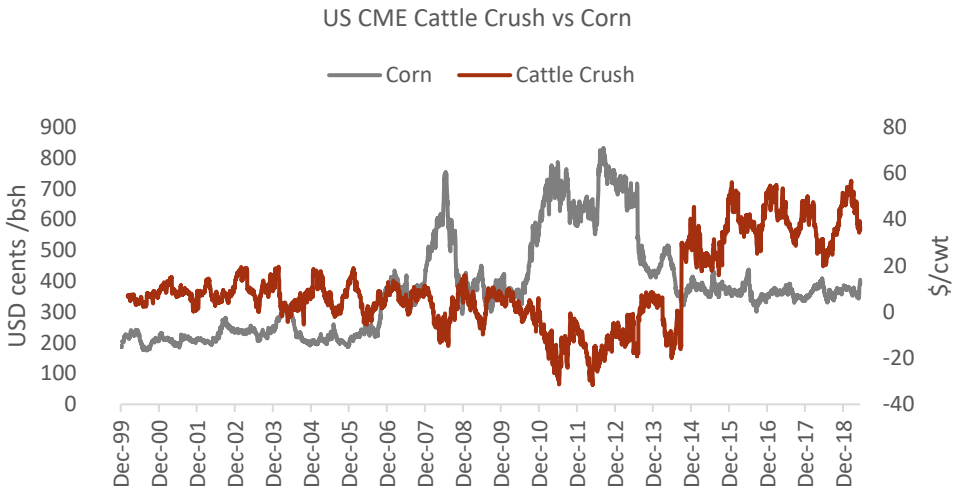


Figure 39: Inverse Relationship between US CME Cattle Crush and Corn

Given the absence of local benchmarks and hedge instruments in Australia, the CME cattle crush is a potential strategy for larger lot feeder/processors in Australia.

Participants across the supply chain in the US actively manage commodity price risk via the CME listed contracts. Should similar industry accepted benchmarks be accepted in Australia it would provide a similar platform for processors to mitigate similar risks.

6.2 Australian Cotton Industry

The Australian cotton industry exports virtually 100% of lint produced through around sixteen marketers currently.[19] As a mature deregulated market having been fully deregulated since the early 1990's, there is significant competition for lint into the export market. Similarly, the ginning (processing of field modules into lint bales and cotton seed) of cotton is relatively competitive and transparent, with several major ginning companies competing for business.

The traditional physical pricing benchmark for cotton is the A Index. Originally a delivered northern Europe designation, this in more recent years now references physical prices into Asia, where the bulk of cotton is exported. This physical benchmark serves as a reference point for global trade, along with a long-established futures benchmark that trades in the ICE exchange in New York.

Producers of cotton are able to manage their USD income stream effectively against their AUD cost base via the following forward marketing and hedging alternatives:

- Basis contracts or Call Pools with merchants (up to 3-4 years out): where producers can fix legs of their commodity price at different times i.e. futures, basis and FX;
- Physical forward cash contracts merchants (up to 3 years out): typically, in AUD. May be in USD if the producer hedges FX independently via a bank;
- Commodity Pools (up to 2 years out): are offered by merchants and advisors;
- Exchange traded futures market (up to 2 years out): producer must manage margin calls, which risks them being stripped of cash in a rising market;
- OTC swaps and options (up to 5 years out): offered by banks and large trade houses, typically with a credit line to cater for all (clean) or part of any negative variation margin.

The above forward hedge and marketing alternatives undoubtedly de-risks the industry, allowing for investment for expansion over and above what would be possible without such risk mitigation. Such investment and development capital is often deployed into activities that reduce variability of production. Furthermore, the gins (processors) have a high degree of visibility out several years of contracted volumes, allowing for efficient planning and scheduling.

The sophistication of risk management within the cotton industry is considered high by financial market service providers.

Given the efficiency and transparency of the cotton industry, there is little incentive for producers to enter investment in gins in order to vertically integrate; toll ginning is common place and, in some cases, producers choose to merchandise further downstream to benefit from markets that value provenance and sustainable practices.

It is common for producers to sell cotton seed to the ginner as payment for converting modules to lint bales; there may need to be a top-up cash payment if cotton seed prices fall below a certain level. Perhaps there is a possible parallel model in this respect to meat processors in terms of producers marketing prime cuts and processors marketing offal and hides, particularly given the benefits of provenance in prime cuts and scale and specialisation of offal and hides marketing.

[19] AgRee Commodities Pty Ltd

Cotton participants across the supply chain benefit from having a globally accepted futures benchmark that forms the basis of any cotton risk management activities.

6.3 Natural Rubber Industry

- ~USD25B trade with annual production of 12.6M tonnes[20]
- Benchmarks include Shanghai futures, Tokyo futures, two Singapore Stock Exchange (SGX) futures contracts
- SGX futures set physical pricing globally - monthly average of the 2nd nearby futures. The contract is physically deliverable (although this is rare) and the exchange provides some arbitration
- Producers - 30% plantations but 70% small holder production globally
- Smallholder producers, for example in Southern Sumatra, Indonesia, have access to SGX futures (prices) on their mobile phones and are well aware of the discount they trade to SGX TSR20 (block rubber) futures when the middlemen bid them for raw cup lump rubber (tapped from trees) for cash and transport to rubber processing plants nearby to be on-sold
- This bench-marking benefits producers and the supply chain with very active receivables financing taking place in the natural rubber trade where banks finance trade houses, such that tire manufacturers can defer payment and keep inventory off balance sheet. Again, this financing process is assisted by the open and transparent pricing benchmarks available

The transparency and visibility of the natural rubber index allows small, medium and large companies to have confidence in the price they are receiving for their produce.

6.4 New Zealand Dairy Industry

Historically, the dairy industry in New Zealand had few industry benchmarks. The statutory marketing board in Australia (Australian Dairy Board), pooled, sold and paid the achieved price retrospectively to dairy farmers. Even within this pooling system, there was reportedly a poor linkage between the milk payout price and the aggregate prices of output products. Major products, such as bulk butter, had no benchmarks and trading margins were reportedly volatile. For example, word-of-mouth recent trades to valued export markets, such as Japan, were reportedly used to assist negotiating pricing discussions. Taking this example, the trade into Japan is now transparent and competitive in dairy. Similarly, the traded sale of Australian beef into Japan is now reasonably competitive for grain and grass-fed beef, basis the US benchmarks and South American trade intelligence respectively.

At a producer level, two decades ago there was a progressive move from pricing milk as cents per litre to bifurcating the pricing mechanism to incentivise producers for differing specifications such as milk solids - fat and protein. This is akin to the grids now increasingly published by meat processors in Australia.

The New Zealand Dairy industry has evolved further in the last five years and more relevantly, with liquid milk benchmarks and hedge mechanisms, in just the last two years. Progressive New Zealand Dairy producers are now pricing up to half of their production forward, securing their income stream, enabling them to fund capital intensive productivity improvements.

[20] Rubber Statistical Bulletin. (March 2019). International Rubber Study Group, January-March 2019 edition.

Benchmarks, futures and or options available to the New Zealand Dairy Industry include[21]:

- NZX Liquid milk
- NZX Whole milk powder, skim milk powder, AMF (Milk Fat) & butter.
- Published benchmarks exist for other products such as Cheddar, Whey Powder and Rennet Casein.
- Other international benchmarks and futures are referenced on the US CME and Euro XE.

Figure 40 below highlights how the liquidity and activity of the NZ milk contracts has performed since inception.

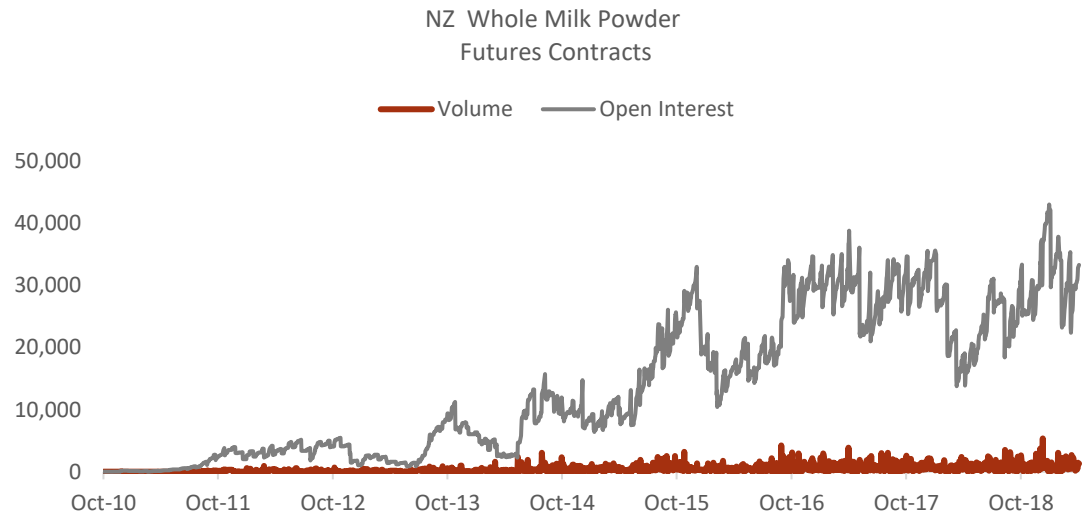


Figure 40: History of NZ Dairy Futures[22]

Given the access to the benchmarks above and hedge instruments, New Zealand processors are successfully increasing market share in the international markets by fixing forward supply contracts.

While red meat products are not homogeneous as dairy products, apart from trimmings and some co-products, there are some parallels that can be drawn at the feedstock (cattle input) level to the Australian red meat processing sector.

The rise of benchmarks in the New Zealand Dairy industry in recent years has increased the ability for the industry to manage risk, attract international investment and compete in international markets.

[21] Global Dairy Trade

[22] New Zealand Futures

6.5 Crude Oil Refinery

The risk profile of meat processors is very similar to that of an oil refiner.

Figure 41 below highlights a simplified flow of inputs and outputs for both a meat processor and oil refiner, and compares and contrasts the accessibility to market benchmarks to be uses to negotiate physical contracts and manage risk.

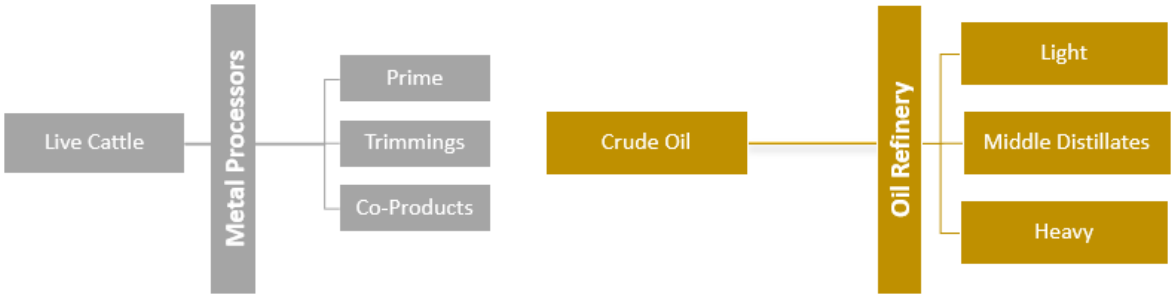


Figure 41: Comparison of Oil Refiner to Meat Processor

Meat Processors	Oil Refiner

• Cattle price varies by size, weight, breed, location
• Established (US) futures for live and feeder cattle.
• No Australian or Asian futures contracts for any live or feeder cattle
• No futures markets for any products produced
• Limited OTC market for trimmings in the US only
• No Australian or Asian benchmark for any product sales
• Limited risk management opportunities other than bilateral physical contracts
	• Crude oil price varies by quality (e.g. API Gravity, Sulphur content) and geography
	• Over 120 varieties of crude oil BUT the industry focuses on 2 main global benchmarks- WTI and Brent
	• Both WTI and Brent have established futures and OTC markets
	• Refined products have established industry benchmarks:
	  • Futures- heating oil, gasoil
	  • Industry publication- Platts, Argus
	• Industry benchmarks form basis for all physical contracts expressed as premium/discount to the relevant benchmark
	• Seasonal demand for refined products varies from summer (gasoline) to winter (heating oil)

- WTI and Brent are the established global benchmarks for crude oil which are referenced in most physical contracts. Moreover, as listed futures contracts, they are one of the most actively traded commodity futures contracts turning over approximately $85B per day on average for tenors out to 10 years.
- For the refined products there are futures markets in heating oil and gasoline while industry publications such as Platts and Argus provide product and regional benchmarks.
- For example, the price of diesel in Australia is determined by reference to a Singapore published index price for gas oil.

There is much the red meat industry could learn from the oil market. The transparency and efficiency of established benchmark prices in the oil industry forms the basis for active and cost-effective risk management across the oil supply chain.

7.0 SUMMARY AND RECOMMENDATIONS

The Australian red meat sector remains exposed to the volatility of financial market risks:

- Foreign Exchange;
- Interest Rates;
- Commodities & weather;
- Liquidity & credit.

The Australian financial market is a deregulated, liquid, transparent and cost-effective to mitigate most of these risks, including weather. Moreover, there are commonly used instruments and techniques that can be utilized to mitigate market risks.

Recommendations

1. **Foreign Exchange**
    - The AUD foreign exchange market is one of the most actively traded markets globally;
    - It is liquid, transparent and cost effective to mitigate most foreign currency purchases and sales;
    - Utilize the forward foreign exchange and options market to:
        - hedge any timing mis-matches between physical purchases and sales
        - lock in budget revenues in foreign currency
    - Given the importance of China to the red meat export sector, processors should consider offering local currency (CNY) contracts to establish and maintain customer relationships;
    - This could be a significant competitive advantage position against international companies which can be subject to local regulatory and liquidity challenges;
    - The China foreign exchange market has developed such that this risk can be readily hedged into AUD in a cost-effective manner, potentially improving the competitive standing of Australian products.

2. **Funding and Interest Rate**
    - The sector has enjoyed extended periods of low wholesale interest rates, however, remains vulnerable to increases in interest rates;
    - There are various techniques to mitigate interest rate risk including:
        - Fixed rate loans
        - Interest rate swaps
        - Interest rate options - caps and collars
    - The Australian interest rate market is highly liquid, flexible and cost effective to manage interest rate risk;
    - Members should analyze the impact of rising interest rates on projected cashflows and undertake remedial action;
    - Sources of funding to support the sector are expected to broaden from the traditional bank lenders to alternative forms of capital from private equity, stream finance, or specialist venture capital firms.

3. **Commodity Risk**
    - The sector is exposed to multiple commodity risks;
    - Commodities are the most volatile of all other financial market risks and can therefore cause the most financial stress;

- There are efficient and transparent markets to mitigate multiple commodity risks (transportation, power, grain), however, the absence of any meaningful domestic futures or OTC markets in live cattle or processed meat represents a significant shortcoming and risk to the sector;
- Futures markets in the US for live and feeder cattle have little or no relevance in the Australian market;
- Industry accepted benchmarks for live cattle, in particular, are critical to allow participants to mitigate risk.

4. Synthetic Processor

- The synthetic processor highlighted the historical volatility of a typical processor with assumed cattle inputs, product yields and costs of production;
- The model also projects future variability of income assuming market volatility remains consistent;
- While the analysis made several assumptions regarding inputs and yields the model has the flexibility to cater for various scenarios, assuming availability of relevant data is made available;
- AMPC welcomes the opportunity to assist members to use this proprietary model with their specific product data.

5. Peer Group Comparison

- The red meat sector can learn from the best practices of their US industry peers and other sectors;
- In 1999, the US beef industry came together to establish benchmarks and compulsory reporting of data that has resulted in improved trust and efficiency.
- This led to the development of futures contracts (and OTC instruments) which is widely used today by US producers, processors and end users active manage risk and institutional investors wishing to trade this market;
- Participants in other agricultural sectors (cotton, NZ dairy, natural rubber) actively engage in hedge activity, as do oil refineries, whose risk profile is similar to meat processors;
- These sectors have open and transparent market benchmarks which are used to evaluate expansion projects, price physical contracts and facilitate risk management activity.

6. New Industry Benchmarks - The Way Forward

- There are no Australian industry accepted benchmarks for later stage live cattle or produced meat that are used extensively in physical purchases and sales, ***representing a significant risk to the sector;***
- Traditional benchmarks such as the EYCI have reduced in relevance and usage in commercial contracts and hedge activity;
- Recent attempts to relaunch new benchmarks have not been successful due to lack of full industry support.

Key Recommendation

- The sector needs to adopt industry accepted benchmarks that will form the basis of physical contract negotiations for a large part of the industry, creating a foundation for an efficient platform to identify, measure and manage price risk;

- We recommend the creation of industry forum to discuss the creation of industry accepted benchmarks in the backgrounding and finishing stages of the beef cattle supply chain, such as feeder steer (entry weight);
- The forum will be represented by participants across the supply chain including:
    - ✓ Producers – graziers and lot feeders
    - ✓ Processors
    - ✓ Traders
    - ✓ End Users
    - ✓ Peak industry bodies
    - ✓ Government departments
    - ✓ Banks and financial institutions
    - ✓ Insurance
    - ✓ Futures exchanges
    - ✓ Research and market data services

Key Benefits:

- ✓ Improved market transparency leading to industry efficiency;
- ✓ Separation of physical risk to financial risk, critical given Australia's high dependence on international markets;
- ✓ Allow for the separation of pricing and supply mitigating any potential areas of conflict;
- ✓ Allow stakeholders to identify specific premiums/discounts for their livestock against a relevant benchmark;
- ✓ Better educated sector with the ability to utilize best practices in risk management from industry peers, allowing participants to hedge key risks;
- ✓ Improved international competitiveness - aligning global meat prices better with Australian cattle prices;
- ✓ Improved access to capital as a result of reduced risk;
- ✓ Optimise the allocation of natural resources, processor resources and assisting environmental and social sustainability via future price signals, and more stable workforce needs;
- ✓ Provide incentives for investment in research, development, innovation, drought-proofing, extension and forward-looking policy making.

AMPC welcomes the opportunity of supporting the establishment of this forum

8.0 APPENDIX

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