



5-year Economic Outlook for Merino Farming

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Problem Statement

NZ pastoral livestock production is currently faced with a rapidly changing environment. Input and output prices and their relativities are increasingly dynamic. The policy and regulatory environment seems to change quickly and with little warning. The physical climate and natural resource base is changing as a result of internal and external forces.

Meanwhile agriculture continues to play a major part in NZ's social, economic, and environmental systems. There is a clear need for a better understanding of possible 'sustainability trajectories', and 'most likely scenarios' with respect to the future. Stakeholders need confidence in the future of agriculture for smarter public and private investment in the sector, and more informed setting of policies and regulations. At the farm level, attracting high calibre entrants will require an improved certainty of the economic sustainability at the farm and industry level. Information about possible future scenarios is needed by producers for on-farm decisions relating to input and output optimisation. And there is a need for renewed and justified optimism within rural communities.

Purpose and relevance

The purpose of the proposed research is to;

Provide a better understanding of the likely viability of NZ's merino production sector to inform private and public decision making

Objectives

1. Identify the primary variables influencing the economic viability of merino production
2. Quantify the relative impact of major variables on long term farm viability,
3. Estimate the likely trends in these variables over the medium to long term
4. Predict the net impact of future trends in key variables on the economic viability of merino production in NZ.

Methodological Approach

A 'model farm' is used to illustrate the current situation of a 'typical' Merino high country production unit. This model is taken as the average performance parameters of the clients of one of the accounting firms servicing high country farmers in the central South Island. The income statement for this model farm is used to identify the key determinants of profitability.

Literature has been reviewed to track past trends in these determinants, as well as the fundamental factors that have influenced the trends. This information has been used to identify and justify a likely future trend.

Different scenarios are modelled to generate possible and probable outcomes for merino farming in the future. The modelling process has been kept as simple as possible using Microsoft Excel.

Fine wool production in New Zealand

Some of the defining characteristics of merino farms include:

- The key product produced is fine wool. Market prices are volatile because of the nature of the end products (largely luxury items) and the complex demand and supply forces,
- Weather patterns are variable and unpredictable, and the future impact of climate change is uncertain,
- The two growing seasons are spring and autumn (summers are hot and dry),
- There is a large reliance on the sale of store stock,
- Most fertilizer needs to be applied aurally (this discourages the application of lime),
- Most farms have a capital value that exceeds their productive value,
- This is in part due to the appeal of the high country in terms of amenity, recreational, and ecological values,
- High land values mean high rates (payable to local government) and possible difficulties for farm succession,
- It can also translate to high debts,
- But also means high equity (and so a willingness by banks to lend funds),
- Most farmers have leased their land (excluding improvements) off the Crown via a long term pastoral lease. Most farmers have the option of free-holding these leases.
- The rents charged by the crown for the pastoral leases are now including 'amenity values' (and so substantially increasing the rentals paid),
- Rabbits have been a major problem in the past. RCD has effectively controlled most populations until now, however resistance to RCD is now increasing.

Identification of Primary Variables

The 'Merino High Country' farm class was selected for analysis from the *Ibbotson Cooney Farm Survey of Farm Income and Expenditure*. This survey collates financial and on-farm information from the clients of Ibbotson Cooney. The five year period 2003 to 2007 was selected for analysis.

The income statement for the model farm for the average merino high country farm is summarized below. It is clear from the statement that the biggest revenues are from wool (representing 50 percent of gross farm income), and from sheep sales (representing 31 percent of gross farm income). The 5 biggest single expenditure items are interest, drawings, shearing, labour, and fertilizer. For the purposes of this exercise, 'labour' is taken as the sum of wages, shearing, and drawings, and combined these account for 30 percent of total expenditure. Table 1 illustrates the income statement of an average farm.

Table 1

	Average (2003-2007)	
Sheep	159,167	31%
Wool	253,692	50%
Cattle	40,866	8%
Other	51,580	10%
Total	505,305	100%
Interest Paid	88,145.66	15%
Personal Drawings	68,719.74	11%
Shearing Costs	57,611.41	10%
Wages	51,682.63	9%
Fertiliser	45,170.29	8%
Vehicle and Fuel	35,595.90	6%
Animal Health	34,460.31	6%
Feed, Haymaking & Grazing	32,516.48	5%
Property R & M	27,856.15	5%
General Admin & Phone	21,828.36	4%
Contract Work & Plant Hire	17,731.17	3%
Weed and Pest Control	16,855.70	3%
Fencing	14,427.64	2%
Rates	12,074.31	2%
Seeds	10,949.00	2%
Insurance	9,997.19	2%
Taxation	9,417.24	2%
Freight	9,091.25	2%
Power	9,012.70	2%
Other	25,575.01	4%
Total	598,718.14	100%
Farm Surplus	-93,413.27	
<i>GST Excl</i>		

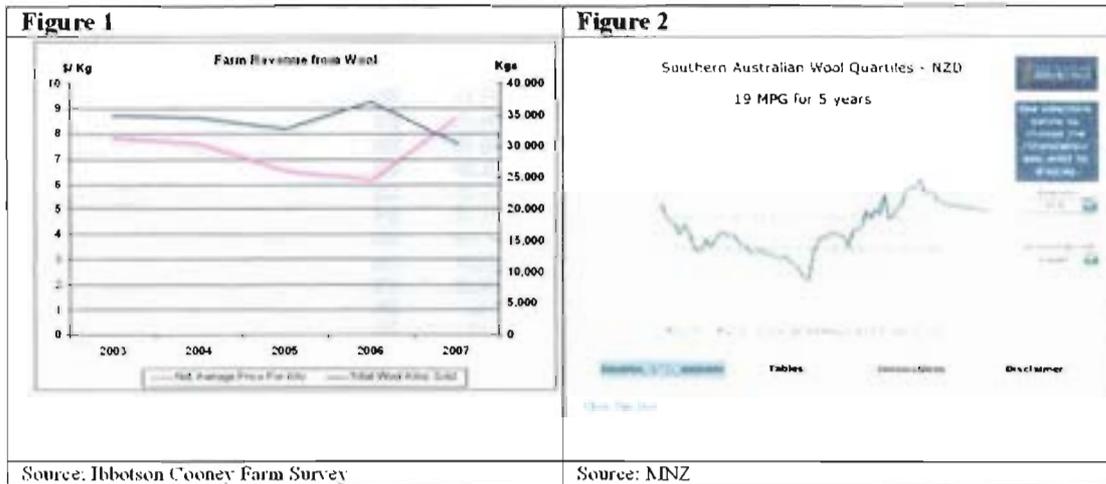
The next section of this report outlines the past trends in each of the primary variables identified above (sheep meat and wool on the income side, and labour, interest, and fertilizer on the expenditure side), the forces behind these trends, and the probable future trends. The remainder of the report will analyze the impact of these projections.

Primary Variables; Trends, Forces, and Projections

Wool prices

Current situation

For the average merino producer, total revenue from wool has varied from a high of just under \$ 300,000 in 2003, to a low of \$ 225,000 in 2006. Figure 1 illustrates the trend in wool production and prices received by the model farm throughout the last five years. Since the beginning of 2006, strong economic growth has contributed to increased demand (and so higher wool prices). This is illustrated in Figure 2. It can also be seen that the Merino New Zealand prediction for future short term prices are stagnant.



Key forces

1. **Global economic prosperity** – many of the final products derived from merino wool can be considered luxury goods (e.g., suits, sportswear, etc). Demand for these products will increase in times of economic prosperity as consumers will have greater discretionary income to spend on such products. Over the last two decades the expectations and outlook for economic growth amongst the worlds advanced economies has had a significant impact on wool prices (figure 3) (Rabobank, 2008¹). Note that the wool indicator typically lags the economic indicators, often by up to several months. The slowdown of economic conditions globally in 2008 and beyond, especially in the US, Japan, and Western Europe, is expected to have significant impact on wool prices due to an expected slowing of

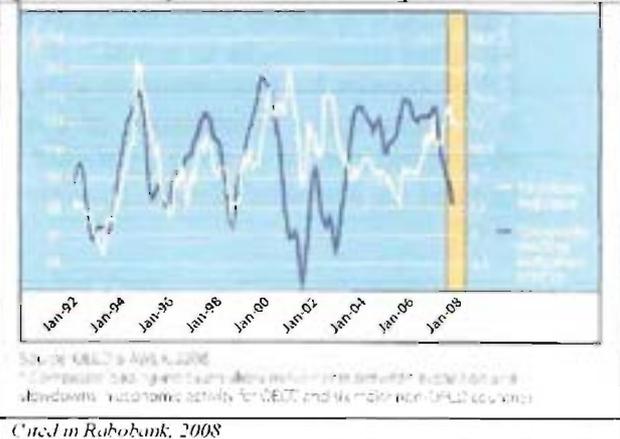
¹ Rabobank, 2008. Wool – can it overcome the challenges?

discretionary spending. There has already been a significant decline in retail apparel sales in the US, UK, and Western Europe—exports from China to the US and Japan fell by 7.7 and 11 percent respectively in January and February 2008 (Rabobank, 2008). It is likely that the rate of economic growth in major wool consuming countries will remain low throughout 2008 and 2009, but will bounce back in 2010 and 2011. Producers of finer wools (sub 16 microns) will perhaps be more buffered from this downward pressures as the very high income consumers for which the end products of this wool is produced, are less likely to be impacted by the economic downturn.

2. **Consumer tastes and preferences** – Consumers in targeted end markets are increasingly scrutinizing the production and processing systems that supply their food and apparel products. End consumers are seeking products that have been produced in an ethical and ecologically ‘friendly’ manner, and want this to be verified. Retailers have begun to respond to this need for

traceability as consumers increasingly insist on knowing what they are spending their money on. Icebreaker (a New Zealand based outdoor apparel company) has recently introduced a novel traceability system—“*Baacode*” involves a unique number on each garment that customers can enter into icebreakers website to ‘recount the journey that underpins the company’s ethos’ (i.e., the journey from the sheep station to the retailer). Icebreaker founder Jeremy Moon states “you get value for it because there are a lot of people who want to buy things with integrity, so when you have something with integrity it makes sense to tell people about it.” (The Dominion Post, 2008²). New Zealand Merino has made substantial inroads in working with processors/ retailers such as Icebreaker as well as producers, to satisfy these demands. Such systems all come at considerable cost, and appears yet to be proven the extent to which the ‘added value’ exceeds the added cost. It is foreseeable that in the medium term these systems will themselves become commoditized. Further, there is a real possibility that negatively framed campaigns reduce consumer demand for end products made from fine wool. Examples include PETA’s public objection to mulesing in Australia, and the topical ‘Food Miles’ issues in Europe. However, it is also possible that negative perceptions associated with substitutes (synthetics, cotton, etc.) increase demand for wool provided the fine wool sector can maintain a relatively ‘clean’ image.

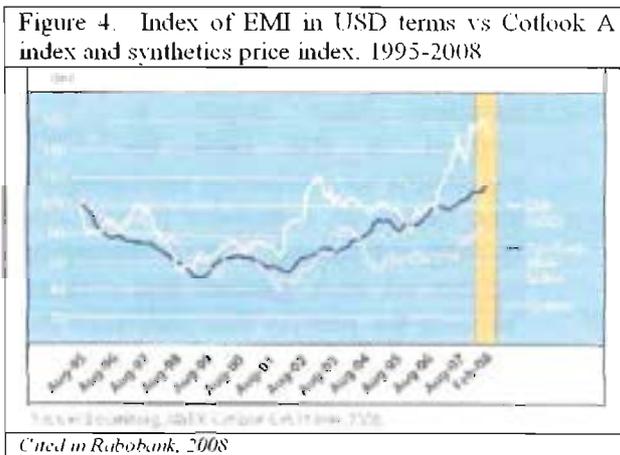
Figure 3. Leading composite economic indicators on the global economy and 19 micron wool prices, 1992-2008



² The Dominion Post. 2008. *All the way back to the sheep*. Saturday, August 2, 2008. accessed from <http://www.stuff.co.nz/1640108a13.html> on August 8, 2008).

3. **Price of substitutes** – As the price of substitutes decreases (or the functionality increases at any given price level), then demand for wool products will decrease (and visa versa). While wool prices have risen over the last three years, prices for most textile fibres have also seen increases (Figure 4). Price increases for textiles in general are in part attributable to rising demand from developing countries, and the transfer of higher input costs from manufacturers to processors. The key driver in this light has been the 500 percent increase in oil prices between 2002 and mid-2008 (Rabobank, 2008). This has resulted in higher costs for the raw materials that make up synthetic fibre. But even with the higher oil prices, wool is currently over 4 times the price of synthetic. Cotton prices have been relatively depressed over recent years due to increased production in China and India which has lifted cotton stocks to record highs. However, strong demand and a decline in US production have combined to help push cotton prices back up. Into the future, it is likely that a combination of new technologies and supply side growth in developing countries (with relatively cheap inputs) will continue to constrain demand for fine wool, despite possible continuation of significant rises in the cost of oil.

4. **Wool supply** – as the profitability of alternative uses (e.g., meat, milk, crop production) of productive resources (land, labour, capital) increases relative to that of fine wool production, then the supply of fine wool decreases (and visa versa). With food prices in general having risen substantially, some fine wool producers have changed (partly or wholly) to alternative land uses. In New Zealand, these



changes represent only a relatively small proportions of total wool production (largely because fine wool production is the only option on many NZ merino farms), however in Australia where much of the merino producing area could alternatively be used for crop production, change in land use (away from Merino) is much more likely (in the face of high and rising grain prices and stagnant fine wool prices). That is, the price of some cereal crops such as wheat doubling in the last 12 months has substantially altered the relative profitability of wool and cereal production. Also, in New Zealand, some areas currently used for wool production, may be transferred to dairy support (or even dairy itself). In New Zealand, supply has been (and continues to be) reduced due to significant areas of crown pastoral lease (that was previously used for fine wool production) being returned to the crown (for conservation and recreation purposes). It is also conceivable that there will be a net reduction in supply as a result a 'lower

rainfall' environment with respect to anticipated climate change. Overall, this will contract supply and so increase price, provided a critical mass of wool can be produced to continue to sustain an economically viable supply system. That is, it is plausible that because the share of the global textile market is so small, any future reduction in supply will contribute in a reduction of critical mass necessary to sustain production and processing systems, and maintain wools status and reputation in the market place—thus, there may be an anomaly in that any future supply reductions could eventually adversely effect remaining producers by eroding the critical mass necessary to sustain the fine wool sector.

5. **Currency** – Wool is generally traded in USD and the appreciation of both the AUD and the NZD against the USD has meant that overseas buyers are currently paying the highest prices for merino wool since the collapse of the reserve price scheme for wool in 1989. Europe and China continue to be the key export destinations for raw and semi-processed wool—as a result, any movements of the Yuan and Euro against the USD can have a major impact on the prices paid by wool importers. The movement to a floating currency exchange by the Chinese government has resulted in an 18 percent appreciation of the Yuan, and this has helped to absorb some of the impact of the higher USD prices. Likewise, the Euro has appreciated significantly against the USD (29 percent since January 2006) and this has softened the impact of higher USD prices on European buyers (Rabobank, 2008). In summary, the USD has generally weakened – so prices in USD are higher, but wool buyers are still able to afford them because the prices they pay in their local currency, have not increased to the same degree (that the USD prices have).

5-year projection

In sum, global economic sentiment will have the most significant impact on fine wool prices in the next few years. This is likely to be negative for the next 3-4 selling seasons, and will subsequently recover thereafter. Consumers will continue to demand verifiably 'clean, green' products and the NZ fine wool sector is well positioned to meet these requirements. Substitute products will continue to be competitive, but will face the same consumer scrutiny as wool. And total supply is likely to continue to trend down but with negligible impact on prices received by remaining growers. Currency fluctuations will continue to have important implications, though it is difficult to assess the nature and extent of these. A 'best guess' of the future price trends would be a readjustment up in the first year, followed by sustained modest growth thereafter as global economic growth rebounds and consumers have more discretionary income to effect their preferences for 'natural, green, traceable' consumer products. In an optimistic situation, demand for wool would not be affected by the current economic situation, and so would jump to a higher equilibrium over the coming two years, and appreciate at a stable rate thereafter (as marketing campaigns focusing on the performance and 'feel-good' factors of wool (produced in environmentally and socially acceptable ways) gain traction). In a worst case scenario, demand for wool would fall significantly in the first two years (due to a

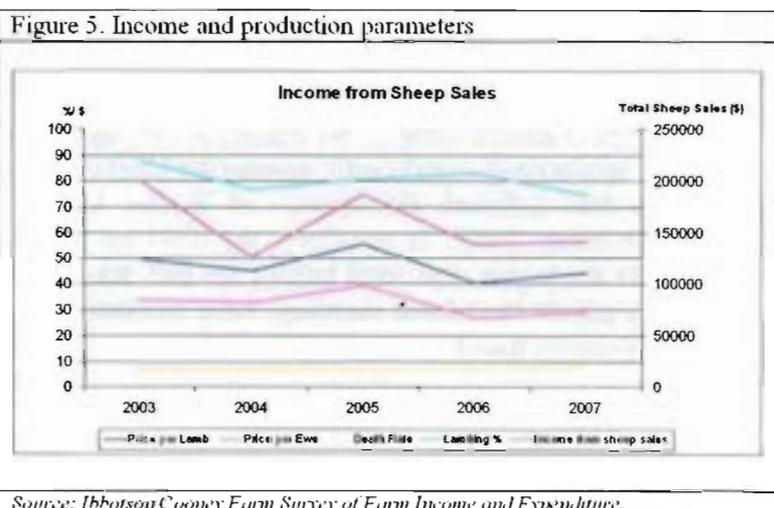
combination of bad press (e.g., related to muelsing) and reduced demand resulting from global economic turmoil), and would remain stagnant for the following three years.

Projection of wool price changes (percent per annum); 2009-2013					
	2009	2010	2011	2012	2013
Best Guess	15	5	5	5	5
Optimistic	15	15	5	5	5
Worst Case	-15	-10	0	0	0

Sheep meat prices

Current Situation

The model farm has seen income from sheep sales fluctuate from a high of just over \$ 200,000 in 2003 to a low of just over \$ 120,000 in 2004. This largely reflects variance in a combination of lambing percent, death rate, and stock prices (see graph). It can be seen that variance in total revenue has been mostly attributable to fluctuations in the price per sheep sold (figure 5).



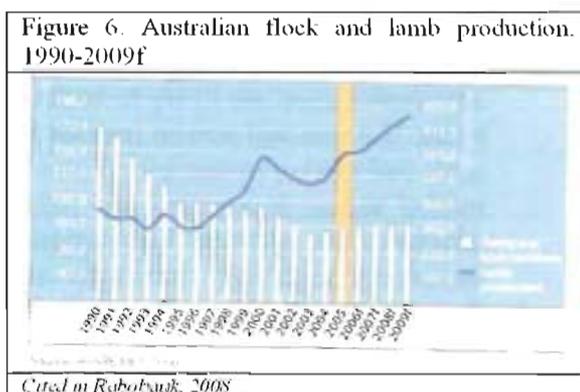
Key forces

1. **Demand in developing countries** – In spite of world population growth slowing from 1.26 percent (1996-2005) to 1.10% (projected 2006-2015), absolute annual increments continue to be large. It is anticipated that between 50 and 70 million people will be added annually to the world population until the mid 2030s. Almost all of this increase is expected to take place in developing countries, especially the group of 50 least developed countries. More food and fiber will be required to feed and cloth these additional people and to increase the daily food uptake of the still 830 million undernourished world wide. There is thus significant scope for further increases in demand for food even as population growth slows down (FAO³). This is in part because consumers are enjoying increasing levels of disposable incomes (and are perhaps more sheltered from the

³ FAO, 2008. *Current world fertilizer trends and outlook to 2011/12*

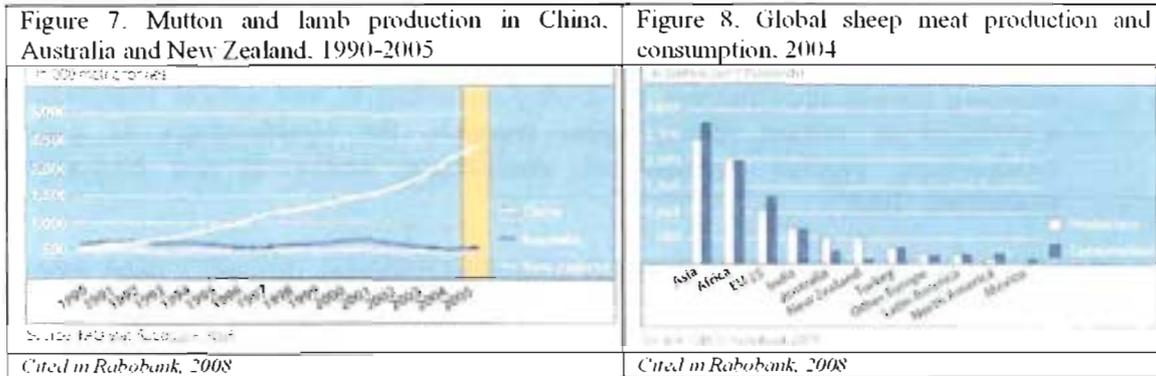
effects of the global recession). In these countries, the primary basis for competition among food retailers is price and availability. Given an existing export orientation that focuses on traditional markets in developed countries, targeting growth opportunities in developing countries will require significant investment in market identification, research, the establishment of trade relationships, product development, distribution, marketing and education (Rabobank, 2008⁴).

- 2. Demand in developed countries** – in developed countries, demand is much more oriented towards product quality, food safety, and traceability. Demand in these countries has been relatively static and opportunities largely relate to expanding the product offering into higher value cuts, providing an increased range of products, and to broaden consumer awareness of (and appetite for) comparatively niche lamb products (Rabobank, 2008). The effects of the current global economic downturn in developed countries are yet unknown though it is probable that lambs status as a high value niche product consumed by relatively wealthy individuals will shelter it from the global recession which will have a greater impact on the spending of middle income individuals.



- 3. Supply side forces** – Supply in many of the developing countries has increased dramatically over the past decade. For instance the production of lamb and mutton in China has increased from about 500,000 tonnes in 1990 to just under 2,500,000 tonnes in 2005 (see figure 7). However, the substantial increases in supply have generally not kept pace with the increases in domestic demand. In EU countries, domestic producers have reduced sheep numbers partly in response to disease outbreaks (FMD and bluetongue virus in particular), and partly due to CAP reforms. In NZ short term supply has increased via the slaughter of capital stock partly because of conversions to dairy and possibly because of tenure review (land taken out of production). And in Australia short term sheep meat supply has increased because of the drought (again via the slaughter of capital stock). Both of these increases in short term supply will result in reduced potential supply in the medium to longer term. Overall, tighter global supplies will put upward pressures on the price of sheep meat.

⁴Rabobank, 2008. New Zealand's meat industry – adapting to change

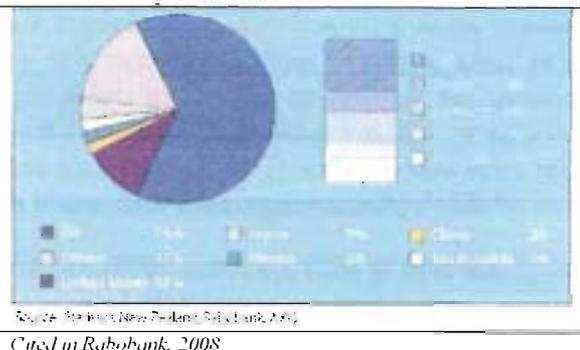


4. **Industry structures** – Reduced meat production will have an impact on the processing sector. There has been recent pressure for processing plants to reduce over-capacity, and plants have made progress in addressing this. However, the adjustment costs are likely to be factored into sheep meat returns over a period of years. Volume will remain important for processors as critical mass, economies of scale and market awareness all provide assistance when products are exported and market access is required and reduced supply might mean lower supply chain efficiency due to reduced economies of scale. Further, processing sectors will face increasing regulatory oversight and compliance costs. Technologies in the processing sector have increased efficiencies in past years (for example, over the past 20 years staff numbers on a processing chain have almost halved), and will continue to do so in the future (via the likes of computer scanning of carcasses). However, this will require ongoing investment in research and development.

5. **Substitute products** – The main substitute products for sheep meat are beef, pork, and poultry. These products are much cheaper to produce than sheep meat, and provide valuable benefits to consumers in terms of the versatility of product offerings and their suitability for providing quick, convenient, and easy solutions to household meal requirements. From a global perspective these meat products (pork and poultry in particular) are produced in much more intensive production environments relying heavily on grain based feeds (as opposed to pastoral based feed which fuels NZ meat production). Over the last 18 months global grain prices have increased substantially. While there is potential for this to have significant positive effects with respect to the relative price competitiveness of sheep meat, these benefits have largely been offset by higher land and input costs faced by producers in NZ.

6. **Trade environment** – NZ’s most valuable export market is the EU (the UK in particular, being the destination of more than 20 percent of New Zealand’s sheep meat exports). NZ enjoys a 227,854 tonne (carcass weight equivalent) annual EU quota which provides a significant competitive advantage over competitors such as Australia (which holds only 18,650 tonnes of quota). Over 50 percent of NZ’s sheep meat exports are destined for the EU by volume and this accounts for 64 percent of the total value of NZ’s total sheep meat exports (Figure 9). While changes in the global trade environment are proving to be slow, change is inevitable. Australia will continue to push for the freeing of access to European markets and this will put additional competitive pressure on NZ producers. However, reforms of the CAP have resulted in less distorted production decisions by European farmers, and an overall reduction in sheep meat supply (this benefiting exporting countries). Overall, freeing of the trade environment will force NZ producers to actively seek new markets.

Figure 9. New Zealand sheep meat export destinations by value, 2005



7. **Third millennium issues** – Emerging issues, particularly in developed country markets, including product traceability, disease-free status, fair trade, animal welfare, sustainable production methods, food miles, and carbon foot-printing, all present challenges for NZ’s pasture based farming systems. There is a constant need to keep pace with the rapid changes required in key markets and the advances undertaken by export competitors – for example electronic identification of livestock and complete paddock to plate traceability for individual animal products (Rabobank, 2008). NZ could be well positioned to take advantage of these emerging market requirements, but significant leadership and investment is required and there will be ongoing costs associated with managing the various traceability/ auditing, etc systems involved. These costs will most likely need to be carried by the producer. One particular threat to sheep meat prices would be a disease outbreak in New Zealand. This would have immediate effects in terms of market access, and would have ongoing implications in terms of our image as a provider of safe food products. It is conceivable that in the future there could be implications for meat producers from the likes of Fontera’s recent involvement in the China milk contamination issues.

5-year projection

On the positive side, reduced supply, sustained moderate growth in demand, a freer trade environment, and potentially more expensive substitute products (grain fed animals) will put upward pressure on sheep meat prices. On the negative side, threats to preferential

access to EU markets, third millennium issues and costs associated with compliance (traceability, etc), and increased costs of production (land, fertilizer, etc) will partly offset the upward pressures. Overall however, it can be expected that there will be significant modest price increases over the coming 2-3 years, followed by a period of stability. In an optimistic scenario, lamb would continue growth at stable and significant rates (say 10 percent per annum) on account of rising popularity as a healthy and versatile free-range protein source and relative competitiveness increases due to sustained high grain prices (for feed-lotted animals). In a worst case scenario, demand would plummet due to some sort of shock (disease outbreak), and would remain low for several years.

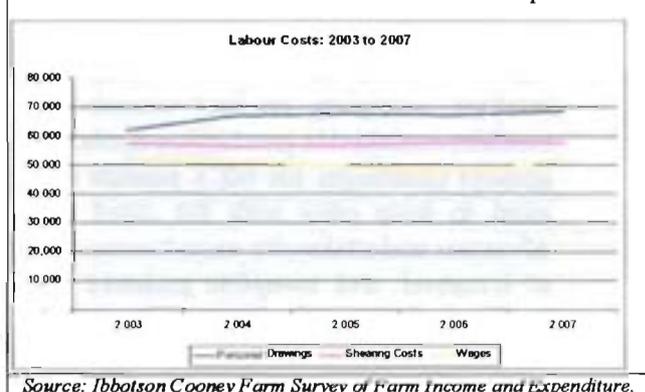
Projection of sheep meat price changes (percent per annum); 2009-2013					
	2009	2010	2011	2012	2013
Best Guess	5	10	10	5	0
Optimistic	10	10	10	10	10
Worst Case	-30	0	0	0	0

Labour costs

Current situation

Labour (comprising of wages, drawings and shearing) accounts for 30 percent of the model farms total expenditure. The last three years has seen increases in the cost of labour that have not been seen in decades (Figure 11). Labour costs increased 3.9 percent in the year to the June 2007, the largest annual increase since December 1992. The salary and wage rates (including overtime) component of the Labour Cost Index (LCI) rose 3.2 percent, while the non-wage labour costs component rose 8.1 percent.

Table 10. Labour costs for New Zealand merino producers

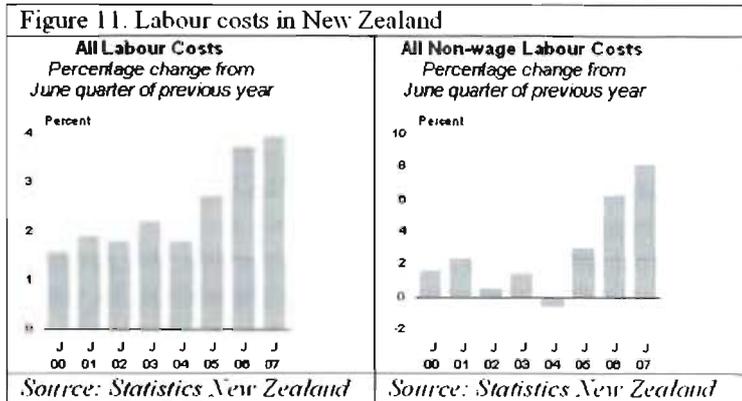


A recent Research Note published by JP Morgan attributes this to a tight labour market and a net outflow of skilled workers from the country.⁵ The rise in non-wage labour costs was due to rises in the cost of annual leave and statutory holidays, superannuation, workplace accident insurance and other non-wage labour costs (Labour cost Index, June 2007). Non-wage costs are also having a large influence and these are attributable to government policy that has favoured employees in terms of increased annual leave etc. For the private sector, annual leave and statutory holiday costs rose 10.6 percent. The main reason for the increase was the change in minimum annual leave entitlements from three weeks per year to four weeks per year (Statistics NZ).

⁵ (Research note: "Flight of the Kiwi: mobile workers drain human capital").

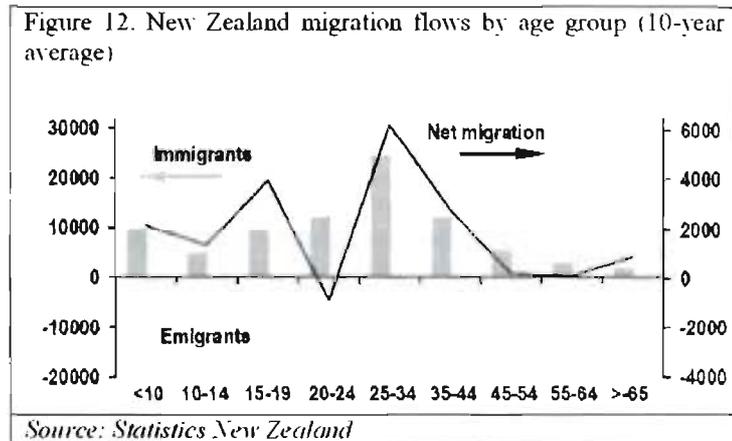
Key forces

Migration – The loss of skilled workers to countries like Australia and England has exacerbated New Zealand’s already tight labor market; this will add to long term wage inflation as corporates raise wages to try to prevent Kiwis from being wooed offshore. Wages are generally lower in New Zealand when compared to Australia and the UK; this wage gap needs to narrow in order to keep talented individuals from leaving.



The dent in the 20- to 24-year-old age bracket (Figure 12), generally consisting of graduate students, is not being filled by graduates from offshore. Anecdotal evidence suggests that students travelling to New Zealand arrive, complete their degrees, and leave—few stay permanently. As a result, it is very difficult for domestic companies to find quality graduates, as the labour market for that age group is global. This impedes productivity growth and inflates wages.

The largest net flow of immigrants are people not entering the work force. This category consists of responses for children, students, and retirees (JP Morgan, 2008). The aging population will have a similar effect as net migration – there will be fewer working age people from which to select agricultural employees.



Taxes and regulation – One could speculate that a government motivated by prospects of continued election would continue to implement employee oriented policy. The current employment environment encompasses a regulatory framework with significant compliance costs (ACC, minimum wages, etc). A streamlining of this framework could result in reduced labour costs, and likewise additional employment related regulation could add to costs. Given the tight economic environment it is likely that changes on this front will be a fairly low priority for the public sector in the short term.

Availability and attractiveness of Agricultural employment opportunities – the availability of future employment opportunities within agriculture will depend on the future prosperity of the sector. Assuming modest growth and improved economic

performance at the farm and sectoral levels, opportunities for employment in the sector will expand, and employers will be able to afford to make employment opportunities more attractive (via improved remuneration packages, better working conditions etc).

Availability and attractiveness of alternative employment opportunities – however, the ability to attract employees will be highly influenced by the relative competitiveness of the agriculture sector (with respect to other employing sectors in the economy). It is quiet possible that of all economic sectors, the primary sector will fare relatively well throughout the impending economic slowdown. In which case the price of labour would stabilize at existing levels.

5-year projection

Ongoing net migration, continuation of compliance/ regulatory costs (e.g., Kiwisaver getting up and running), and relatively high returns from dairy farming will serve as significant upward pressure over the coming two years. However, these forces will most likely be offset in full by the economic slowdown and the likely resulting increase in unemployment rate. In the longer term (3-5 years), nominal wage rates are likely to appreciate only at the rate of inflation. In an optimistic scenario wages may decrease by 5 percent per year for the first three years and then stabilize at a new equilibrium. In the worst case scenario wage growth would stall for the first two years before continuing upward appreciation by, say, 5 percent per year. These scenarios are illustrated in the table below.

Projection of wage rate changes (percent per annum); 2009-2013					
	2009	2010	2011	2012	2013
Best Guess	0	0	0	0	0
Optimistic	-5	-5	-5	0	0
Worst Case	0	0	5	5	5

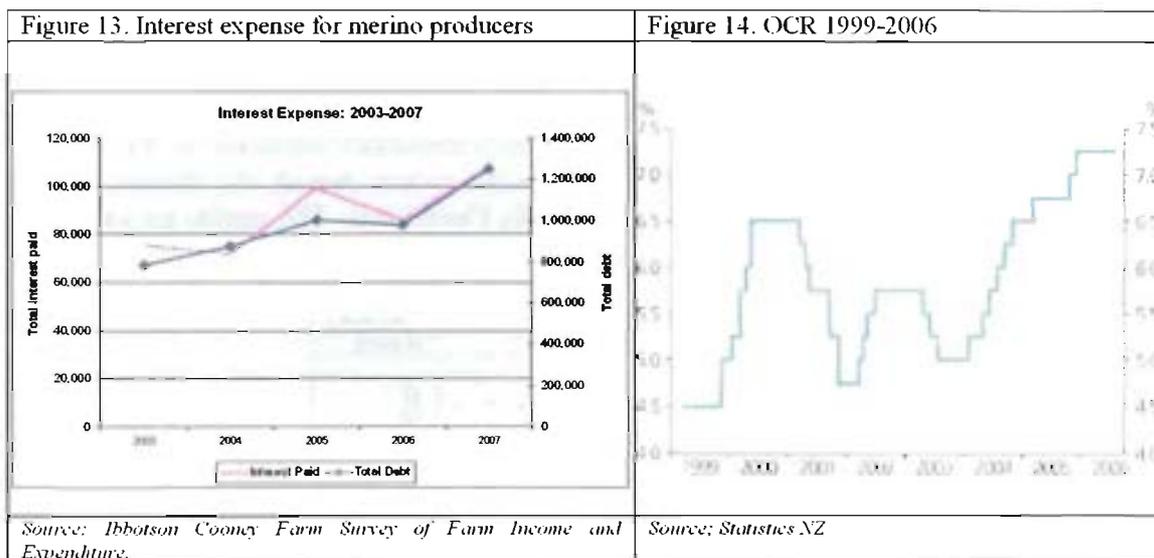
Interest costs

Current situation

The interest expense has grown faster than any other expense for the model farm. Figure 13 shows that the interest expense has increased from \$ 76,000 to \$ 108,000 from 2003 to 2007. This is attributable mostly to an increase in debt (from \$ 79,000 to \$ 125,000 over the same period). The most likely explanation for the increase in debt over the last five years would be the funding of the cash deficits (which have averaged \$ 76,000 per year).

The main force influencing the cost of borrowed funds is the OCR. This is the inter-bank borrowing rate set by the Reserve Bank. The Reserve Bank uses this as the principle mechanism for keeping inflation within its targeted bracket of 0-3 percent. The OCR was introduced in 1999, and is currently at an all time high. Figure 14 shows the pattern of

OCR changes since its inception. It also demonstrates its influence on retail borrowing costs. The way in which the OCR influences commercial interest rates is outlined in the following table.



How the OCR works

Most registered banks hold settlement accounts at the Reserve Bank, which are used to settle obligations with each other at the end of the day. For example, if you write out a cheque or make an EFT-POS payment, the money is paid by your bank to the bank of the recipient. Many hundreds of thousands of such transactions are made every day. The Bank pays interest on settlement account balances, and charges interest on overnight borrowing, at rates related to the OCR. These rates are reviewed from time to time, as is the OCR. The most crucial part of the system is the fact that the Reserve Bank sets no limit on the amount of cash it will borrow or lend at rates related to the OCR.

As a result, market interest rates are generally held around the Reserve Bank's OCR level. The practical result, over time, is that when market interest rates increase, people are inclined to spend less on goods and services. This is because their savings get a higher rate of interest and there is an incentive to save; and conversely, people with mortgages and other loans may experience higher interest payments.

When people save more or spend less, there is less pressure on prices to rise, and therefore inflation pressures tend to reduce. Although the OCR influences New Zealand's market interest rates, it is not the only factor doing so. Market interest rates – particularly for longer terms – are also affected by the interest rates prevailing offshore since New Zealand financial institutions are net borrowers in overseas financial markets. Movements in overseas rates can lead to changes in interest rates even if the OCR has not changed.

Source: Reserve Bank of New Zealand.

Key forces

Analysis of the factors influencing the Reserve Bank's OCR Policy has been made via a keyword search of the official News Releases of the RB at the time of announcing changes in the OCR since January 2006 (21 announcements in total). The Reserve Bank reviews the OCR eight times per year and provides a statement justifying its decision to change the OCR, or leave it the same. Every second review period, the Reserve Bank provides a *Monetary Policy Statement* and a Media Conference. The results are outlined in the following table.

Explanatory variable (re interest rate)	Frequency of citing
Housing Market	17
Exchange rate	14
Oil/ energy (price/s)	13
Labour Market	11
Government expenditure (fiscal policy)	10
Food (price/s)	9
Commodity prices	8
Business confidence	5
Emissions Trading Scheme	3
Dry whether - drought	2
Incentives to save	1

A summary of the commentary provided by the RB relating to each of these fundamental factors influencing the Reserve Bank's decision making at the current time is as follows;

- **Housing Market** – the housing market has cooled significantly over the past 12 months, serving as a break on inflation (people have a lower propensity to spend when their equity (largely based on real estate values) falls). Commentators expect this cooling of the housing market to last for between 12 to 36 months, and thus the demand for funds will be substantially dampened over this period (exerting downward pressure on interest rates)
- **Exchange Rates** – the New Zealand dollar has been trading at relatively high levels for the last three years. In recent months it has fallen significantly (approximately 10 percent in August 2008 alone). The lower exchange rate means imports are more expensive (and so exerts upward pressure on inflation). Also, a lower exchange rate contributes to higher export receipts, and so increased domestic demand.
- **Oil / energy prices** – increases in energy costs contribute to inflation. The cost of oil and electricity has increased significantly over the last 12 months.
- **Labour Market** – this has remained tight over the last 12 months. This adds to inflationary pressure due to competition for labour forcing wages higher. Recent cooling of the domestic (and global) economy has eased labour market pressures.
- **Government expenditure (fiscal policy)** – has been contributing positively to inflation, particularly in the pre election government spend. Government spending may continue to increase prior to the 2008 election.

- **Food prices** - food prices continue to trend upwards, putting ongoing upward pressure on inflation (and thus potential interest rates).
- **Commodity prices** – dairy prices in particular have been contributing to higher inflation over the past 12 months. (High commodity prices translate to higher incomes for exporters, and so greater domestic demand).
- **Emissions Trading Scheme** – This remains somewhat of a wild card, but is likely to lead to higher living costs and higher inflation – that is, the ETS acts in a similar way to expansionary fiscal policy.
- **Dry weather** – is reducing output from the agricultural sector, and so is effectively dampening inflation.
- **Global and regional growth** – prospects for growth (globally and regionally) have weakened. With poorer economic outlooks in the economies of our trading partners, underlying inflation is likely to be restricted.
- **Credit conditions** – these have been tightening significantly over the last 6-12 months, and have served as a restraint on headline inflation

5-year projection

The Reserve Bank is likely to drop the OCR over coming review periods. The most recent global economic downturn will accelerate the rate and magnitude of these OCR cuts. However, given global financial liquidity concerns, these OCR cuts will not necessarily translate to immediate falls in retail interest rates. Thus in the short term (one to two years) tight global credit conditions will force interest rates to be high (irrespective of OCR changes). Into the medium term (2-5 years) interest rates will drop substantially as a result of a weak economy (and in particular, a weaker labour market associated with this). The fall will be moderated by (potentially) high commodity prices (and thus export receipts). An optimistic view would see interest rates drop quickly in response to short term reductions in the OCR, and remain low for the duration of the forecast period. The worst case scenario would see a protracted situation of tight global financial liquidity which would squeeze interest rates up slightly over the next two years and keep them high thereafter.

Projection of interest rate changes (percent per annum); 2009-2013					
	2009	2010	2011	2012	2013
Best Guess	5	0	0	-5	-5
Optimistic	15	15	0	0	0
Worst Case	5	5	0	0	0

Fertilizer

Current situation

New Zealand farmers have recently observed fertilizer price increases that are substantially greater than any other increases on record. Global demand for fertilizer has seen international phosphate rock prices increase by 50 percent and sulphur prices double over the past six months. DAP prices are at a global record high, increasing by more than 70 percent over the same timeframe (Farmnews, 2008⁶).

These soaring prices are being fuelled by the same forces that have recently driven up commodity returns: global economic growth and subsequent demand for agricultural products, and the focus in the United States and Brazil on growing crops to convert into bio-fuels (Farmnews, 2008). Other commonly perceived relevant factors include the high demand from China, limited and dwindling supplies of the non-renewable fertilizer resource, and high fuel costs (for processing and transport).

Many farmers have already reduced fertilizer inputs – they have not yet adjusted stocking rates or policies hoping for a correction in the fertilizer market (and other input markets), and or a boost in the returns from output sales. This ‘wait and see’ approach is appropriate in the short term, however farmers will need to make some hard decisions in the medium term if fertilizer prices remain high, and output prices do not lift. The key questions are, why have fertilizer prices increased so dramatically, are the price increases permanent, can more rises be expected, are all fertilizer products equally effected by the rises, and what can (and what will) farmers do to cope with these prices.

Until now fertilizer demand has been relatively stable and predictable. The fertilizer supply sector has been able to gradually adjust production to meet the (gradually) changing demand for fertilizer. However, recent unexpected substantial rises in food prices have led to a relatively fast response by farmers in terms of expansion and intensification of agricultural production. And the fertilizer industry has been unable to respond to changing demand for fertilizer as fast as farmers can change in response to changing demand for food. Thus fertilizer prices have leapt due to the constrained supply in the face of rapid demand expansion.

Key forces

Demand for Food and Fibre - Global demand for fertiliser is influenced directly by the demand for food. And demand for food is a function of both the number of people, and the demands of those people. In spite of world population growth slowing from 1.26

⁶ Farmnews, 2008. Fertiliser prices skyrocket in NZ. Accessed from <http://www.farmnews.co.nz/news/2007/july/804.shtml> on July 1, 2008.

percent (1996-2005) to 1.10 percent (projected 2006-2015), absolute annual increments in population growth continue to be large. It is anticipated that between 50 and 70 million people will be added annually to the world population until the mid 2030s. Diets have shifted away from staples such as cereals, roots and tubers and pulses towards more livestock products, vegetable oils and fruits and vegetables. Total meat production in developing countries more than quintupled from 27 million tonnes to 147 million tonnes between 1970 and 2005, and, although the pace of growth is slowing down, global meat demand is expected to increase by more than 50 percent by 2030 (FAO, 2008⁷).

While New Zealand is efficient at converting pasture to food and fibre, from a global perspective increases in the demand for food will translate into higher fertilizer demands because of greater demand for feed (not only pasture, but grains and meals). Similarly, increased demand for vegetable and fruit production will increase fertilizer demand (per hectare requirements for vegetable production is about two times that of grain production).

Growth in the demand for food will largely be concentrated in developing countries where populations are growing the fastest, and/ or large numbers of consumers are becoming sufficiently affluent to purchase food products other than those produced by themselves or other local subsistence farmers. Thus the projected growth in demand for fertilizer will largely come from developing countries looking to meet their domestic food demand from local production.

Bio-fuels - High oil prices are creating new markets for agricultural commodities that can be used as feedstock for the production of bio-fuels. Bio-fuels are being promoted as contributing to a wide range of policy objectives, most notably as providing greater energy security with regard to liquid fuels, increasing rural incomes, lowering greenhouse gas emissions and providing economic opportunities for developing countries (FAO, 2008). Production of ethanol and bio-diesel has soared in OECD countries since early 2004 and will probably continue to increase at least until the end of the decade due to processing capacity soon to come on line, and due to the difficulties of dismantling existing subsidies and protective measures (Steenblik, 2007⁸).

The predicted impact of increased bio-fuel production on world fertilizer demand is expressed in two ways; percentage fertilizer consumed by bio-energy crops and, total fertilizer used for feedstock production. FAO (2008) has shown that variance within and among such estimates show how approximate they are. For example, Smeets and Faaij (2006)⁹ estimate that bio-energy crops will account for 1 to 8 percent of fertilizer consumption in 2015, and 2 to 16 percent in 2030, while Cassman et al. (2006)¹⁰ estimate 27.6 percent in 2010/11.

⁷ FAO, 2008. *Current world fertilizer trends and outlook to 2011/12*

⁸ Steenblik, R. (2007). *Biofuels-at what cost? Government support for ethanol and biodiesel in selected OECD countries.*

⁹ Smeets and Faaij (2006). *Future Demand for Fertilizer from Bioenergy Crop Production.* Biofuel Review

¹⁰ Cassman et al. (2006). *Re-estimation of Global Fertilizer Requirement for 2015, 2030 and 2050.*

The effect of such market related factors is compounded by sometimes incoherent policies supporting bio-fuel production in response to vested sector interests. There are currently about 14 million hectares or one percent of arable land planted with bio-fuel crops which provide about one percent of transport fuels. Even if this doubles to 35 million hectares by 2030, the increase over the period would be of the order of 4.3 percent per annum. Another measure of possible impact is to take the average of the three previously mentioned forecasts of fertilizer to be used for bio-fuel production worldwide in approximately 2012 (2.4, 6.4, 13.5 million tonnes) which amounts to about 2.4 percent of total fertilizer use at that time. While the need for large amounts of feedstock is likely to fuel demand in the short term, no dramatic increase in fertilizer demand is expected over the medium term (FAO, 2008).

The major implication of expanding bio-fuel production for NZ farmers relates to changing land use practices. Conceivably, indirect effects mean reduced land available for food crop production (increased food prices and increased competition for resources (land labour and fertilizer by food producers)), less land for textile production (especially cotton) and less cotton supply, and greater demand for wool products.

Nutrient reserves and their extraction - There has been some speculation that the raw materials (or 'feedstock') for fertilizer production are dwindling. That is, there is currently a shortage of supply (due to limited extraction and processing capacity), but this does not reflect a scarcity of the underlying resource. Given current and projected global fertilizer requirements, there are sufficient reserves of feedstock for 100's of years of fertilizer supply. With regards to phosphorous, assuming an ongoing rate of increase of consumption of 1.7 percent per annum through to 2020 and then stability, it would be expected that reserves (deposits that can be profitably extracted under prevailing market conditions) remaining at 2020 would last for a further 81 years, and reserve bases (reserves that have not yet been exploited but could be mined with a higher cost of production) for a further 249 years (Rabobank, 2007¹¹).¹²

While farmers can respond to price signals relatively quickly, it takes much longer for the fertilizer sector to respond. This is largely because the large initial investment in extraction and processing systems serves as a barrier to entry, new plants take several years to establish, and investors need confidence that any increase in demand will be sustained before investing in increased supply capacity. For example, Agrium, a Canadian fertilizer company, has recently announced plans to construct a USD 1.2 billion production facility in Egypt. It is expected to take three years before the plant will commence operation (Rabobank, 2007). Furthermore, it is reputed that prior to the recent

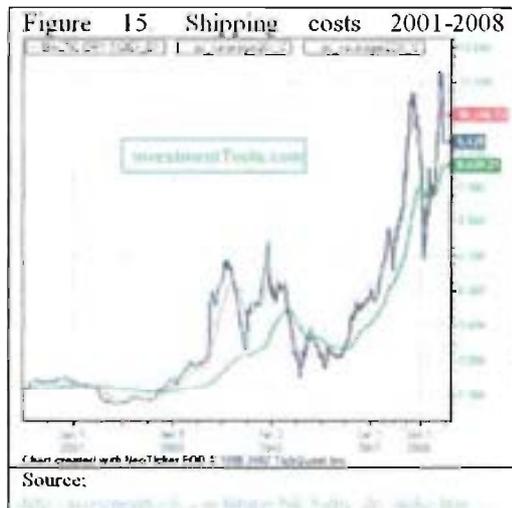
¹¹ Rabobank, (2007). Fertiliser – a precious commodity

¹² Conflicting opinions regarding the growth in fertilizer consumption exist. One study found that Assuming the world's arable land remains constant in area in the next century, and if the meat consumption in advanced countries is matched by the rest of the world, the demand for fertilizer will increase and reach 220 Tg y-1 by the middle of the next century. This is approximately three times more fertilizer than is currently used, and would accelerate environmental deterioration. The world would be suffering from conflict between supplying sufficient protein and greater nitrogen pollution of the environment. (Kawashima et. Al., (2008). A modelling study of world protein supply and nitrogen fertilizer demand in the 21st century).

leap in food (and fertilizer) prices, fertilizer companies had invested little in maintaining existing plants—many were in a depreciated state and needed major investment before capacity could be increased.

Nonetheless, costs of extraction will continue to increase over time as the easier to extract minerals are exploited first. At any given point in time the remaining ore is less accessible and of lower quality meaning a higher degree of beneficiation is required (this is the process where extracted ore is reduced to particles that can be separated into the mineral and waste products). However, new technologies related to extraction and processing will at least partly off-set this gradual increase in cost.

Shipping - Freight rates have become a more important factor in agricultural markets than in the past. Increased fuel costs, stretched shipping capacity, port congestion, and longer trade routes due to altered trade patterns, have pushed up shipping costs (Figure 15). Over the last 5 years these trends have had much to do with general global economic growth. As well as increasing very rapidly over the last two years, shipping rates have been extremely volatile, and this has had much to do with uncertainties about the state of the global economy (and the threat of a US led global recession). In January alone, the Baltic Dry Index fell to a reading of 6,462, down nearly 30%, and it was down 42% from an all-time high reached in November of 2007. However, since then rates have rebounded to all time highs (which are over four times greater than they were 4 years ago). Aside from being affected by oil prices and global economic sentiment, the impact of transport costs on fertilizer prices will grow as fertilizer is produced in fewer localities close to raw materials and ample energy availability. Expansion of the global shipping fleet in the next 24 months will reduce shipping costs to some extent (FAO, 2008).



Cost of energy - High oil prices contributed to price increases for most agricultural crops by raising input costs on the one hand, and by boosting demand for agricultural crops used as feedstock in the production of alternative energy sources (bio-fuels) on the other. The combination of high oil prices and the desire to deal with environmental issues is driving the rapid expansion of the bio-fuels sector. This is likely to boost the demand for feed stocks mainly maize, sugar, rapeseed, soybean, palm oil and wheat for many years to come. However, much will also depend on the supply and demand fundamentals of the bio-fuel sector itself. High oil prices could depress the use of oil-based fertilizers which have been behind much of the increase in farm production during the past half century (FAO, 2008).

Aside from the impact on production and shipping, oil prices have a significant impact on the cost of fertilizer application. The price of oil has increased markedly over the last 12 months, and has been highly volatile. Few stakeholders are willing to take a firm stance

on likely price trends into the longer term. Since early August 2008, there has been a significant reduction in global oil prices.

Between 70 and 90 percent of the production cost of nitrogen fertilizer is the cost of natural gas. In the future, as the price of energy increases, there will be increasing demand for natural gas resources from other (non-fertilizer) users. This will put upward pressure on the price of nitrogenous fertilizers. While merino producers are relatively small users of nitrogen, substitute products (e.g., cotton) and substitute land uses (dairy and grain production) are larger users, and increases in the cost of nitrogen could have some important implications in terms of the relative returns of competing resource uses. Of all fertilizers, nitrogen will likely witness the largest and most sustained price rises into the longer term.

5-year projection

World fertilizer consumption is to grow annually at about 1.7 percent from 2007/2008 to 2011/2012, equivalent to an increment of about 15 million tonnes. World fertilizer supply is expected to increase by some 30 million tones representing an annual growth rate of 3% percent which is comfortably ahead of demand for the outlook period (see Table 2). It is important to note that New Zealand (one small part of Oceania per Figure 5), is a very minor player in the global fertilizer trade. World phosphate fertilizer supply is forecast to increase by 6.3 million tonnes by 2011/2012 at a growth rate of 3.2 percent per annum. It is estimated that a surplus of some 0.4 million tonnes at the beginning of the period will increase to 2.9 million tonnes in 2011/2012. FAO (2008) summarized a recent report by stating “*High commodity prices experienced over recent years have led to increased agricultural production and correspondingly greater fertilizer consumption. This has been reflected in tight markets and higher fertilizer prices. While demand for basic food crops, for high value crops such as fruit and vegetables, for animal products and for crops capable of being used to produce bio-fuels is likely to remain strong, it is expected that increased fertilizer consumption required to support higher levels of production will be adequately catered for by growing supply world wide over at least the next 3 years.*”

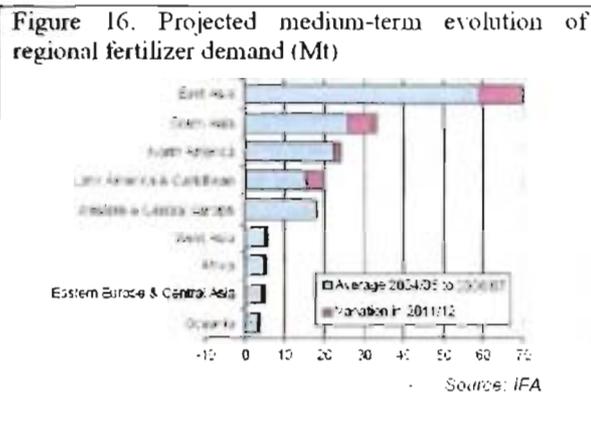


TABLE 2
World fertilizer supply and demand, 2007/2008-2011/2012

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
	[thousand tonnes] ¹				
Total supply	206 431	212 225	219 930	230 334	240 711
Total demand	197 004	201 482	205 947	211 230	216 019
Surplus (deficit)	9 427	10 743	13 983	19 104	24 692

¹ Difference between supply potential and consumption; negative signs denotes deficit situation.

If anything, these figures should serve to reduce the global price of fertilizer (that is, the price at which NZ suppliers can procure fertilizers from the global market). However, it seems likely that the cost of getting the product from production sites, to New Zealand and eventually onto farmland will remain high due to high shipping costs, high internal freight costs, and high application costs. Based on this analysis it is projected that fertilizer prices will continue to rise significantly over the coming three years, stall at year four, and then begin a downward correction in year 5. In an optimistic scenario, the fertilizer supply sector would adjust more rapidly than projected and the price increases would peak now, stall in year one, and begin a steady fall thereafter. In the worst case, fertilizer prices would continue to rise over the coming three years, and would be sustained at these new highs thereafter.

Projection of wage rate changes (percent per annum); 2008-2012					
	2009	2010	2011	2012	2013
Best Guess	15	10	5	0	-10
Optimistic	0	-10	-20	-10	0
Worst Case	20	15	10	0	0

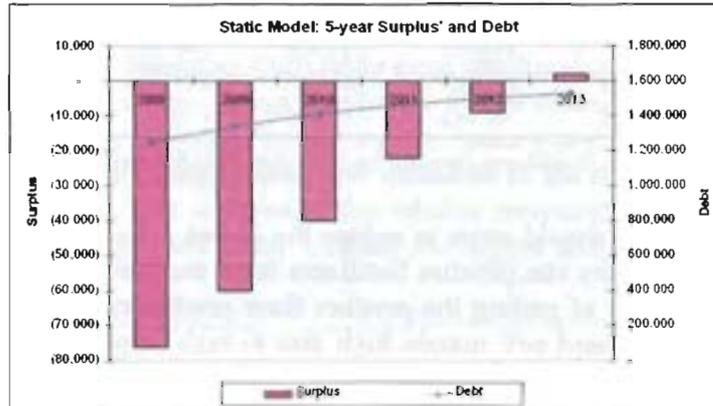
The Future of Farming – A Static Model

Given the projections made in the previous section, it is now possible to project what the ‘bottom line’ result will be for farming into the medium term (i.e., over the next five years). The model farm is used to project financial results on an annual basis. It is assumed that producers make no changes to current practices or input or output levels given the projected pricing scenario—that is, the modelling is made assuming a static behavioural environment.

	2008	2009	2010	2011	2012	2013
Wool Income	254,000	279,000	293,000	308,000	308,000	308,000
Sheep income	159,000	167,000	184,000	193,000	203,000	203,000
Other Income	92,000	92,000	92,000	92,000	92,000	92,000
Total income	505,000	539,000	569,000	593,000	603,000	603,000
Labour	178,000	178,000	178,000	178,000	178,000	178,000
Interest	88,000	99,000	103,000	107,000	103,000	99,000
Fertilizer	45,000	52,000	57,000	60,000	60,000	54,000
Other	270,000	270,000	270,000	270,000	270,000	270,000

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Total Exp.	582,000	599,000	609,000	615,000	611,000	601,000
Surplus	(76,000)	(60,000)	(40,000)	(22,000)	(9,000)	2,000
Debt	1,250,000	1,340,000	1,410,000	1,462,000	1,500,000	1,528,000



The table above shows that producers can expect to make a \$ 76,000 loss in 2008, but that this would reduce to a small surplus in 2013. However, the likelihood that the assumption of a static behavioural environment holds true is highly unlikely. The following section explores the likely outcomes assuming that farmers actively change behaviours in response to changes in the signals from input and output markets.

The Future of Farming – A Dynamic Model

In an effort to optimise resource use and output levels, most farmers change farming practices in response to market signals. The table below highlights the typical changes made in response to these signals, inclusive of the general production environment.

Typical Producer Response Patterns to Environmental Forces		
Environmental Stimulus (ceteris parabis)	Producer Reaction – Short Term	Producer Reaction – Long term
Meat prices increase	<ul style="list-style-type: none"> Fatten more stock (on additional crop, feed brought in, nitrogen applied) Buy in store stock (or hold on to stock that otherwise would have been sold store) 	<ul style="list-style-type: none"> Breed more towards meat breeds Focus on lambing percentage Increase breeding flock (and decrease wethers, velveting stags, etc)
Wool prices increase	<ul style="list-style-type: none"> Sell less CFA ewes Hold on to hoggets that would otherwise have been sold prior to first shearing Employ more classers, shed-hand etc (greater returns from well prepared wool) 	<ul style="list-style-type: none"> Breed more toward the needs of the wool market Focus on u, wool weights, yield, etc Decrease non-wool producing stock classes Put fewer old ewes to a terminal sire.
Interest rates increase	<ul style="list-style-type: none"> Skimp on all other costs Reduce drawings Focus on optimisation (every decision counts) Any surpluses used to repay debt (but usually very few surpluses in this scenario) Fall; More drawings 	<ul style="list-style-type: none"> Reduce any expansion initiatives Reduce term debt by sale of capital assets (e.g., land, cottage, off farm assets) Growth in the seasonal facility is transferred to long term debt. Fall; borrow more for expansion or development or off farm investment
Fertilizer costs	<ul style="list-style-type: none"> Reduce expenditure on fertilizer 	<ul style="list-style-type: none"> Reduce output

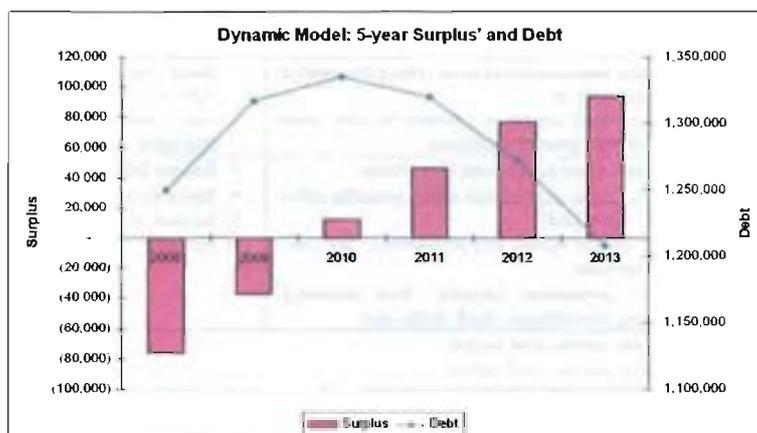
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increase	<ul style="list-style-type: none"> • Apply to flat land (where application costs are lower) • Prioritize applications to areas where the highest responses will be • Conduct more testing to identify priority areas that yield the greatest responses 	<ul style="list-style-type: none"> • Reduce application rates • Make more informed application decisions based on where the objectively verified highest returns will be • More intensively monitor applications and responses
Labour costs increase	<ul style="list-style-type: none"> • Substitute hired labour with own labour • Reduce labour expenditure where possible (shed hands, casual staff) • Spend less on repairs and maintenance and non-essential work • Reduce production intensity (less scanning, capsules, vaccinations, stock shifts, etc) 	<ul style="list-style-type: none"> • Reduce full time labour units employed, • Increase own workload • Reduce output (stock units carried) • Simplify production system
NET EFFECT	<ul style="list-style-type: none"> • Maintain current meat output • Maintain current wool output • Continue to reduce debt where possible • Maybe some very well analyzed and executed developments • Reduced total fertilizer application • Much more targeted fertilizer application • More on paddocks (and so perhaps a slight shift in emphasis from wool to meat) • Higher fertilizer spend • Simplified farming systems – less labour intensive, and greater outsourcing to contract service providers • <i>In general - The combined positive forces (increased meat and wool returns and lower interest rates) will approximately balance the negative forces (higher fertilizer and labour prices)</i> 	
<p><i>Source: Author (pending verification via interviews, surveys, or focus group discussions).</i></p>		

The table below outlines a scenario on the basis of the above price predictions, and assuming behavioural response in relation to market signals in terms of:

- 1) Incremental gains in meat and wool production of 5 and 3 percent respectively
- 2) Ten percent reductions in the quantity of fertilizer applied for the first three years, and a 15 percent increase in application in year five when prices begin to ease.
- 3) And a corresponding five percent reduction in carrying capacity and output in the last two years (resulting from reduced fertilizer inputs).
- 4) Substitution of ten percent of wage labour with own labour (and no additional drawings).
- 5) Accumulation of term debt (sufficient to fund cash losses). Or reduction of debt if surpluses are generated.

	2008	2009	2010	2011	2012	2013
Wool Income	254,000	279,000	293,000	308,000	308,000	308,000
Sheep income	159,000	167,000	184,000	202,000	212,000	212,000
Other Income	92,000	92,000	92,000	92,000	92,000	92,000
Total income	505,000	539,000	569,000	602,000	612,000	612,000
Labour	178,000	178,000	178,000	178,000	178,000	178,000
Interest	88,000	93,000	93,000	93,000	88,000	84,000
Fertilizer	45,000	52,000	57,000	60,000	60,000	54,000
Other	270,000	270,000	270,000	270,000	270,000	270,000
Total Exp.	582,000	593,000	598,000	601,000	596,000	586,000
Surplus	(76,000)	(54,000)	(29,000)	1,000	16,000	27,000
Debt	1,250,000	1,334,000	1,393,000	1,421,000	1,435,000	1,438,000

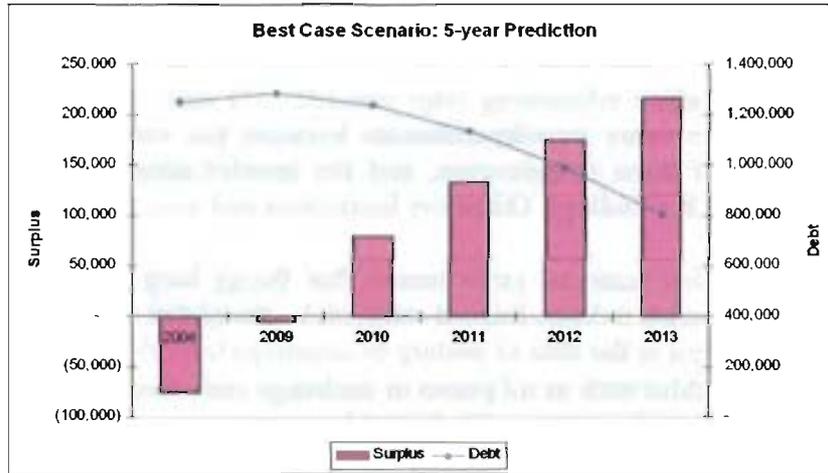


The Future of Farming – Best and Worse Case Scenarios

It is possible that the output prices are higher than those projected, and input costs lower. The table below illustrates the financial outcomes should the 'optimistic' scenarios eventuate.

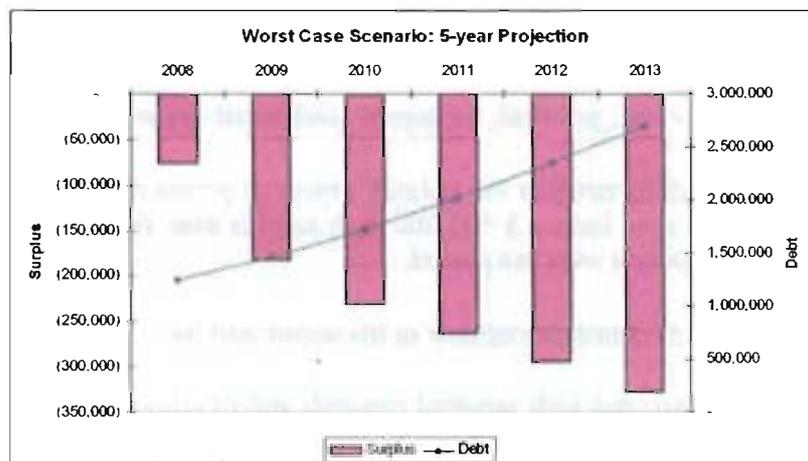
	2008	2009	2010	2011	2012	2013
Wool Income	254,000	292,000	336,000	352,000	370,000	388,000
Sheep income	159,000	175,000	193,000	212,000	233,000	256,000
Other Income	92,000	92,000	92,000	92,000	92,000	92,000
Total income	505,000	559,000	621,000	657,000	695,000	737,000
Labour	178,000	169,000	161,000	153,000	153,000	153,000
Interest	88,000	81,000	69,000	69,000	69,000	69,000
Fertilizer	45,000	45,000	41,000	33,000	29,000	29,000
Other	270,000	270,000	270,000	270,000	270,000	270,000
Total Exp.	582,000	566,000	541,000	525,000	522,000	522,000
Surplus	(76,000)	(6,000)	79,000	132,000	174,000	216,000
Debt	1,250,000	1,286,000	1,237,000	1,135,000	991,000	806,000

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Similarly, farmers may face a much tougher operating environment than the ‘best guess’ scenario. The table below illustrates the potential outcomes from a pessimistic trajectory.

	2008	2009	2010	2011	2012	2013
Wool Income	254,000	216,000	194,000	194,000	194,000	194,000
Sheep income	159,000	111,000	111,000	111,000	111,000	111,000
Other Income	92,000	92,000	92,000	92,000	92,000	92,000
Total income	505,000	420,000	398,000	398,000	398,000	398,000
Labour	178,000	178,000	178,000	187,000	196,000	206,000
Interest	88,000	99,000	118,000	137,000	158,000	181,000
Fertilizer	45,000	54,000	62,000	69,000	69,000	69,000
Other	270,000	270,000	270,000	270,000	270,000	270,000
Total Exp.	582,000	601,000	629,000	662,000	693,000	726,000
Surplus	(76,000)	(182,000)	(231,000)	(264,000)	(295,000)	(328,000)
Debt	1,250,000	1,461,000	1,722,000	2,017,000	2,342,000	2,700,000



Limitations and Assumptions

There are endless variables influencing farm viability, and each is influenced by many factors. Also there are many interdependencies between the variables analyzed. This study simplifies all of these complexities, and the simplifications made substantially reduce the accuracy of the findings. Other key limitations and assumptions include:

- The recent global financial crisis means that things keep changing rapidly (oil prices, stock market indices, interest rates, etc) – the global economic crunch went from non-existent at the start of writing to catastrophic by the end.
- Other key variables such as oil prices or exchange rates have not been included in the model (and are thus assumed to be held constant)
- No accounting for land values and changes in equity has been made
- The ‘model farm’ used is based on only a sample of the entire merino sector
- There has been no allowance for non-cash items such as depreciation
- Changes in government policy (including the likes of the ETS) can have major implications for farming in the future, but these have not been accommodated.
- No accounting for different saturations for different farmers has been made – some are experienced, some not, some highly leveraged, some not, etc.
- All figures quoted are in real terms – they are net of general economic inflation

Nonetheless, the simplicity of the model caters to a wide audience, and serves as a platform for more comprehensive modelling in the future.

Conclusions and Implications

Overall, the economic outlook for merino producers is for cash losses for the next two years, followed by four years of cash surpluses. These cash surpluses are sufficient to enable about a ten percent reduction in term debt.

- The economics of merino farming systems are dependent on complex and interacting economic, political, biological, and social systems.
- The modelling demonstrates the volatile nature of primary production. The range in projections varies from a \$ 500,000 cash surplus over the five year period, to a \$ 1,400,000 cash loss over the period.
- Key to sustained economic viability in the sector will be:
 1. Significant and well targeted research and development efforts to develop new technologies for on and off farm applications that will add net value to the produce sold or reduce production costs.
 2. Fostering a political and regulatory environment that is efficient and supportive of primary production.