Commodity Price Risk Management in Australia – A Dare to be Average!

A report for

By Bruce Watson

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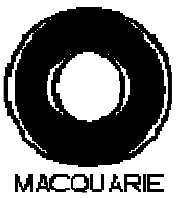

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Foreword

"The grain business is the least forgiving"[1]

Cargill Executive

Many Australian grain growers over the past three years would have a significant amount of empathy with this statement. Between battling drought, rapidly rising (and falling) commodity and input prices, wheat growing in Australia has not been easy when errors of management or judgement have been made. The question facing many growers now is how do we deal with this volatility in grain prices; is it here to stay or will grain markets revert back to the old days where a $US 30c/bushel move in the CBOT wheat price overnight made headlines on the ABC Country Hour?

This volatility has been compounded by the high grain prices over the past three years and the (at the time) excellent forward selling opportunities that they presented to Australian grain growers. The sting in the tail however is that prices kept increasing and, coupled with two significant droughts, significant cheques were written to grain merchants or banks in 2006 & 2007 for hedging decisions that went wrong.

The purpose of this paper is to review the academic literature, coupled with my travels overseas this year, in an attempt to understand what drove global grain prices to the dizzying heights of early 2008, only to see them come crashing back to earth this year. Many grain growers are now asking the question, will we see grain prices return to those highs and is this volatility in grain markets here to stay? This paper also examines alternatives to capture these price spikes, bearing in mind the volatile production grain growers face in Australia.

We now have many tools in our risk management portfolio to take advantage of these pricing opportunities. However, with the period of volatility that I believe is now upon us, it is imperative that we select the right tool for the job at the right time. As farmers, we need to ensure that we are low cost producers in addition to being technically sound when it comes to production. However, more importantly, we need to refocus our attention from trying to pick the tops of grain markets, to attempting to secure a market average price. A dare to be average challenge!

[1] "Merchants of Grain", Dan Morgan, 1979

Acknowledgments

I would like to thank both Nuffield Australia and my sponsor Macquarie Agricultural Services for the opportunity that they afforded to me this year to travel a significant portion of the world looking at agriculture and agribusiness globally. It has been an incredible experience and one that I will cherish for the remainder of my life.

Thanks to my nine peers from our global focus program travels and the 2009 Nuffield year group. You are an incredible bunch of people, inspiring in many ways and I have made many friends out of the experience. I would also like to extend a personal thanks to Jim Geltch, David Brownhill and the remainder of the Nuffield executive for operating such a professional and rewarding association and for the opportunities that you have given to me this year.

I must thank both my parents, Jim & Janelle, my sister Katrina and her husband Mark, for encouraging me to apply for the scholarship, and also for their love and support. I would also like to thank them for running the farm in what is proving to be another challenging year, but each day is a day closer to when it will rain and the "normal" seasons will return.

Thanks to Kevin & Barbara Miles and our agronomist Peter Yelland for all their assistance this year. Your input and contribution to Kebby & Watson is much appreciated.

A big thanks to the hundreds of people that I have met over the 20 weeks of travel this year in various meetings and also to those of you that offered your gracious hospitality to both myself and my wife on our travels. The network of Nuffield is truly incredible and I feel privileged to now be a part of it. I hope that I have the opportunity to repay your generous hospitality in the future. In particular, I would like to thank Ben Riensche of Jesup, Iowa for his time, thoughts and opinions on how to market grain and operate commodity businesses. Ben, you have had a massive impact on me and this report and I hope that I can do you justice.

Lastly, and most importantly, I would like to thank my wife Karina, for her love and support and especially for encouraging me to apply for the scholarship and also insisting that if I was successful, that you would have to come with me for my individual study component! I had a great time travelling with you (it certainly beats travelling on your own) and I hope that we get many more opportunities in the future to see more of the world.

Abbreviations

ABC – Australian Broadcasting Corporation

ASX – Australian Stock Exchange

BRIC – Brazil, Russia, India & China

CAD – Current Account Deficit

CARD – Centre for Research & Development

CBOT – Chicago Board of Trade

CFTC – Commodity Futures Trading Commission

DDG – Dried Distillers Grain

E10 – Ethanol 10%

EMH – Efficient Markets Hypothesis

ETS – Emissions Trading Schemes

Ha - Hectare

JIT – Just in Time

FOB – Free on Board

GFC – Global Financial Crisis

GM – Genetically Modified

mmt – Million metric tonnes

OECD – Organisation for Economic Co-operation and Development

OPEC – Organisation of Petroleum Exporting Countries

OTC – Over the Counter

R&D – research & Development

RFS – Renewable Fuel Standard

EU – European Union

USA – United States of America

USDA – United States Department of Agriculture

USDA RE - USDA Economic Research Services

WFP – World Food Program

Executive Summary

This paper begins with a review of the academic literature examining what drove the increase in global grain prices in 2007/2008. This information, coupled with observations and discussions on my Nuffield scholarship, has drawn me to conclude that the following were the principal drivers of the increase in world grain prices:

- Low global stocks, coupled with trade policies that further interrupted global food supply;
- Strong economic growth leading to increased demand for food from developing countries, particularly China and India;
- The impact of an increase in the crude oil price and its increasing correlation with the ethanol and corn price;
- Market psychology and fear. Although it should be noted that index fund and hedge fund pressure as a whole did not contribute significantly to the increase in global grain prices; and
- Rapid $US depreciation.

However, as many farmers are well aware, many of these circumstances changed over the past 12 months and we are now faced with low grain prices again. Notwithstanding this, the factors identified above could come together again to send grain prices soaring, although maybe not to the dizzying heights we witnessed in March 2008. In short though, volatility in global grain prices is here to stay for the immediate future at least.

The question then remains how to capture these high prices and manage this volatility in a less risky manner. Whilst methods of forward selling such as cost plus selling, active management, the use of storage, cash contracts, futures and options are reviewed, I believe that grain growers need to adopt a form of passive marketing into their marketing portfolio, similar to an index fund approach to their superannuation. A comparison with the finance industry and the role of accepting average prices is discussed, with the conclusion being that grain growers as a whole can't pick market prices or market directions, thus they are better suited pursuing a marketing strategy of accepting an average price. With respect to the tools on offer, it is argued that using options would be a less risky manner of hedging due to a

combination of the inherent production risks that grain growers face in Australia coupled with the volatility in grain prices that is expected to continue in the future.

However it should be noted that marketing is not a significant driver of on farm profitability, with factors such as cost management implementation of new technology (where it delivers advances in efficiency or increases in yield) and yield management having a far more significant impact on the profitability of the farm business. Thus, growers need to consider a portfolio approach to their grain marketing including a combination of passive and active management coupled with some on farm storage if the market is telling you to store grain.

Introduction

When I applied for my Nuffield Scholarship in June 2008, commodity prices were at, or had just come off, all time highs. Many people were advocating that we had reached a new paradigm in commodity prices, and that prices would continue to be "stronger for longer". What I wanted to investigate is why these prices increased so dramatically, and would they remain at these lofty levels for the foreseeable future? Even as this report is bring written, it is incredible to see the changes on the landscape in relation to both the prices of commodities and the approach that many farmers are now taking to commodity price risk management.

On my travels I had the opportunity to meet with many different people – farmers, grain merchants, academics, futures traders, end users, risk management advisors, bankers and numerous other people involved in the grain's industry. After discussion with all of these people, there seemed to be a common thread coming through with respect to what drove the increase in global grain prices and how farmers can better manage their price risk. These findings have been outlined below.

1.0 What's Driving Grain Prices?

There has been a great deal written about what drove the increase in global grain prices in 2007/2008. The usual culprits such as speculation in futures markets and the growing influence of biofuels have been mentioned but, and like most answers in economics, there is no single factor that has caused grain prices to rally so quickly at the time. Rather, it has been a number of factors that together caused a "perfect storm" in commodity markets. In fact Josette Sheeran, Executive Director of the World Food Program (WFP), identified the components of this "perfect storm" as amongst other things increasing demand for food from emerging economies, competition between biofuels and food production, high fuel prices, and increasing climatic shocks such as droughts and floods."[2]

Further commentary on this issue has been provided in the popular press and also amongst academic circles. Some of the better academic papers and reports that attempt to explain this issue were prepared for the Farm Foundation by Abbott et al. (2008 & 2009), in addition to work undertaken by Trostle (2008) and Schnepf (2008). All of these give an excellent insight into this issue and I will briefly summarise their findings and comment on them below.

[2] Statement given at the Inauguration Ceremony: 30th Anniversary Session of IFAD's Governing Council," by Josette Sheeran, Executive Director, WFP, February 13, 2008.

1.1 Fundamentals – Are They Still Relevant to Pricing?

Traditional fundamental analysis of grain markets is no different to many other markets in that at the end of the day; it argues that price is determined by the relationship between supply and demand, or as expressed another way, when the number of buyers equals the number of sellers.

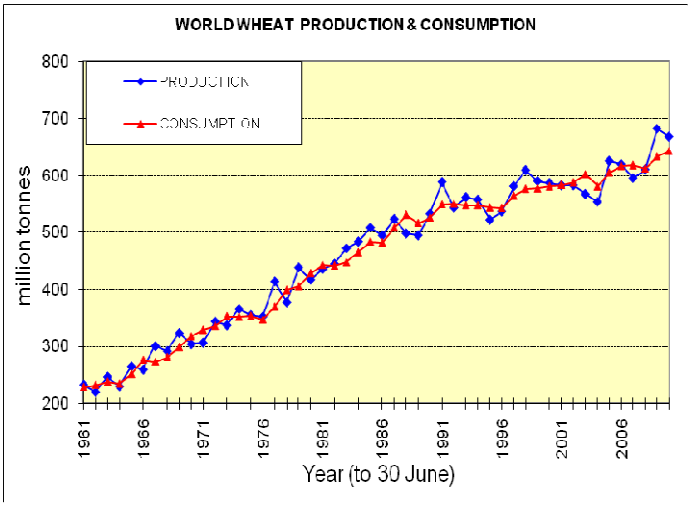
1.1.1 Demand

On the demand side, global economic growth has been exceptionally strong and this has driven an increase in demand for not only grain *per se*, but also protein (especially in the form of meat, dairy and vegetable oils) as developing countries expand and the per capita incomes of their people rise. As a consequence of this, grain increasingly is diverted to feeding animals for meat and dairy. This has been particularly the case in China and India, where increases in economic growth and their purchasing power, has lead to "a permanent increase in global demand for more and different kinds of food".[3] In fact, together these two countries account for 28% of the increase in global grain consumption (Westhoff, 2008). The impact of the price of oil, biofuels policies and the potential demand from new sources such as Index Funds has also been important, but this will be discussed in a separate chapter.

What I would like to briefly comment on is the world production and consumption of the three main commodities that affect Australian grain growers – these being wheat, coarse grains and oilseeds in Figures 1-3 below. What one can see is consumption basically keeping track with production with the two lines crossing every 5 years or so as production gets ahead of consumption or vice versa as commodity prices change and either it becomes more attractive to produce (high prices) or more attractive to consume (lower prices). As a result, it could be argued that demand creates its own supply (a concept which I will discuss in more detail in Section 1.5). The question going forward is will the world be able to, as it has in the past, meet this new demand or are resource constraints (such as land, water, fertiliser etc) going to prevent supply from increasing?

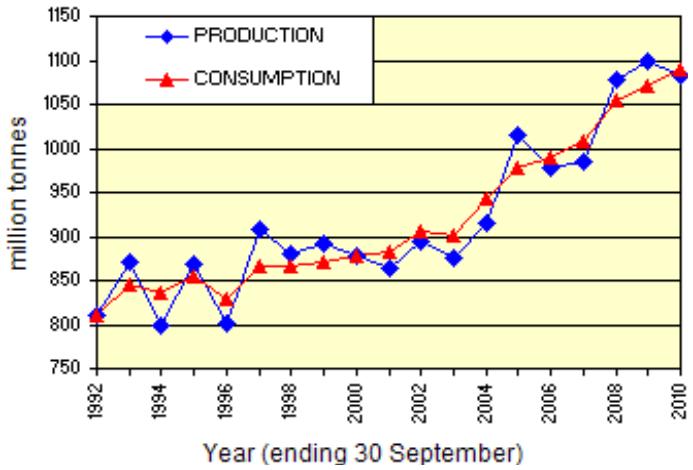
[3] See USDA Agricultural Projections to 2017, OCE-2008-1, USDA, pp. 12-13. For more info on economic growth in the developing world.

Figure 1: World Wheat Production & Consumption



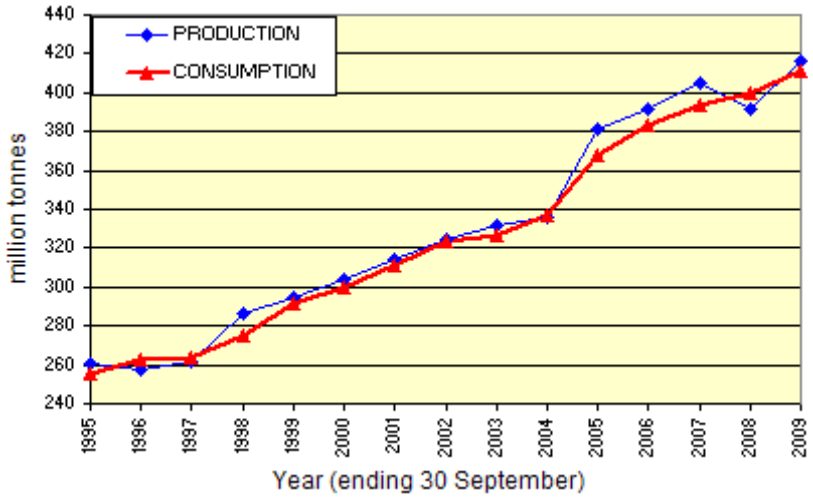
Source: Analysing Agriculture

Figure 2 World Coarse Grain Production & Consumption



Source: Analysing Agriculture

Figure 3: World Oilseed Production & Consumption



Source: Analysing Agriculture

1.1.2 Supply

On the supply side, traditionally an examination of production, use, imports, exports, ending stocks and where those stocks are located (i.e. exporters or importers of grain) is undertaken in an attempt to ascertain the supply fundamentals to make a prediction about the future direction of commodity prices. Over the past decade we have witnessed a rapid decline in global stocks and especially stocks/use ratios. In fact global consumption of grains exceeded production in 7 out of the 8 years since 2000 (Trostle, 2008). Abbott et al. (2008) argue that the reasons why stocks have shrunk so rapidly are due to:

- Yield variability has decreased due to improved seed and agronomic technology;
- An increase in global food growing areas means a failed crop somewhere might be offset by a bumper crop elsewhere in the world; and
- Increased levels of world grain trade improving the perception of available supply.

The weather also played a significant role in the decline in stocks. Chronologically, dry weather in 2006 (Australia, South Africa, Russia and the Ukraine) and 2007 (Southeast Europe, Russia, Ukraine, Canada, Northwest Africa, Australia) in conjunction with freezing or flooding at inopportune times (Northern Europe, US Hard Red Winter Wheat belt and Argentina) has had an adverse impact on crop yields. On top of this, a 1 in 500 year flood in the US Midwest, particularly Iowa, in June 2008 when planting of corn and soybeans was due to commence, saw futures prices for corn and soybeans make all time highs. Wheat and rice had already made contract highs around March of 2008.

As a result of these supply shocks, "the line between surplus stocks and shortages can be very thin" and when this line is crossed, "very small changes in anticipated stocks can be associated with major price impacts."(Abbott et al. 2008)

In response to these high prices, the governments of many countries also made, with the benefit of hindsight, policy choices that further exacerbated the situation. Export taxes were levied on some commodities by countries (including China, Argentina, Russia, Kazakhstan, Malaysia and Indonesia), export restrictions by others (Argentina, Ukraine, India and Vietnam) and outright export bans by even more (Ukraine, Serbia, India, Egypt, Cambodia, Vietnam, Indonesia, India and Kazakhstan), all in an attempt to insulate their own consumers

from the impact of rising food prices (Trostle, 2008). This meant that there was less food available for importing countries and a mad scramble to accumulate stocks, even at record prices, was made to ensure that countries did not run out of food, thus highlighting the inelasticity of commodity prices, especially for food, when people fear that it is about to run out!

The benevolent hand of government has also played a role in more ways. There had been a policy for the government to accumulate stocks in case of food shortages, particularly after WWII and the commodity boom of the 1970s. However, with a move to just in time (JIT) inventory management and low, stable prices preceding the last decade, government held stocks have been allowed to decline (particularly in China, see a further explanation in Chapter 1.5). A combination of JIT inventory and low, stable prices for food commodities (on top of other spending priorities for governments globally) has also witnessed a decline in public sector research and development (R&D) as crop research has moved to focus on genetically modified (GM) crops rather than conventional approaches to yield and production increases (Trostle, 2008). Trostle (2008) also argues that global aggregate yield growth has declined from 2% over 1970-1990 to 1.1% between 1990-2007 and is expected to decline further. Whether GM technology halts this decline is yet to be seen.

In 2008, the globe witnessed stocks fall to all time record lows since the 1970's in most commodities. Schnepf (2008) gives a good summary of the global grains balance sheet at this time as shown in Table 1 below.

Table 1. Summary of Global and U.S. 2007/2008 Ending Stocks

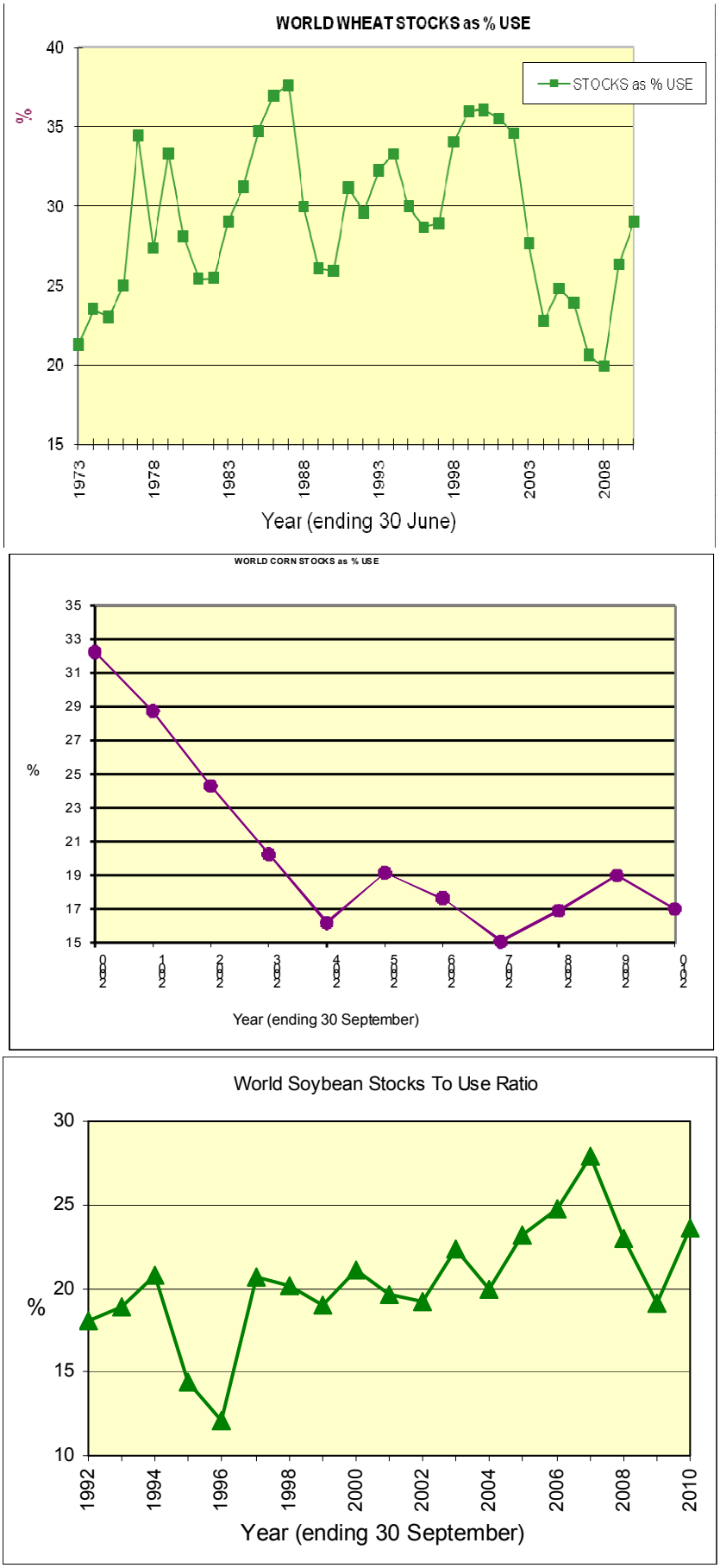
	Ending Stocks			Stock-to-Use Ratio	
Commodity	Million tons	Lowest since	Change from 2006/07	Stocks/Use %	Lowest since
Global[a]					
Total Grains[b]	317.2	1981	-6%	13%	on record
Coarse Grains[c]	127.5	1977	-7%	11%	on record
Wheat	112.5	1977	-10%	16%	on record
Corn	103.0	1983	-5%	12%	1973
Rice	77.2	2006	1%	17%	2006[d]
Soybeans	49.3	2004	0%	16%	2003
Cotton	13.0	2004	-3%	36%	2003
Vegetable Oil	8.9	2003	- 3%	5%	1972

Source: USDA, PSD data base, April 9, 2008.
Note: The 2007 crop year covers the period from the start of the 2007 harvest to the start of the 2008 harvest. Thus, ending stocks for the 2007 crop represent supplies available in 2008 just prior to the harvest for the 2008 crop. Similarly, the stocks-to-use ratio for the 2007 crop is a measure of available supplies relative to use just prior to the harvest of the 2008 crop.

[a] USDA's PSD database for global commodities extends back to 1960; thus, "lowest on record" means the lowest data point" since 1960.
[b] Total grains include coarse grains, wheat, and rice.
[c] Coarse grains include corn, sorghum, barley, oats, and rye.
[d] Rice stocks in 2006 were the lowest since 1976.

The picture painted here describes a situation where supply simply wasn't in a position to meet demand given any more shocks to the system. However, as we have subsequently witnessed, supply over 2008 and 2009 has been able to exceed demand quite comfortably and stocks are now being rebuilt, with the softening of grain prices a consequence. It should however be noted that whilst wheat stocks are being rebuilt, corn and soybeans stocks are still at comparatively low levels, which means if a supply shock were to occur in a major producer, prices could again appreciate quite rapidly. Historical and forecast stocks/use ratios for wheat, corn and soybeans are presented in Figure 4 below.

Figure 4: Stocks/Use Ratios for Wheat, Corn and Soybeans 2000-2010.



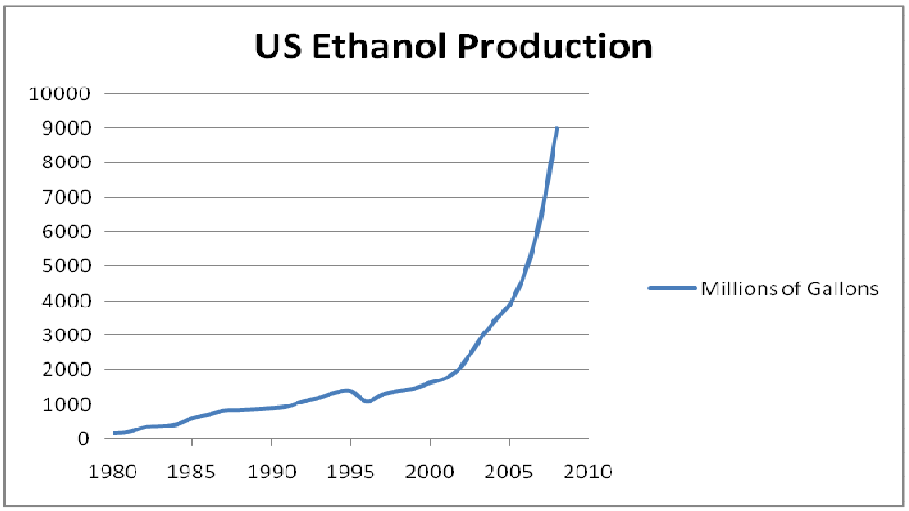
Source: Analysing Agriculture

1.2 Corn – Is it the New Black Gold?

Contrary to popular belief, biofuels are not a new development. In fact one of the first cars, the Model T Ford, was designed to operate on gas or ethanol or both.[4] Biofuels were also used in both World Wars and in the 1970s. A common theme with biofuels, seems to be that they regain prominence when "food becomes too cheap."[5] However after food spikes, the economic attractiveness of biofuels falls and the industry then moves back into hibernation.

Despite the recent spike in grain prices, the difference between then and now is that in response to concerns about high oil prices, energy security and climate change, governments have now implemented mandates or support schemes for their renewable fuel sectors and rather than being the boom and bust industries of the previous century, I believe they now will be a permanent fixture of the grains industry for the foreseeable future. I fact another 900 million-1 billion gallons of ethanol capacity is expected to be added in 2009, with the focus then shifting to cellulosic ethanol. A graph of US ethanol production since 1980 is provided in Figure 5.

Figure 5: US Ethanol Production

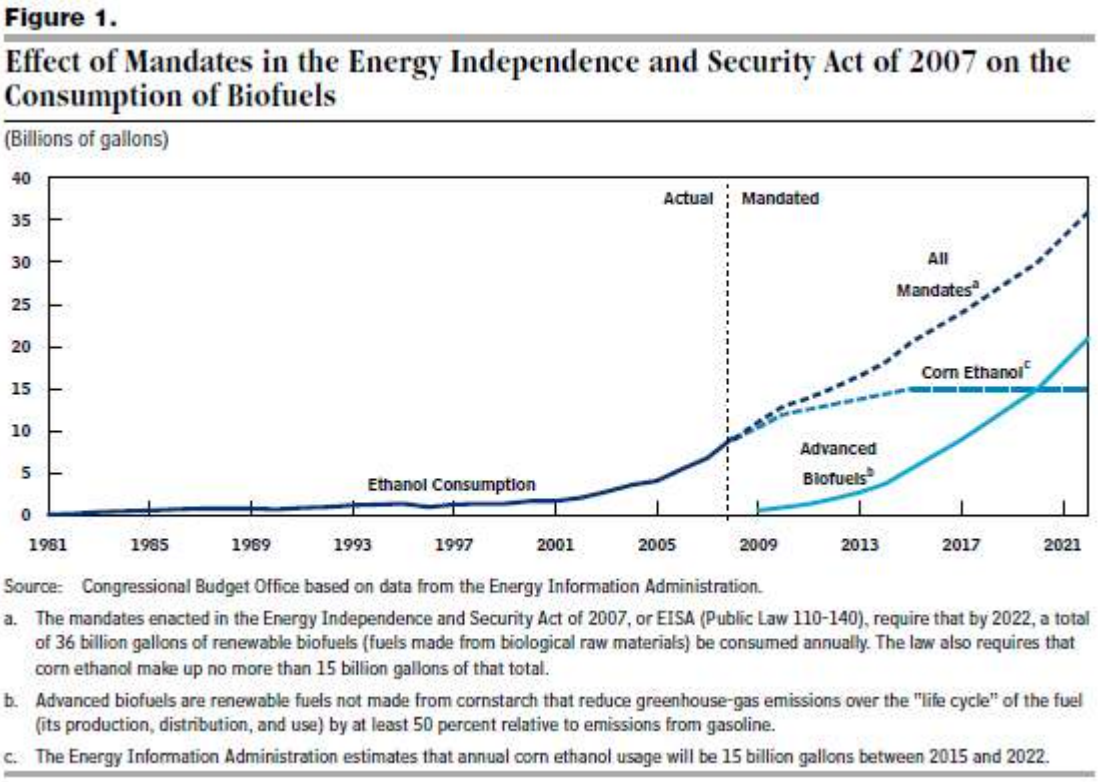


Source: Renewable Fuels Association

[4] http://www.biofuelsforum.com/biodiesel_news/1115-renewable_energy_has_icon_henry_ford.html
[5] Guy Allen, Louis Dreyfus Commodities. Discussions 25 June 2009

Cellulosic ethanol[6] has also been mentioned as a potential substitute for grain ethanol. In fact, ethanol derived from corn is capped at 15b gallons in 2015, and total biofuel production in the USA is mandated at 20.5b gallons in 2015. Thus, the balance has to be made up of cellulosic ethanol or other non-corn sources. By 2022, biofuel production is mandated to be 36b gallons, with corn ethanol remaining mandated at 15b gallons.[7] However, cellulosic ethanol is still in the development phase and very few if any plants have been built. There are also significant logistic difficulties with cellulosic ethanol production that are yet to be overcome. Nevertheless, mandates do mean that the cellulosic ethanol has to be produced and as such its production will have an impact upon corn prices and even crop choice in the future. A graph highlighting this expansion in biofuels is presented in Figure 6 below.

Figure 6: Effect of Mandates in the Energy Independence and Security Act of 2007 on the Consumption of Biofuels



The three largest biofuel producers are Brazil (sugarcane for ethanol), the EU (canola oil for biodiesel) and the USA (corn for ethanol and to a lesser extent soybean or canola oil for

[6] Includes potential products such as switchgrass, crop residues and forest waste

[7] See *"The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions."* Congress of the United States Congressional Budget Office, April 2009

biodiesel). An outline of the ethanol and biodiesel production globally has been provided in Table 2.

Table 2: Global Ethanol Production 2008

Country	Millions of Gallons
USA	9000.0
Brazil	6472.2
European Union	733.6
China	501.9
Canada	237.7
Other	128.4
Thailand	89.8
Colombia	79.29
India	66.0
Australia	26.4
Total	**17,335.2**

Source: RFA, F.O. Licht 2008 Estimates

These three countries also have a series of mandates, subsidies and tariffs that support their biofuel programs. Schnepf (2008) gives a good summary of these programs which include:

- Brazil – minimum of 20-25% sugar cane ethanol in its gasoline supply and 2% biodiesel blend by 2008 rising to 5% by 2013.
- EU – a goal of 5.75% biofuels in motor fuel by 2010 rising to 10% by 2020 (predominantly biodiesel). It is important to note that this is a goal, not a mandate.
- USA – The Renewable Fuels Standards (RFS) mandate 9 billion gallons by 2009, rising to 20.5 billion gallons in 2015 and 36 billion by 2022. However corn ethanol is capped at 15 billion gallons in 2015 with the remainder to be comprised of biodiesel or non-corn ethanol. Nevertheless, more important than this is the blending wall, which is the amount of ethanol needed at the current national blending level of 10% (i.e. E10), which is estimated at 14 billion gallons (Abbott et al. 2009). The USA also have an ethanol tax credit (for blending with gasoline) which has been reduced to US45c/gallon in 2009, a biodiesel tax credit of $US 1.00/gallon and a $US54c/gallon tariff on imported ethanol.
- Other biofuel programs include China, Canada, Thailand, India and Australia.

Biofuels have been regarded as one of the major factors in increases in the price of food. However widely different estimates have been given for its impact, ranging from 2-3% from the USDA to 65% from the World Bank (Westhoff, 2008). However, what I believe is that the influence of oil has had a greater influence on the escalation in food prices than that of government biofuel policies, because as the amount of biofuel facilities and the biofuel

programs have been increased, we have also seen the price of corn increase its correlation to the price of oil quite dramatically, especially since 2006. Abbott et al. (2009) give an excellent summary of this relationship which is outlined below in Figure 7 and Table 3.

Figure 7: Corn Crude Oil Correlation 2000-2009

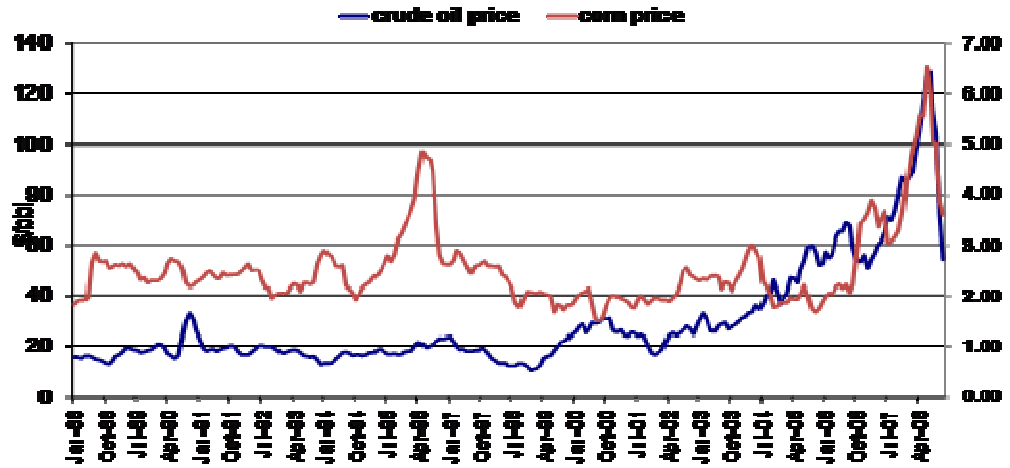


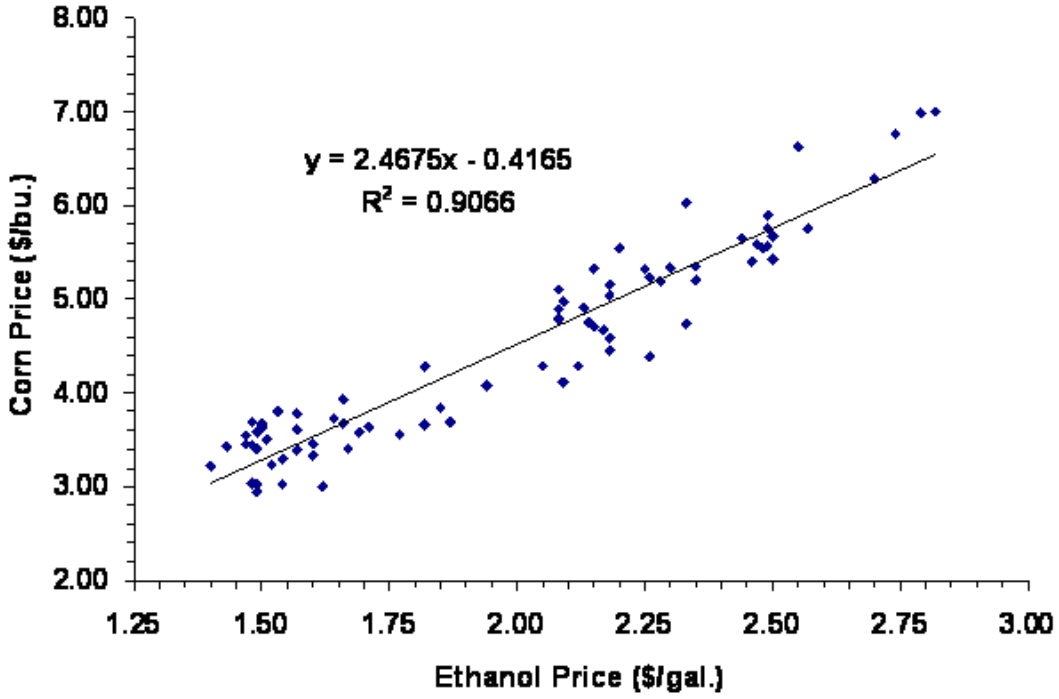
Table 3: Crude, Gasoline and Corn Price Correlations

Period	Correlation Type	Correlation
1998-2005	Crude – gasoline	0.95%
	Crude – corn	-0.26%
2006-2008	Crude – gasoline	0.92%
	Crude - corn	0.80%

Source: Abbot et al. (2009)

Irwin and Good (2009) further built on this relationship by examining the relationship between corn and ethanol during the period of 2007-2009 which roughly corresponds to the period of when corn prices rapidly appreciated. They found an extremely high correlation between the two, even at low and high corn prices, which tends to indicate that this link between the corn and ethanol price is now quite strong. This can be seen in Figure 8 below.

Figure 8: Relationship between Weekly Corn and Ethanol Prices at Iowa Ethanol Plants, September 7, 2007 – March 6, 2009



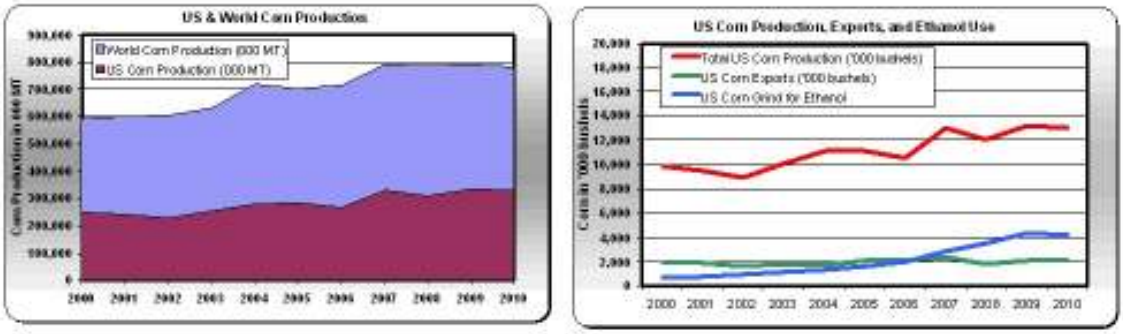
Source: Irwin & Good, (2009).

Essentially, what Figures 7 and 8 and Table 3 demonstrate is that the correlation between the price of oil and the price of corn is now very strong. This is because, as Abbott et al (2008) speculate, a) crude oil price drives gasoline price; b) gasoline and ethanol are close substitutes; c) gasoline and ethanol prices are linked; and d) ethanol (in the USA) comes from corn. The question I would pose is will this link be maintained in the future (i.e. will the biofuel policies of these nations continue to be supported) or will we see this link broken if they are changed? I believe, after discussion on my travels and at least in the short term, that this link will continue because of the strong political base of the corngrower in the USA coupled with the amount of infrastructure and investment that has gone into the ethanol industry that needs to be recouped. Furthermore, after discussions with people in the ethanol industry, speculation is that the blending wall will be lifted from E10 to E12 (i.e. a 12% ethanol blend) in the near future, further lifting the demand for ethanol.

This ethanol demand is appropriate under a situation of plentiful stocks, but it would be interesting to see what would happen in the case of a drought in the corn belt of the USA

Midwest. The Midwest has not experienced a drought since 1988 and commonly, they occur every 19-23 years.[8] By implication, this would mean that a drought in the Midwest is not too far away (between 2007-2011). The USA now produces approximately 40% of the world's corn, with approximately 1/3 of that corn being utilised by the biofuels sector and 1/6 exported. Further details of these trends are provided in Figure 9 below and Appendix 1. Assuming a "drought"[9] that reduced production by 25%, this would suggest that exports would effectively collapse in the face of demand for corn for ethanol and livestock domestically. Thus, the 2 billion bushels (approximately fifty million tonnes) of corn that was previously exported would have to be found from elsewhere in the globe. Schnepf (2008) refers to a model developed by the Centre for Agricultural Research & Development (CARD) that speculates that if a similar drought to 1988 occurred, corn prices would rise to $US 8.62/bushel compared to $US 7.28 without the RFS mandate, which is an 18% increase.

Figure 9: US & World Corn Production; US Corn Production, Exports and Ethanol Use



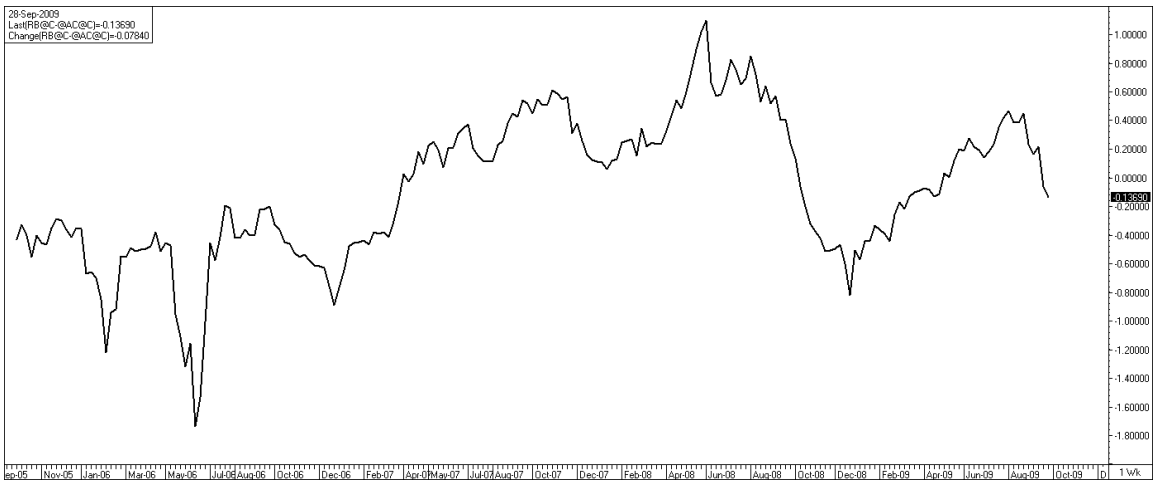
An interesting aside about the RFS mandate is that until very recently, in the middle of the Global Financial Crisis (GFC) when corn prices were still relatively high but the price of oil was falling rapidly, was that the RFS mandate hasn't been binding because the price of oil and the price of corn has meant that with the blender's credit of US45c/gallon, it has always been profitable to produce ethanol. However, even in this case where the economics of ethanol production became unattractive, because the RFS is mandated by law, 10% of gasoline usage in the USA still has to contain ethanol. As a result, this is a very powerful source of demand

[8] The $12 Corn Special Report, Stewart Peterson

[9] Having travelled through the Midwest, a drought there is nothing like Australia where they will still harvest a crop, unlike Australia where we may harvest nothing. For more details on what climate change could mean for Australia, please see Appendix 2

that is virtually price inelastic, as there are very stiff penalties in place if the mandates are not met. It is also interesting to note that at the current oil and ethanol price ($US78/barrel and $US 3.72/bushel for corn) that blenders margins are very attractive (as highlighted in Figure 10 below) and more ethanol capacity is being constructed (although nothing like in the period February to June 2008).

Figure 10: Blending Margins in Ethanol 2005-2009



The livestock industry, especially that portion more or less dependent on grain as a feedstuff, has been one of the most vocal critics of the policies supporting the biofuel industry. The National Cattlemen's Beef Association supports renewable energy, but argues that there should be a "market based approach for the production and usage of corn ethanol."[10] However, what very few people realise is that out of a tonne of corn 410 litres is converted to ethanol and 312.5kg (at 10% moisture) is a by-product of Dried Distillers Grain (DDG). This DDG also has a nutrient value of 120% of normal corn, so one could make the argument that there are synergistic benefits from the ethanol industry, as one can extract the ethanol but still be left with a high nutrition feed. However, it appears that the DDG's are only being used in ruminant animals (beef cattle and dairy) as opposed to the pork and poultry industries because of fibre and fat concerns.

One final comment on the ethanol situation concerns the recent developments in the sugar market. I should also preface this comment in that it applied to this particular point in time. Sugar is now trading around $US23c/lb, which is a very high price considering around 2003 it

was at $US3-4c/lb. Much of this has been explained by the increase in sugar being converted into ethanol in Brazil and the short crops in India caused by a variable monsoon. Is this higher sugar price, coupled with a resurgence in the ethanol price because it is arguably more attractive to convert sugarcane in Brazil to sugar than to ethanol (thus limiting the global supply of ethanol), going to see more corn used for ethanol and possibly for exports into the EU from the USA? This development could be an important further source of demand for ethanol from corn in the USA as ethanol exports from the USA displace those from Brazil, especially given the weak $US at present.

[10] http://www.beefusa.org/uDocs/renewableenergyleavebehind893.pdf

1.3 Speculation – Too Much of a Good Thing?

Many articles in the popular press have blamed speculators and their associated flow of investment capital into commodities for the price spike and its subsequent collapse. Many global investors have viewed commodities, rightly or wrongly, as a diversification hedge,[11] and there has been an incredible increase in capital deposited in many futures markets in commodities of all kinds, not just agricultural.[12] This is because analysts and traders viewed commodities as "havens for investors protecting their assets from the declining value of the U.S. dollar and inflation" (Domanski & Heath, 2007), whereas this role was traditionally the domain of gold and other precious metals. Whilst no-one can argue that there has been an incredible amount of capital deposited in these markets, I feel that to lump the cause of the increase in global grain prices solely at the feet of speculators is incorrect for reasons that I will outline below. However, prior to this it would be useful to explain how the circumstances of commodities attracting this additional capital and investment attention came to pass.

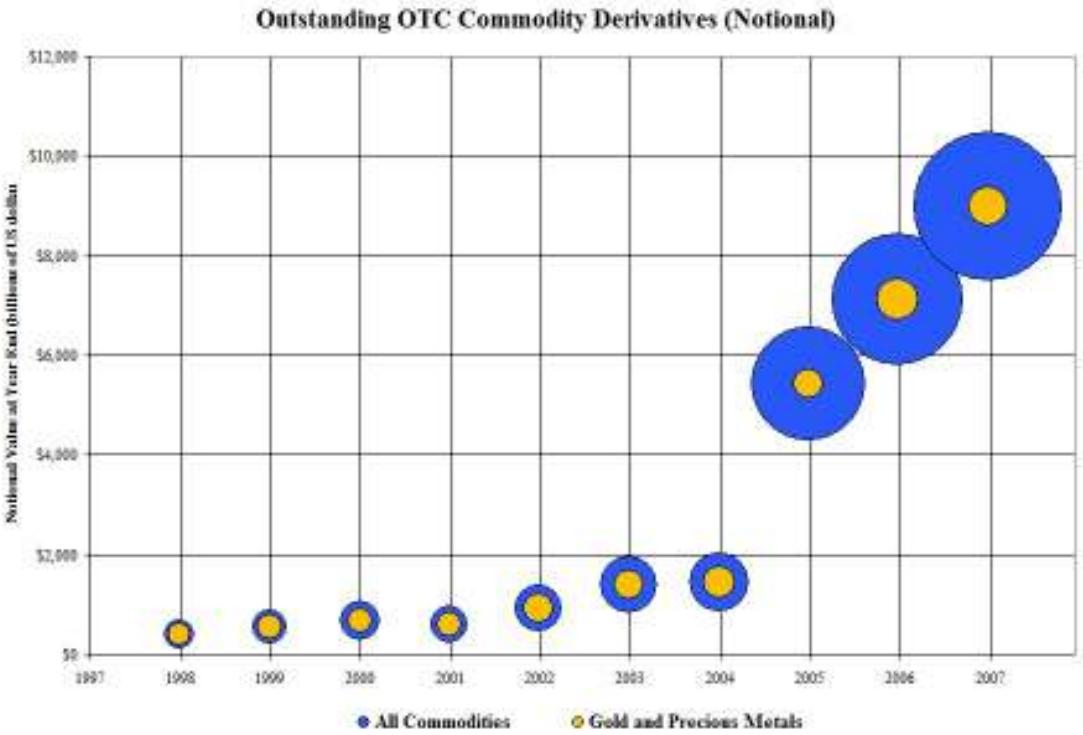
Firstly, academic research about the diversification benefits of commodities to a balanced investment portfolio began to come to prominence in the early 2000's. The most prominent of these was a paper by Gorton & Rouwenhorst (2006) which demonstrated that over a 45-year period, a diversified investment in collateralized commodity futures earned historical returns that are comparable to stocks. They also argued that the returns on this portfolio of commodities were less risky than stocks because:

- The distribution of commodity returns is skewed right, whereas equity return distributions are skewed left. In other words, relative to a normal "bell-shape" curve, equities experience proportionally more crashes, whereas the "crashes" in commodities occur most often on the upside, leading to positive returns to investors; and
- Commodities have the ability to diversify portfolios of stocks and bonds. The sources of the diversification benefits are the ability of commodities to provide a hedge against inflation - stocks and bonds are poor hedges by comparison - and to offset the cyclical variation in the returns of stocks and bonds

[11] Nathanial Gronewold, "Commodity 'feedback loop' fuelling price surge," Greenwire, March 11, 2008, at [http://www.eenews.net/Greenwire/].

Secondly, there was a change in regulations by the CFTC and the CBOT to increase speculative limits for a number of agricultural contracts listed on the exchange. Many hedge funds and banks also were able to receive exemption from speculative limits imposed on them previously[13] and as a result, a number of index funds (the most famous of which is the Goldman Sachs Commodity Index and the Rogers International Commodity Index[14]) were formed to attract money from investors seeking diversified returns away from stocks and bonds. An example in the growth of money into these funds is provided below in Figure 11.

Figure 11: Growth of Money into Commodity Funds



Some have argued that this increase in speculative money and investment by long only commodity index funds into agricultural futures markets has caused:

- Increased market volatility;
- Distorted historical price relationships; and,
- Fuelled more rapid increases and decreases in the level of commodity prices (Sanders & Irwin, 2009).

[12] Domanski & Heath (2007) term this the "financialisation" of commodity markets

[13] This is because they were taking money from investors to "hedge" their exposure to these commodity markets through the OTC market, thus being reclassified from speculators to hedgers

This is because index funds are traditionally long-only (i.e. they will buy futures and then roll them forward into future contract months, never selling or going short a commodity). The problem with this, it is argued, is that in smaller markets (such as some of the grain and livestock markets) these funds can have a significant amount of the bought or long positions in various contract months (as a percentage of open interest), and thus they have been accused of increases in prices because there is this overwhelming buying pressure on the commodity all the time.

The increase in commodity prices attracted a great deal of attention from the press and also from government, particularly in the USA. Apart from crude oil,[15] one of the most affected markets was wheat, with the Senate's Permanent Subcommittee on Investigations releasing a report on 23 June 2009 titled "Excessive Speculation in the Wheat Market."[16] Their findings were that the index traders increased futures prices relative to cash prices and that, as a result, this impeded price convergence which severely impacts on the performance of the wheat futures contract for hedging purposes. To remedy this situation, they recommended that:

- Existing position limit waivers for index traders be phased out;
- If necessary, impose additional restrictions on index traders, such as position limits of 5,000 contracts per trader;
- Investigate index trading in other agricultural markets; and,
- Strengthen data collection on index trading in non-agricultural markets.

The biggest problem with this increase in index fund buying, it is argued by many, is that it has lead to a lack of convergence between the CBOT wheat contract and the underlying physical cash wheat price. This lack of convergence between the cash price and the futures price for the commodity at contract expiry is a critical problem. Economic theory, as stated by Irwin, Garcia, Good & Kunda (2008), argues that convergence will occur when cash prices are greater than futures at contract maturity, because arbitrage will mean that people will buy futures and accept delivery of the grain and make a profit, and vice versa if futures are greater than the cash price. The problem is if markets converge and then don't converge, hedgers (be

[14] see Appendix 1 & 2 for weightings
[15] See http://hsgac.senate.gov/public/index.cfm?FuseAction=Press.MinorityNews&ContentRecord_id=648ca6ed-b5b0-46ef-82b3-19e69163592e
[16] See http://levin.senate.gov/newsroom/release.cfm?id=314947

they farmers or end-users) will not have confidence that their hedge is effective, and thus one side may decide not to use the contract and this then leads to contract non-performance and eventually its decline.[17] This is what happened in late 2007 and early 2008 when rapid limit up moves in futures prices resulted in: firstly many merchants pulling bids because they could not afford the margin calls they were being exposed to for the forward contracting of grain; and secondly that cash prices were bearing no resemblance to the prevailing futures price of the commodity at the time, hence there was no effective hedging mechanism because the basis was too weak.[18]

The questions behind why this lack of convergence occurred were addressed by Irwin, Garcia & Good (2007) when they investigated the performance of CBOT corn, soybean and wheat contracts after the changes in speculative limits. In particular, they concentrated their work on three main areas: liquidity, volatility and convergence of futures contracts.

Liquidity is defined as the magnitude of outstanding, or unfilled contracts, which is important because market participants (be they hedgers or speculators) desire a market with enough contracts outstanding that large transactions won't result in a substantial change in price (Irwin, Garcia & Good, 2007). The liquidity of a market is commonly measured in open interest. What Irwin, Garcia and Good (2007) found was that open interest in these markets increased quite dramatically in mid 2005 and early 2006 and this probably reflects the increase in trading by hedge funds and long-only index funds. However, it should be noted that Sanders, Irwin & Merrin (2008a) demonstrate that after this surge in open interest, index fund positions stabilised over the next couple of years.[19] Furthermore, the data by the CFTC that was used for this study classifies positions by entity, not trading activity which can blur the data as speculators can hedge and hedgers can speculate (Irwin, Sanders & Merrin, 2009). Despite this, an increase in open interest is a good thing because it can lead to increased market efficiency through lower transaction costs (such as a smaller bid-ask spread) and also accommodate interest from bigger market participants who will want to ensure that if they trade a market, they don't move it substantially.

[17] Hieronymus (1977) argues that "when a contract is out of balance the disadvantaged side ceases trading and the contract disappears."
[18] This was particularly the case for wheat in early 2008 when the spot CBOT wheat contract rose to over US$12/bushel
[19] Their data period was up to April 2008

Volatility is a measure of "the emergence of new and unexpected market information" (Irwin, Garcia & Good, 2007). They also argue that "some level of volatility is deemed necessary for trading activity, but extreme volatility can also discourage participation by some sectors of the market." After examining the data,[20] they argue that there was "little to suggest that the change in speculative limits had had a meaningful impact on price volatility."

With respect to convergence Irwin, Garcia & Good (2007) found that convergence was not an issue for the CBOT corn and soybean markets, it was for the CBOT wheat market. It should be noted that unlike corn and soybeans, wheat trades at two other exchanges in the USA, namely Kansas City (Hard Red Winter) and Minneapolis (Hard Red Spring) They argue that the problems for the wheat market are more likely due to contract specification, because "even though the CBOT contract is effectively for Soft Red Winter, the price of that contract was driven higher by the overall increase in wheat prices and the preference of many market participants to trade in the more liquid Chicago market than at the other exchanges."

Other problems have been the fact that the CBOT storage rate for wheat is less than that which is privately available to store wheat (hence encouraging storing of CBOT wheat and less out-turning by elevators) and the less than adequate number of delivery locations. This is because the Corn Belt has expanded into many traditional wheat growing areas and the traditional delivery locations of Chicago and Toledo are now no longer as relevant. This has been compounded by the fact that most wheat for export now flows to the Gulf of Mexico via Texas or to the Pacific North-West via Portland, rather than the Mississippi, leaving the contract with an exceedingly narrow flow of stocks to draw upon in the delivery process to force convergence. Furthermore, because of this change in trade flows, it is argued that wheat is delivered to Chicago and Toledo because they are the traditional delivery locations, not to satisfy the demand for commercial shipments, and hence congestion ensues.

An important point regarding index fund buying is made by Irwin, Good, Garcia & Kunda (2009) in response to the Senate's Permanent Subcommittee on Investigations Wheat Market report. They argue that equating index fund money flows into wheat futures with demand is wrong. Rather, since futures markets are zero sum markets where all money flows must net to

[20] From September 4, 2001 to August 31, 2006

zero,[21] it makes no sense to equate increased buying with new demand as it does to equate increased selling with new supply. In fact Irwin, Sanders & Merrin (2009) argue that this is the classical statistical mistake of confusing correlation with causation. Furthermore, it should be noted that contemporaneous correlations can exist between money flows and futures price if information on fundamentals is changing at the same time.

A second concern with the increased presence of long index fund money is that it caused an increase in the carries (i.e. the spread in price for one contract month to the next) in the wheat market and this also had an adverse impact on convergence. This is because funds had invested so much money and were effectively long only, that when they would roll contracts forward from the nearby to the deferred (known as the "Goldman Roll") this would create buying pressure to bid up the value of the deferred contract months. Irwin, Good, Garcia & Kunda (2009) argue that since the time window for when this rolling would occur was well publicised, an examination of the prices in this window found that although there was an increase in the size of the spread to the next contract, this spread disappeared once the rolling window had passed. Rather, it appears that the issues associated with contract delivery and specification identified above probably had a larger role to play than index funds.

Another discrepancy with the argument that speculation lead to the increase in global grain prices is that rises in futures prices will lead to rises in cash prices. This impact of increases in futures prices on cash prices is overstated because since in the long term prices are determined in cash markets, speculators would have had to purchase or take delivery of the physical commodity and hold it off the market to restrict supply, hence forcing cash prices higher. However there is no evidence of index funds or speculators accumulating stocks of commodities as they will roll their positions forward so that they specifically can't be forced to take delivery of the product. In fact, as highlighted earlier, supplies of grain were at all time lows when prices began to appreciate, so if supply was adequate and prices were being forced higher by speculation, the excess supply should be seen as an increase in inventories.

One last point concerning the presence of index funds is that, as can be seen from Appendix 3 and 4, they did not exclusively invest in grain futures. Rather, there were a number of

[21] As Hieronymus (1977) states "for every long there is a short, for everyone who thinks the price is going up there is someone who thinks the price is going down, and for everyone who trades with the flow of the market, there is someone trading against it."

livestock and other soft futures that were invested in and these exhibited less if any appreciation than the grain market. In addition, just because index funds had large long positions didn't preclude other players from shorting the market. In fact, as Irwin, Sanders & Merrin (2009) found, in four of the eight markets they studies (corn, soybeans, soybean oil and cotton) the increase in short hedging actually exceeded the increase in long speculation (i.e. more sellers than buyers). Furthermore, commodity prices changed (or didn't change) in markets that were not included in popular commodity indexes or had no futures markets at all. This information is presented in Table 4 below.

Table 4: Change in Commodity Prices, January 3, 2006–April 15, 2008

Commodity	January 2006	April 2008	Change
Panel A. Futures Markets Included in Popular Indexes			
Corn	$2.20/bu	$6.06/bu	175%
Soybeans	$6.28/bu	$13.80/bu	120%
Soybean oil	22.96¢/lb	62.52¢/lb	172%
CBOT wheat	$3.46/bu	$8.96/bu	159%
KCBOT wheat	$3.90/bu	$9.50/bu	136%
Cotton	55.24¢/lb	75.23¢/lb	36%
Live cattle	$96.37/cwt	$91.57/cwt	-5%
Feeder cattle	$114.00/cwt	$103.95/cwt	-9%
Lean hogs	$64.65/cwt	$71.65/cwt	11%
Panel B. Futures Markets not Included in Popular Indexes			
Rough rice	$8.27/lb	$22.17/lb	168%
Fluid milk	$12.65/cwt	$17.29/cwt	37%
Panel C. No Futures Markets			
Apples fresh use	$0.26/lb	$0.41/lb	58%
Edible beans	$19.30/cwt	$34.40/cwt	78%

CBOT = Chicago Board of Trade; KCBOT = Kansas City Board of Trade.
All prices refer to the relevant nearby futures price except apples and edible beans, which are monthly prices received by farmers.

Source: Irwin, Sanders & Merrin, 2009

Notwithstanding this and despite the evidence outlined above, I would argue that grain prices did witness a period of "irrational exuberance" during the period when grain futures contracts were limit up for several days in a row. The behavioural side of trading and markets is only just beginning to be understood and I would argue that market psychology and the herd like action that were witnessed at that time wouldn't normally be observed in an efficient market. Whilst the economic theory discussed above is quite compelling, in practice futures prices did exhibit all the signs of "fear and greed." As Yogi Berra said, "In theory there is no difference between theory and practice. In practice there is."

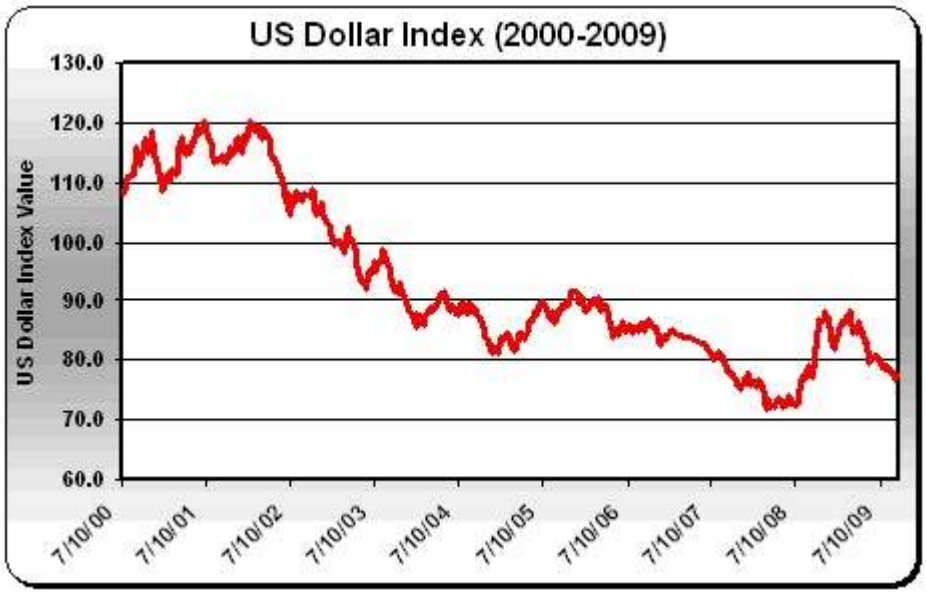
1.4 US Dollar Depreciation – The Next Peso?

One overlooked fact in the cause of the increase in global grain prices was the rapid depreciation in the $US that we witnessed over 2006 – mid 2008. Trostle (2008) gives a sound explanation of this phenomenon. Basically, he argues that since 2002, the $US has been in decline against the OECD and later the currencies of many developing countries. This situation has had two impacts. Firstly, since the USA is a source of many agricultural commodities, it has been cheaper for many importers of these commodities to purchase them because of the relative exchange rates. Furthermore, since the prices of a number of commodities traded globally are denominated in $US, the price of these commodities on their various exchanges in the USA, as well as the spot prices in $US, also rose.

Secondly, some people were arguing that a fear of inflation and $US weakness was causing investors to diversify their investment portfolios to include commodities as a hedge against inflation and as a store of real value in the face of a declining $US.[22] Reasons for this weakness, Abbott et al. (2008) argue, include the large current account deficits (CAD) in the USA, in conjunction with a fear that Chinese and OPEC purchases of Treasury Bills would diminish and that interest rate cuts would make the USA a less attractive place to invest relative to other parts of the world. Below in Figure 12 is a graph of the $US Index over time.

[22] It has been argued that this is particularly the case for crude oil, which as identified earlier, has a strong impact on corn prices.

Figure 12: $US Index 2000 - 2009



An important point to realise here is that, as Abbott et al. (2008) explain, when examining the relationship between the CAD, exchange rates and commodity prices, is that it is very difficult to identify causality. Rather than a high oil price leading to an expansion in the CAD and a depreciating USD, which then in turn leads to higher oil prices, a further expansion in the CAD and a further declining $US, they argue that the prices of commodities and the $US exhibit simultaneity. Thus, no one factor can be apportioned responsibility for causing the other factors to occur.

Abbott et al. (2008) have attempted to quantify the effect of this $US depreciation on commodity prices over the three major commodity price spikes by comparing prices in $US, Real Euros[23] and the USDA Economic Research Services agricultural trade weighted index (USDA RE) of real foreign currency per unit of deflated dollars. This is outlined below in Table 5.

[23] Abbott et al. (2008) used an IMF determined Euro rate prior to 1998 by taking a weighted average of the European currencies that were converted into the Euro.

Table 5: Increases in Food, Crude Oil and Gold Prices

Period:	Corn	Wheat	Rice	Soybeans	Soyoil	Soymeal	Crude Oil	Gold
2002 to March 2008								
$US	143%	217%	199%	171%	240%	107%	308%	217%
Real Euro	37%	79%	69%	53%	91%	16%	130%	79%
USDA RE	46%	91%	80%	63%	104%	24%	145%	90%
1994 to 1997*								
$US	100%	190%	50%	50%	-2%	69%	29%	1%
Real Euro	88%	183%	60%	60%	5%	81%	27%	-7%
USDA RE	85%	176%	41%	41%	-7%	60%	19%	-8%
1973 to 1974 **								
$US	43%	92%	206%	245%	100%	268%	370%	72%
Real Euro	37%	104%	153%	161%	51%	178%	274%	70%
USDA RE	23%	75%	152%	193%	70%	213%	279%	55%

Abbott et al (2008) argue that Table 5 demonstrates that the increase in commodity prices in the 2002-2008 period were predominantly driven by exchange rates, since the price in Euros didn't appreciate as rapidly. This is dissimilar to 1994-1997, when prices increased by similar amounts across currencies, indicating that it was more of a supply induced shock that caused that price spike. They also argue that it was a combination of supply and currency movements that caused the price shock in 1973-1974.

As many farmers are well aware, the $A has a huge impact on our farming returns, with many commentators suggesting that each $A 1c depreciation against the $US can be responsible for a $A4/tonne increase in grain prices, all else being equal. Forecasting foreign currency movements is, as Michael Pascoe describes, a "mugs game", because "it tends to swing over too broad a range and there are simply too many wild and wacky variables involved for anyone, repeat, anyone to have a track record of successfully predicting where the Aussie is going to land."[24] As a result, he also states that there are "two types of economists: those who can't forecast the Australian dollar and those who don't know that they can't forecast the Australian dollar."[25] Despite this, my one big fear with the increase we have witnessed in grain futures prices is that we will see a great deal of the benefit of a higher wheat futures price offset by a stronger $A (at least in the short term) due to the state of US indebtedness and low interest rates combined with the Australian economy's growth story as a supplier of hard (and to a lesser degree soft) commodities into Asia and China and our relatively higher interest rates and expectations of them increasing compared to the rest of the globe.

[24] http://www.smh.com.au/business/strong-dollar-wont-kill-the-boom-20090922-fzm9.html
[25] *Ibid.*

1.5 Is Chindia Going to See Malthus Proved Correct?

No comment on grain prices would be complete without a discussion on the role of China and India. Much has been made of the potential of "Chindia" (the combination of China and India) and their cumulative effect on world food demand, since between the two countries; they have over 2 billion people.[26] On top of this, the two economies have been growing rapidly this decade (see Table 6) and history has shown that as economies develop and their disposable income increases, a substantial component of that increase in income is spent on protein, i.e. meat, dairy and vegetable oils (Schnepf, 2008). There has been a significant amount written about the rise of these two countries (and to a lesser extent Brazil and Russia, the other members of the BRIC countries) and the question has been posed how the world is going to grow enough grain and protein to feed these populous and expanding countries?[27] This burgeoning demand for food has also been used to explain some of the reasons why food prices increased so swiftly and significantly in 2007/2008.

Table 6: Actual and Forecast GDP Growth for China and India[28]

	2006	**2007**	**2008**	**2009 (f)**	**2010 (f)**
China	11.6%	13.0%	9.0%	8.2%	8.9%
India	9.7%	9.0%	6.7%	6.0%	7.0%

f is for forecast.

Source: Asian Development Bank

This has lead to a revival of the Malthusian idea that the world would struggle to supply enough food for this growing population (and the wealth behind it), particularly in view of the prognosis that the world's population will reach 9 billion by 2050.[29] This revival of the ideas of Malthus, (1798) has also been used as one of the arguments to attract a significant amount of outside capital into agriculture (either direct in the form of farmland investment or indirect through a commodity index fund) and also to partly explain the recent increase in global grain prices.

[26] UN Department of Economic & Social Affairs, 2006
[27] See Evans, A., (2009) *"Feeding of the Nine Billion",* for more details
[28] Mitchell, A. (2009) *"Robust Asia to Lead World Out of Misery."* The Weekend Australian Financial Review, p 42, September 26-27 2009.

After visiting China this year, I am not so sure whether the ideas of Malthus are ready to be dusted off just yet. In discussions with many expatriates in China, chief among them some grain traders from Louis Dreyfus Commodities, we debated how China was going to feed itself into the future? It was acknowledged that China had a large population to feed, but unlike many other western countries, it appears that the Number One priority of the Chinese Government is food security and ensuring that none of their 600 million peasants goes hungry. This is because when you look back through Chinese history, the vast majority of civil uprisings have been caused by a hungry/starving population and the Chinese Government, I feel, won't make this same mistake again.

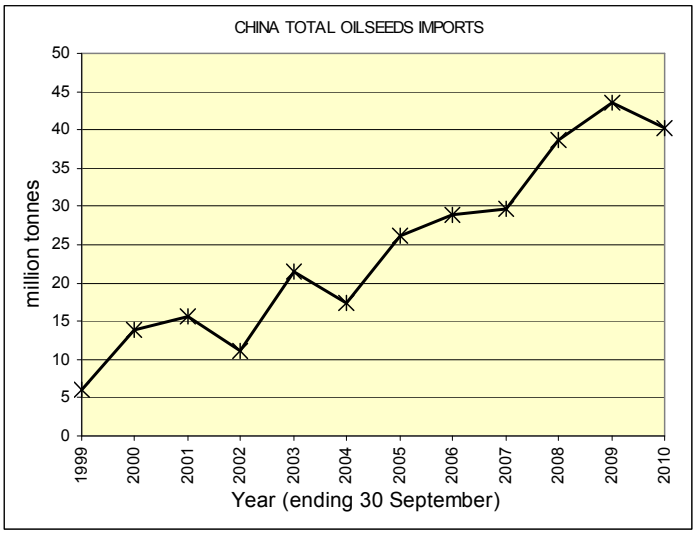
As a result, the arable farming in China is concentrated in the three major food crops (rice, wheat and corn). Of these three crops, China is the largest, second largest and second largest producer in the world.[30] This three crops combined account for 55% of China's sown acreage, with soybeans and canola (their other major food crops) only accounting for 10%.[31] It was argued that the Chinese government has taken a conscious decision to concentrate their grain production in the three major food crops (rice, wheat and corn) at the expense of oilseed crops because:

- Productivity in cereal crops is commonly twice that of oilseeds (thus you get more production from the limited resource that is arable land); and
- Freight as a percentage of crop value is much cheaper for higher value crops like oilseeds, thus the freight component as a percentage is cheaper when importing soybeans from areas like North or South America, than it is for cereal crops whose value is lower.

As can be seen below in Figure 13, the Chinese have been rapidly increasing their imports of soybeans over the past decade and these imports are expected to increase further into the future as the country develops further and demand for oilseed products continues to increase.

[29] *Ibid.*
[30] USDA, 2008
[31] Guy Allen, Louis Dreyfus Commodities, presentation to JP Morgan 10 June 2009.

Figure 13: Imports of Oilseeds by China 1999-2010



Source Analysing Agriculture

Whilst both China and India are big producers of commodities, outside of the Chinese importing soybeans, neither of them are large commodity traders (i.e. importers or exporters). In fact China over history hasn't been a great trading nation. One could probably make the argument that one of the causes of the Opium Wars was that the British had to find something to sell to the Chinese to stop the dramatic losses of foreign exchange to the Chinese Government from all the British tea purchases! Rather, both China and India have focussed on domestic production to satisfy their domestic demand and have largely withdrawn from world affairs until recently.

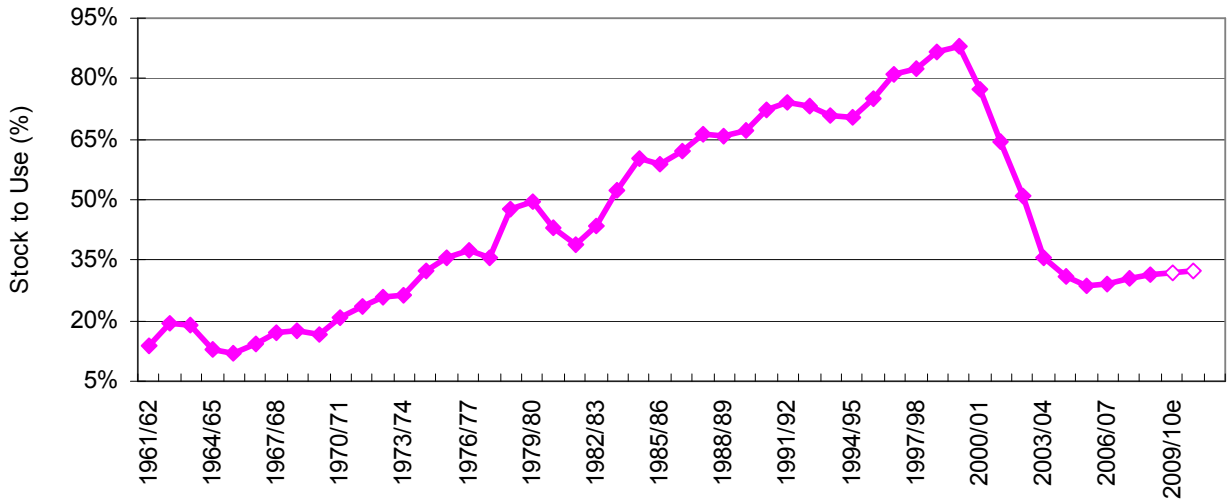
For the other two components of the Chinese protein supply (namely meat and dairy), the picture is not so clear. Whilst China is the largest and second largest producers of pork and poultry globally,[32] the question has been asked if the Chinese will be able to satisfy their red meat demand internally as well, or if they will import it? I feel that eventually, China will have to make a decision regarding what it wants to specialise in with respect to its meat supply, and feel that the cost of weight gain for a kg of meat, coupled with their own internal grain stocks, may see them concentrate on the better feed conversion animals (seafood, poultry, pork and to a lesser extent dairy for fresh milk) and import their red meat products as needed. This situation may well be played out globally as well if grain stocks tighten again and feeder margins for intensive livestock (particularly cattle) decline. The world may have to

[32] USDA, 2008

make a decision whether it wants to pay more for grain finished beef or whether grass finished beef (or better feed conversion animals like poultry and pork) are a better alternative, despite the issues concerning continuity of supply and reliable quality that are commonly associated with grass finished beef.

Regarding grain stocks, China has made some interesting decisions over the past decade. China historically has carried large amounts of stocks internally to satisfy its own domestic consumption and also to ensure that if a crop failure occurred, they would have enough grain to satisfy their domestic requirements. However, this policy changed around the year 2000 when China began to draw down its grain stocks. In fact, between 1998/99 and 2006/07 China's grain stocks had fallen by a staggering 209.6 mmt. These are shown graphically below in Figure 14 and Table 7 below.[33]

Figure 14: China's Stock's / Use Ratio



[33] Guy Allen, Louis Dreyfus Commodities, presentation to JP Morgan 10 June 2009.

Table 7: China's Stocks to Use Comparison

China's Stock to Use Comparision between 1998/1999 and 2005/06

	1998/1999		2005/2006		Change
	mmts	Stock to Use	mmts	Stock to Use	mmts
Corn	122.9	108%	35.3	26%	-87.6
Wheat	97.9	90%	34.4	34%	-63.5
Rice	95.3	71%	36.8	29%	-58.5
Total	316.5	87%	106.9	29%	-209.6

More recently, I have learned, the Chinese have begun to rebuild stocks. Whether this is in an attempt to purchase hard assets as the $US continues its downward slide, or whether they simply want to ensure that sufficient stocks are on hand in case of a supply scare is unknown, but with 1.3 billion people to feed, the number one priority of the Chinese government is to ensure that it doesn't run out of food.

Based on the above evidence, I would argue that assuming China doesn't run out of water (which will be difficult since they control Tibet which has the Himalayas as its backdrop to generate plenty of freshwater recharge) and that the execution risk of China from its command-control economy is managed, that China will continue its policy of self sufficiency except in vegetable oils and to a lesser extent down the track red meat.

Thus when it comes to the arguments presented by Malthus, I don't think that the world will run out of food. Rather, as argued by Malcolm (2009), "As people become richer and are more able to demand food, and even can afford higher prices for it if need be, the incentive is created for agriculture to supply the food that is demanded." Thus, demand will create its own supply (something that many farmers will emphasise with over the past 2 years as supply has expanded rapidly in response to high grain prices, leading to prices to fall) and as argued by Malcolm (2009) "food supply will meet food demand in the future, provided farmers receive the correct market signals and are not thwarted by poor government policies that create perverse incentives."

1.6 The Future – It Ain't What it Used to Be.[34]

The future for grain is still bright. As discussed earlier, ethanol demand is still growing and the US corn belt is yet to receive a major supply shock, which whilst it mightn't happen in the next year or two, will happen down the track unless global warming has a massive and unexpected positive impact on weather in that part of the world. The low prices we are seeing at the moment will undoubtedly see a reduction in acreage and demand will probably start to pick up assuming that the China and Asian growth story re-establishes and livestock demand is re-built with the current low grain prices. Threats on the horizon are the continued strength in the $A vs the $US and possibly a change in policy on the ethanol mandates. Thus, I believe that grain futures prices will track in a higher and probably more volatile range than previously.

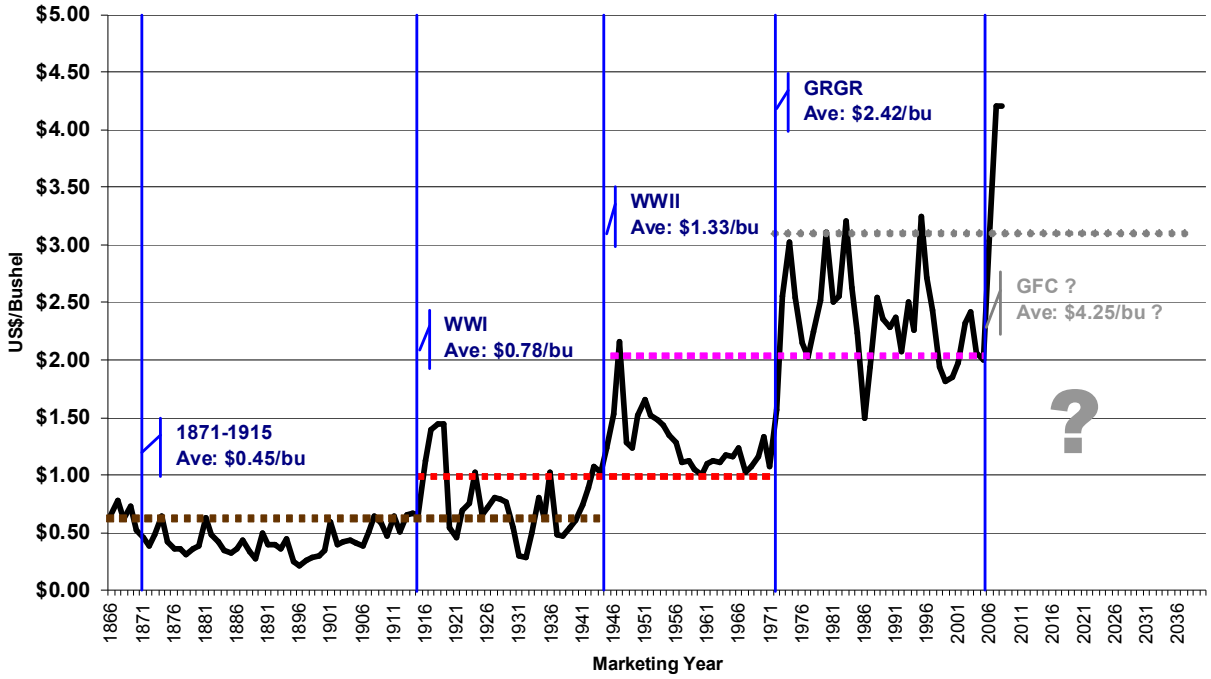
Another consideration is the role of government and its response to potentially higher grain prices in the future. This could come from two angles: Trade policies and government responses if grain prices revisit their highs in March 2008; and the potential ramifications with respect to our cost of production from Emissions Trading Schemes (ETS). There has already been a push from the EU to make imports into the European Zone "carbon compliant" and if agriculture is included in an ETS, then its potential impacts upon cropping and food prices could be quite significant. This will be worth bearing in mind in the future as an ETS will have two significant impacts on price volatility: if grain needs to be sourced from non-ETS countries (leading to carbon levies) and also on farmers costs of production.

With respect to price forecasts, an interesting chart I was shown,[35] which I have reproduced below, tracks corn prices since the 1860s. Every 30 to 45 years we witness a "shock" in prices which sees the old highs become the new lows. Whilst this rule has been violated in the 1980's, each period the lift in prices is approximately 175%, which would give an average corn price in the future of approximately $US 4.25/bushel and a lower limit around $US 3.00/bushel. Whilst this is a forecast and most forecasts are wrong, I would argue that history has a means of repeating itself.

[34] With apologies to Yogi Berra

[35] Guy Allen, Louis Dreyfus Commodities, presentation to JP Morgan 10 June 2009.

Figure 15: US Farmer Marketing Year – Average Price Corn



Irwin & Good (2009) have also attempted to forecast corn, soybean and wheat prices into the future. Whilst their analysis doesn't extend as far back in time as Figure 15 above, it is still worthy of consideration. Their forecasts are provided below as Figures 16-18.

Figure 16: Nominal monthly farm price of corn in Illinois, January 1947 – January 2009 and projected future range

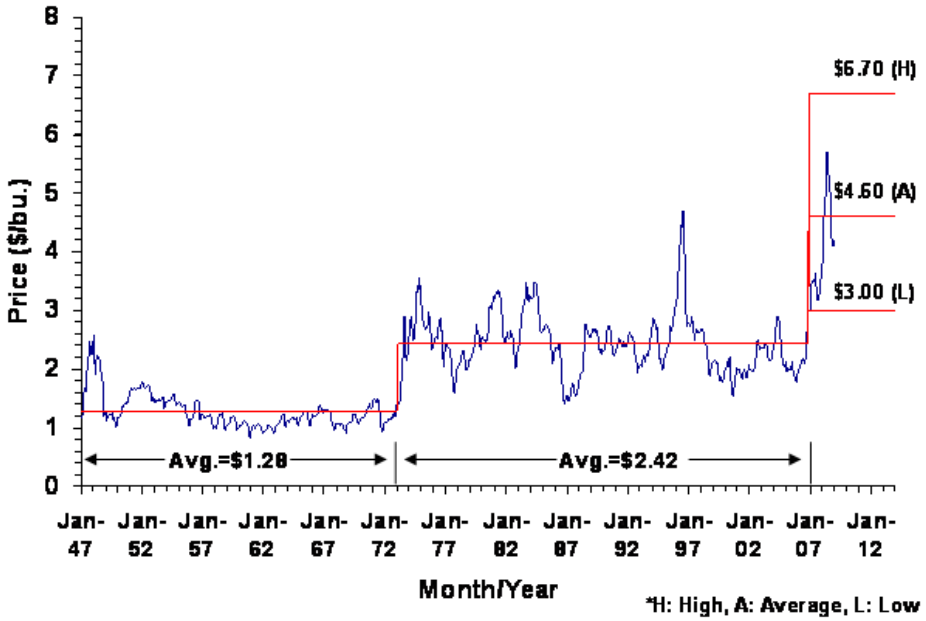


Figure 17: Nominal monthly farm price of soybeans in Illinois, January 1947 – January 2009 and projected future range

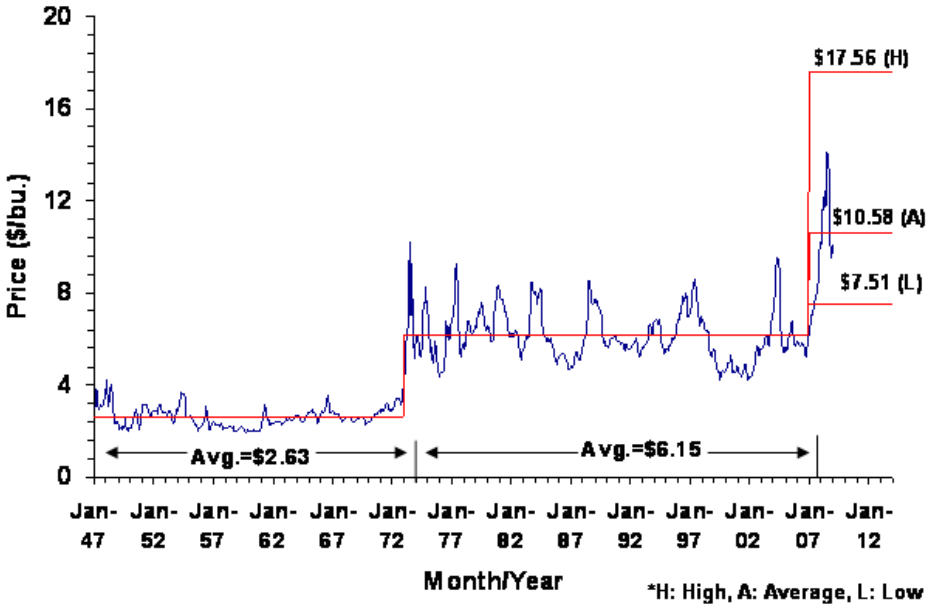
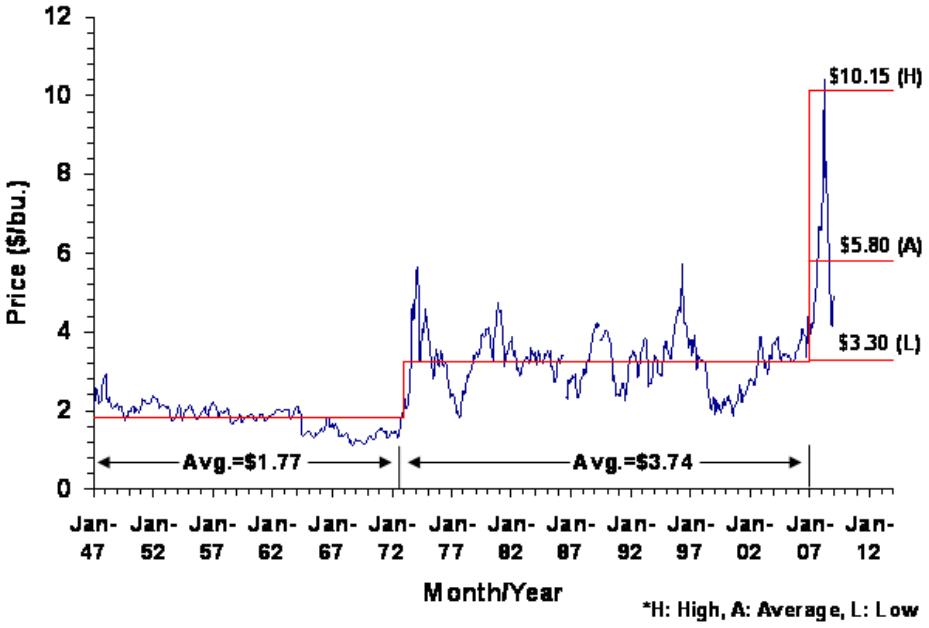


Figure 18: Nominal monthly farm price of wheat in Illinois, January 1947 – January 2009 and projected future range



The percentage increases for corn are similar to those identified in Figure 15. There are two conclusions I would like to make here. Firstly, the direction of wheat prices in the immediate future will be driven predominantly by corn (through the impact of the crude oil price and demand for biofuels) and also soybeans (through the emerging demand for protein in China). Stocks of wheat have now been rebuilt to a large degree, but the competition for acres will see wheat have to remain price competitive with both corn and soybeans in the USA to maintain acreage and hence production. Furthermore, stocks of corn and soybeans will not be immune from a supply scare in the USA given the underlying demand for ethanol and exports to China. Economic growth in the world, and how that feeds into demand for raw materials (particularly in Asia); will also play a major role in determining the future direction of prices.

Secondly, as one can see from Figures 16-18, the anticipated volatility of corn, soybeans and wheat prices in the future is going to be much higher than in the past. This will have major implications for how growers, particularly growers in Australia, manage their price risk. Farmers in Australia (apart from a select few) simply don't have the balance sheets to absorb the volatility in margin calls from using futures contracts to hedge their crops. I believe that it is time to re-evaluate the role of options to manage price risk, and this will be discussed in more detail in Chapter 2 below.

Having given my "forecasts" and to borrow another quote from Yogi Berra, "it is tough to make predictions, especially about the future". I believe that my predictions are ultimately no more valuable than any others that people in the market may have and people can draw their own (and possibly different) conclusions.

2.0 Low Risk Hedging Strategies

2.1 Introduction

Australia has had a history of regulation and orderly marketing in the grain industry, but especially for wheat. The Australian Wheat Board was established in the 1930's (in response to low prices following the depression and the view that multinational grain traders were exploiting farmers[36]) and deregulation of the export market only occurred in 2008. As a result, Australian grain growers have, through no fault of their own, been reliant on outsiders managing their price risk for them (via the National Pool) and with deregulation now upon the industry, we have found ourselves ill prepared for the brave new world of deregulation.

Thus, how should Australian grain growers manage their price risk? On top of this, in Australia not only do we have price risk to worry about, but we live in a very volatile production environment where production, at least around Parkes NSW, can range from 0 to 7t/ha. This makes forward selling quite risky due to the uncertainty of production and we also operate in an environment with very little government support, which means we have to survive on our "wits", so to speak.

Not only that, but in my dealings with other farmers all seem to be obsessed about grain prices and the direction they may be heading. Everyone seems to have a view on whether the market is going to trade higher or lower and many are constantly trying to second guess its direction. In my travels I wanted to find out how farmers overseas are attempting to manage their price risk and are they successful in doing so? In attempting to answer this question, it may be interesting to examine other industries that attempt to manage risk. Chief among these are the finance industry and financial markets.

[36] An excellent book which all farmers should read on the history of the multinational grain traders and the Great Russian Grain Robbery is "Merchants of Grain" by Dan Morgan (1979)

2.2 Are Markets Efficient, or Can They Be Beaten?

"October. This is one of the peculiarly dangerous months to speculate in stocks in. The others are July, January, September, April, November, May, March, June, December, August, and February." Mark Twain

Speculation in stocks and people trying to "beat the market" has been around as long as markets have existed. The question is, can people consistently and repeatedly "beat the market"? In reviewing this question, we will firstly look at some economic literature.

Kendall (1953) is one of the first people to examine stock price data and he found that he could identify no predictable patterns in stock prices; in fact they seemed to evolve randomly. This "random walk" argues that price changes should be random and unpredictable and that changes in stock prices will only reflect new unpredictable information. This situation is referred to as the Efficient Markets Hypothesis (EMH), which was first posited by Fama, (1970) and argues that prices always reflect the true value of the assets and hence, it is not possible to obtain systemic arbitrage profits. Whilst there is some emerging work being conducted on behavioural finance, which is the impact of herds and trading psychology (i.e. fear and greed) on prices of assets, essentially most markets behave efficiently and it is incredibly difficult to outguess the market. In fact the only way to consistently beat the market is to have superior access to information and/or superior analytical ability in using information.

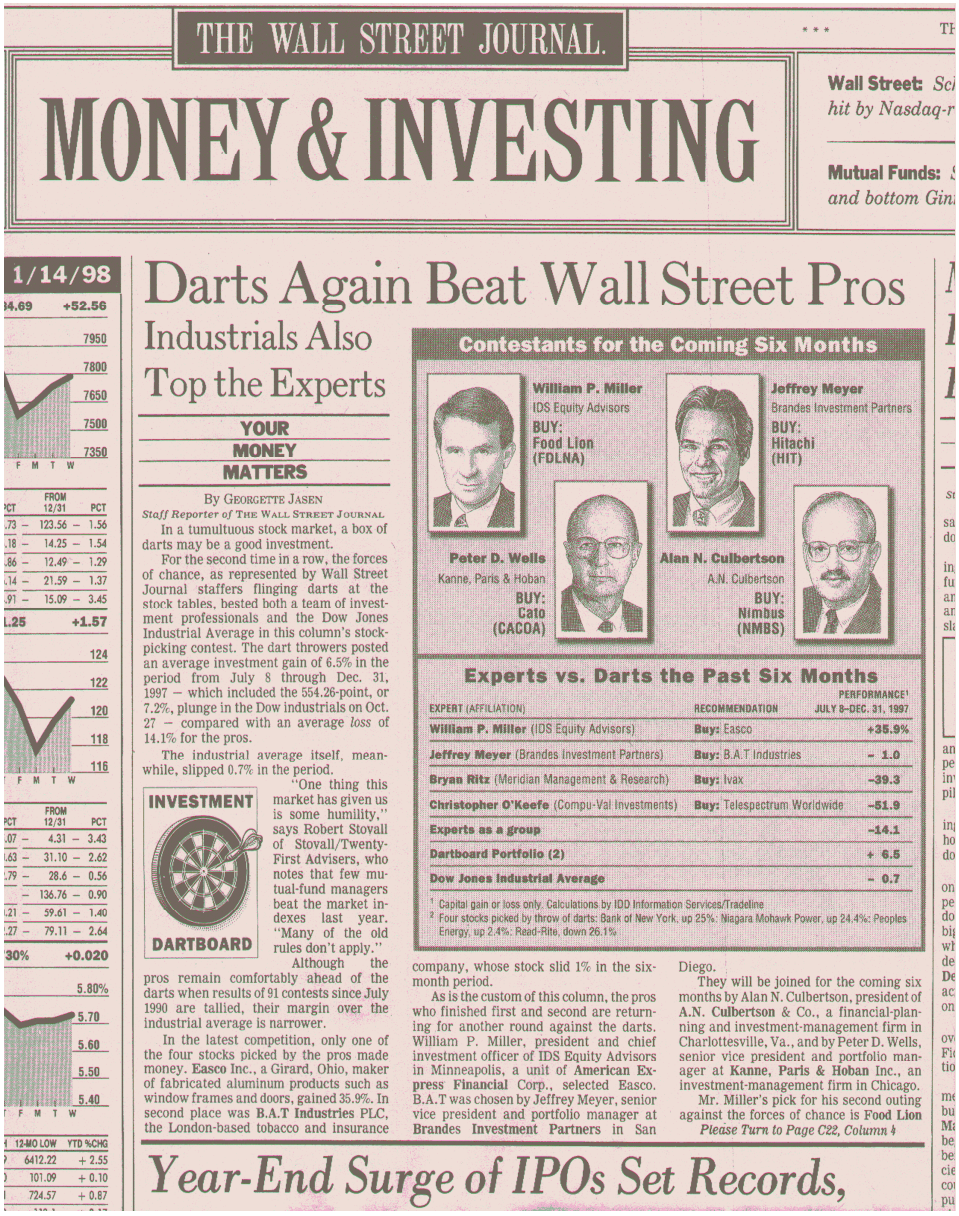
However, this doesn't stop people from trying to find that information. People will pore through supply and demand analysis in an attempt to identify trends or discern information that the market hasn't priced in. Alternatively, people will try technical analysis[37] to try and identify trends, or use historical data in an attempt to predict future prices. Whilst I will not dispute that some people have made this information work for them and they have been successful long term traders, I would add that they are very few in number and that farmers, as a whole, are not excessively represented in this group.

[37] Examples of which include Fibonacci theory, Elliot Wave theory, Gann Analysis, Stochastics, Relative Strength Indices, Death Star Theory, Cycles, Kondratieff Waves etc.

This then leads into an analysis of stock picking vs market averaging. Most managed funds in the stock market will try and beat the market. When arriving at their returns for a given period, these will be a combination of beta (which is defined as the market return) and alpha (refers to the funds outperformance of the market, or its excess returns). If, for example, an active fund manager returns 10% when the ASX 200 Index returns 7% over a given time period, the beta will be 7% (i.e. the market return) and the alpha will be 3% (his outperformance of the market).

In an analysis of mutual funds performance many will consistently fail to beat the market, or if they do beat the market, fail to outperform the market repeatedly. In a study by Lipper Inc in 2001, 82% of US diversified funds lagged the performance of the S&P 500 Index. As a result, since there "is no reliable way to identify the fund managers who will outperform the market, investors do best to buy a broad spectrum of stocks at the lowest cost" (Damato, 2001). In fact, there have been instances where random chance has done better than paid professionals in generating stock market returns. An example of this is highlighted below.

Figure 19 – Dart's win again!



THE WALL STREET JOURNAL.

MONEY & INVESTING

Wall Street: *Sc… hit by Nasdaq-r…*

Mutual Funds: *… and bottom Gin…*

1/14/98

Darts Again Beat Wall Street Pros

Industrials Also Top the Experts

YOUR MONEY MATTERS

By Georgette Jasen
Staff Reporter of The Wall Street Journal

In a tumultuous stock market, a box of darts may be a good investment.

For the second time in a row, the forces of chance, as represented by Wall Street Journal staffers flinging darts at the stock tables, bested both a team of investment professionals and the Dow Jones Industrial Average in this column's stock-picking contest. The dart throwers posted an average investment gain of 6.5% in the period from July 8 through Dec. 31, 1997 — which included the 554.26-point, or 7.2%, plunge in the Dow industrials on Oct. 27 — compared with an average *loss* of 14.1% for the pros.

The industrial average itself, meanwhile, slipped 0.7% in the period.

INVESTMENT DARTBOARD

"One thing this market has given us is some humility," says Robert Stovall of Stovall/Twenty-First Advisers, who notes that few mutual-fund managers beat the market indexes last year. "Many of the old rules don't apply."

Although the pros remain comfortably ahead of the darts when results of 91 contests since July 1990 are tallied, their margin over the industrial average is narrower.

In the latest competition, only one of the four stocks picked by the pros made money. **Easco** Inc., a Girard, Ohio, maker of fabricated aluminum products such as window frames and doors, gained 35.9%. In second place was **B.A.T Industries** PLC, the London-based tobacco and insurance company, whose stock slid 1% in the six-month period.

As is the custom of this column, the pros who finished first and second are returning for another round against the darts. William P. Miller, president and chief investment officer of IDS Equity Advisors in Minneapolis, a unit of **American Express Financial** Corp., selected Easco. B.A.T was chosen by Jeffrey Meyer, senior vice president and portfolio manager at **Brandes Investment Partners** in San Diego.

They will be joined for the coming six months by Alan N. Culbertson, president of **A.N. Culbertson** & Co., a financial-planning and investment-management firm in Charlottesville, Va., and by Peter D. Wells, senior vice president and portfolio manager at **Kanne, Paris & Hoban** Inc., an investment-management firm in Chicago.

Mr. Miller's pick for his second outing against the forces of chance is **Food Lion**

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Contestants for the Coming Six Months

William P. Miller
IDS Equity Advisors
BUY: Food Lion (FDLNA)

Jeffrey Meyer
Brandes Investment Partners
BUY: Hitachi (HIT)

Peter D. Wells
Kanne, Paris & Hoban
BUY: Cato (CACOA)

Alan N. Culbertson
A.N. Culbertson
BUY: Nimbus (NMBS)

Experts vs. Darts the Past Six Months

EXPERT (AFFILIATION)	RECOMMENDATION	PERFORMANCE[1] JULY 8–DEC. 31, 1997
William P. Miller (IDS Equity Advisors)	**Buy:** Easco	+35.9%
Jeffrey Meyer (Brandes Investment Partners)	**Buy:** B.A.T Industries	– 1.0
Bryan Ritz (Meridian Management & Research)	**Buy:** Ivax	–39.3
Christopher O'Keefe (Compu-Val Investments)	**Buy:** Telespectrum Worldwide	–51.9
Experts as a group		–14.1
Dartboard Portfolio (2)		+ 6.5
Dow Jones Industrial Average		– 0.7

[1] Capital gain or loss only. Calculations by IDD Information Services/Tradeline
[2] Four stocks picked by throw of darts: Bank of New York, up 25%; Niagara Mohawk Power, up 24.4%; Peoples Energy, up 2.4%; Read-Rite, down 26.1%

Year-End Surge of IPOs Set Records,

Source: Ben Riensche

This same principle has been applied to grain market advisors in the USA. Irwin, Good, Joao Martines-Filho & Batts (2006) undertook a study that evaluated the pricing performance of market advisory services for the 1995-2004 corn and soybean crops. What they found was that there is limited evidence that advisory programs outperform market benchmarks, particularly after considering risk. Now, maybe Australian grain market advisors are different, and I am not aiming to criticise them, but in the words of Malcolm Bartholomaeus, a respected market commentator "The ongoing fall in the Australian dollar value of US futures highlights the futility of trying to guess where wheat prices are going to go from one year to

the next. It also highlights the futility of trying to pick the bottom of the market, or the top of the market, at any time of the year."[38] Thus, I believe that relying on market commentators to pick the direction of markets is fruitless to say the least. This doesn't mean that market advisors can't add value, as I feel that they have a better understanding of domestic basis trading than many farmers, but I will discuss this in more detail later.

So what does this mean for agriculture? I agree with Irwin, Good, Joao Martines-Filho & Batts (2006) that we as farmers need to be less focussed on active strategies (such as selling grain in an attempt to pick the market) and rather focus on passive strategies and spread sales over the marketing window, at least for the majority of the crop. However how do we achieve this successfully and in a risk efficient manner?

[38] Malcolm Bartholomaeus, The Land, p 98, September 10, 2009

2.3 Options to Manage Price Risk

There are a number of options to manage price risk for farmers. A discussion on the merits of various tools is outlined below.

2.3.1 Pools

Pools have been one of the traditional methods of marketing grain in Australian and global agriculture. Whilst pools do have their advantages, one of their disadvantages is their cost and the risk involved with them. Firstly, many pool operators are charging a percentage value of the Free on Board (FOB) price, which is commonly around 2%. Many passive style index funds on the share market can be obtained for between 0.3%-1.2% depending on the reporting and funds under management that are invested. Thus, I believe that pool costs are excessive.

Secondly, there is the potential for grain to be sold on the eastern seaboard into a domestic market and the price for the remuneration of the pool operator to still be calculated based on a FOB price, despite the fact that a lot of the costs that are borne in fobbing not being incurred. Thus, I would argue that pools are expensive to operate in Australia, especially when we are paying for an active manager that more often than not doesn't beat the market average, as has been demonstrated in the finance sector!

Furthermore, if there are any problems with the pool (such as demurrage, disputes over grain quality with customers or a hedge that goes against the pool operator), it isn't the pool manager that wears that risk, but rather the pool participant (i.e. the grower). I also believe that pool operators in Australia don't disclose enough information about pool performance and their marketing strategies to growers.

Notwithstanding these points, pools do a reasonable job of allowing growers to manage their cashflow. They are also the only pricing tool that growers have available to them that somewhat attempts to obtain a market average. However, they attempt to do this with old crop grain, not new crop grain (due to the uncertainty of how much grain will be delivered into the pool) and as a result I believe that they are marketing over too small a pricing window.

2.3.2 Cash at Harvest

This is another sound marketing strategy and the one that all other marketing strategies should be compared against. The advantages of cash at harvest are no storage costs are involved, the price is transparent and there are no further surprises, unlike in pools on occasions. Depending on your farm's location, cash at harvest can be a bad strategy if you are one of the last to harvest your crops as the market will have more than likely bought enough grain to satisfy their immediate requirements and the market may have moved to a carry situation, where basis weakens and the market is saying that it wants grain in the future, not now. Furthermore, harvest time is traditionally when most grain comes onto the market and thus selling pressure is high, which is often reflected in prices eventually weakening.

2.3.3 Storage

An excellent study on the different grain storage alternatives was undertaken by Holmes & Sackett (2006). In this analysis they examined silos, grain sheds, silo bags and warehousing grain with Graincorp. What they found was that the capital cost of fixed, permanent storage needs a higher return on the grain stored to make an acceptable rate of return compared to a variable system such as silo bags, or using a system such as bulk sheds where the benefits of comingling can also be achieved. Two costs that the report neglected to mention however are insect fumigation, which would be difficult to manage with a grain shed and is part of the price when using Graincorp's warehousing service, and shrinkage, which would be a cost borne by the grower if grain is stored on-farm. Furthermore, given the volatile production environment in most of Australia, having a grain storage facility that stores the majority of your harvest could be wasteful in times of drought. This is because if you can't fill it, there is no money in storing air! As a result, variable storage through grain bags or bunkers could be a more cost-efficient solution.

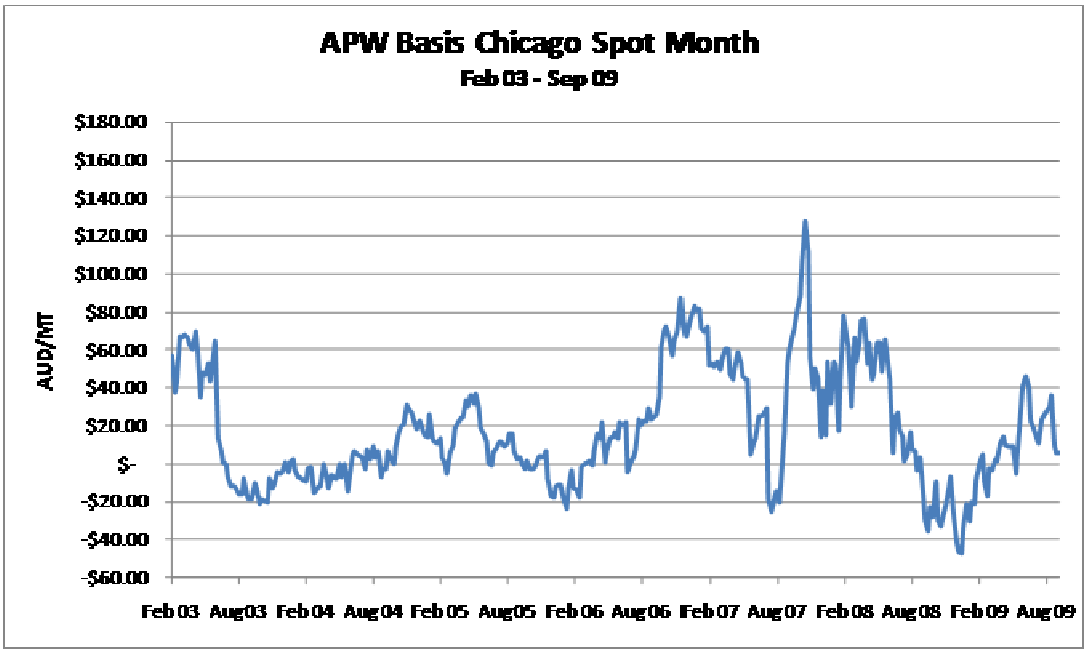
One then needs to ask the question: what is the most efficient supply chain when considering investing more money in on-farm storage? If you are in an export zone and grain has to be exported, then the central bulk handling system will always be the most efficient pathway for that grain. On the other hand if you are located in a feed import zone, or have a number of local markets nearby, then on-farm storage can deliver benefits in relation to supply chain

efficiencies. One also needs to consider your geographic location. If you are one of the first to harvest (i.e. in Queensland or northern Western Australia), the market will normally be bidding quite aggressively to secure grain to ensure that the traders' early contracts can be met. If on the other hand one is in an area that is late to harvest (southern Victoria or southern Western Australia), then the market signals may be telling you to carry your grain.

Another aspect to consider is whether you can turn your storage over (i.e. use it multiple times) such as with a summer/winter crop combination, as there are opportunities to make money in this situation because there is potential to pay yourself two lots of storage fees in one year. It is this aspect of turning infrastructure over that I suggest is not well understood by growers on the whole.

However, the most important consideration when contemplating storing grain is looking at what the market is telling you. Is the basis weak or strong (i.e. does the market want grain now or not) and are there carries in the market (contango) or is the market trading in an inverse (backwardation). This will indicate to you whether the market wants grain later (a carry market) or now (backwardation). By examining the carries, and potentially capturing them on stored grain, you may be able to make additional money compared to the harvest price, but only if the market is telling you it wants grain at a later date. These aspects of basis and carries (particularly when they are so strong in the wheat market at present) is something that as growers we need to become a lot more familiar with and where marketing advisors can deliver real benefits. A short history of Australian basis is shown in Figure 20.

Figure 20: Australian Premium White Basis $A/tonne



Source: Graincorp

2.3.4 Cost Plus Marketing

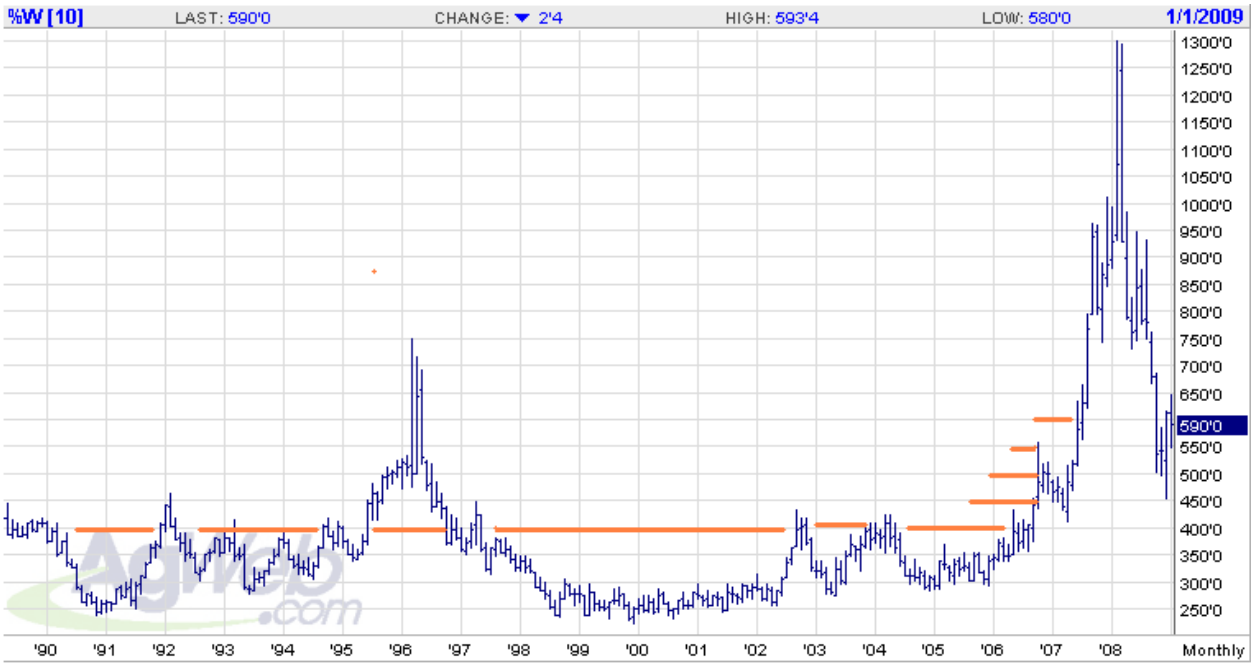
The ideal way of marketing your grain would be to know your cost of production and then sell into the market when it reaches a target margin over your costs (i.e. you can always guarantee a profit). Kim, Brorsen & Anderson (2007) examined this strategy and found that it is the most profitable marketing strategy, followed by always hedging and then selling at harvest. However, as they also comment, when one introduces yield risk it "greatly reduces the advantage of profit margin hedging." This is because it is difficult to know your cost of production per tonne when the variability in tonnage is high, as is the case in most of Australia.

It is also very hard to identify how much crop to sell. For example, if you could guarantee a profit, how much would a farmer sell, 5%, 10%, 20% etc when there is a chance prices could go higher (or lower)? The second problem would be, assuming market efficiency, that prices could subsequently fall and only a small percentage of the crop could be forward sold.

I also heard anecdotally of a large US corn farmer who has a standing order with Cargill to sell 80% of his production if prices hit a certain point that guarantees a profit over his cost of

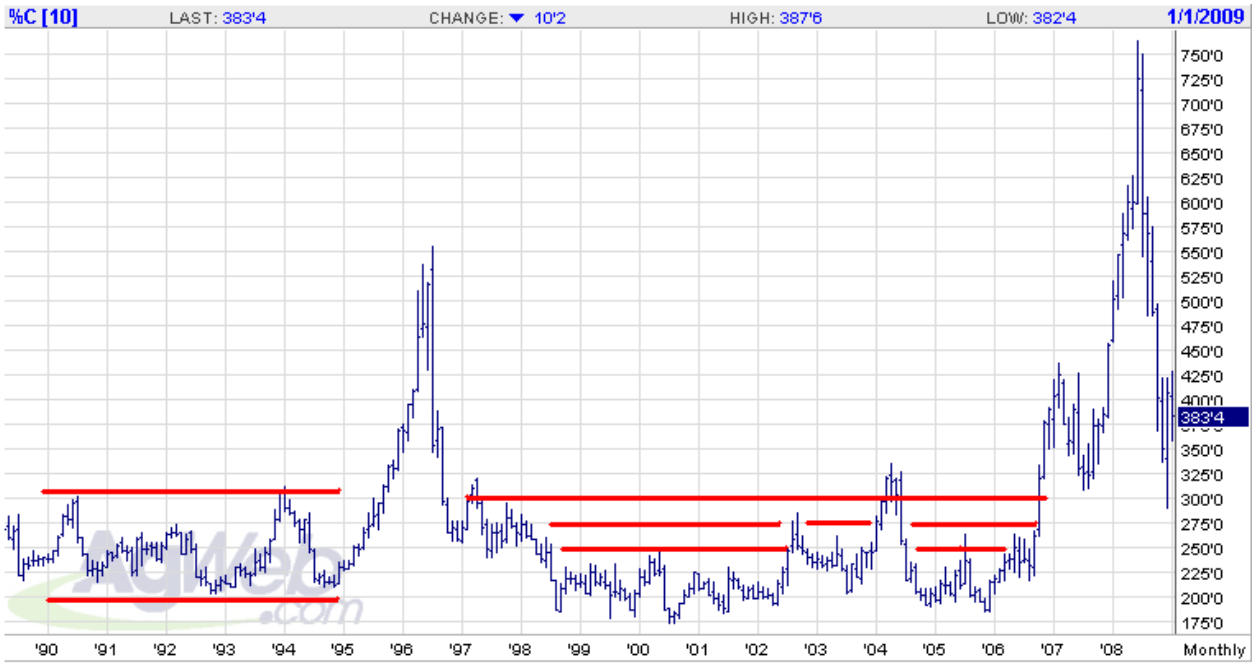
production. Whilst production risk in the corn belt of the USA is far less than Australia, the other problem with this strategy, particularly in years like 2007 and 2008 is that a lot of potential profit is left on the table because the farmer sold out too soon. Alternatively, if the farmer's trigger point is missed, he misses out on that sale. Despite these shortcomings to this approach, the farmer also guaranteed himself a profit if he makes the sale. An example of this is included in Figure 21. Other problems, such as the target price never eventuating are shown in Figure 22.

Figure 21: Target Price Strategy. Sold out too soon!



Source: Ben Riensche

Figure 22: Target Price Strategy. It never gets there!



Source: Ben Riensche

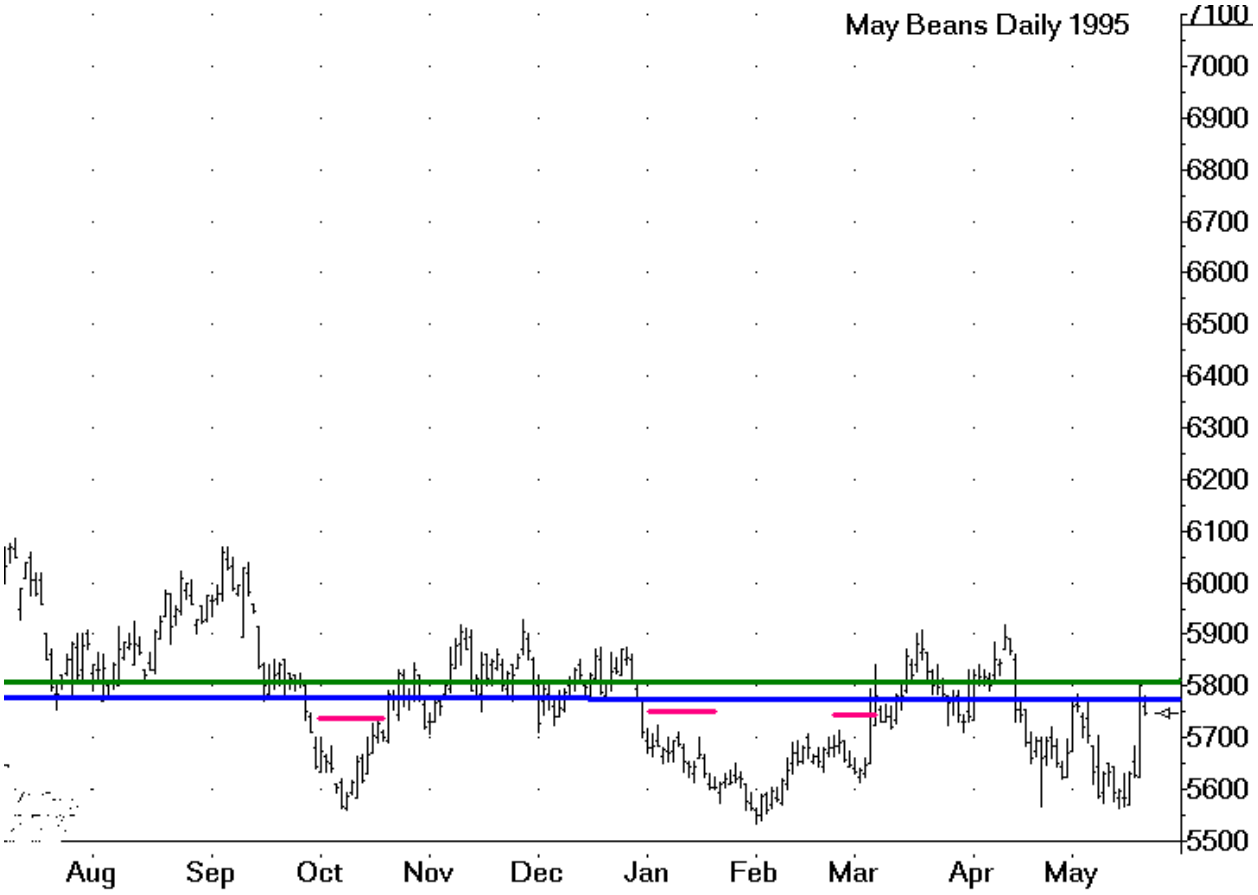
2.3.5 Index Fund Approach

The best marketing approach I witnessed on my travels was with a corn farmer from Jesup, Iowa named Ben Riensche. Ben is an ex Swiss banker and he has an excellent approach to marketing, farming and life in general.

Ben is an avid believer in the EMH and that very few people can pick markets successfully and consistently. As a result, he breaks his crop down into increments of 1/80th and markets his crop every week over two years (half new crop and half old crop) excluding certain periods.[39] A graphical example of this can be seen in Figure 23 below.

[39] These periods are harvest (basis is too weak), end of the financial year (tax motivated sellers) and March 1st (cash flow sellers to meet John Deere machinery repayments). This accounts for 12 weeks a year

Figure 23: Index Selling excluding weak periods



Source: Ben Riensche

Ben argues that the path to a successful business is to accept an average price for your commodities (because the price of commodities reverts to long run average total cost) and focus that time that you would have spent poring over charts and reports on your business (in making it more low cost) or with your family. In fact Zalauf & Irwin (1998) argue that "while individuals can beat the market, few can consistently do so ... the crop producers that survive will be those with the lowest cost of production since efforts to improve revenue through better marketing will have limited success."

Figure 24: Index Selling of Wheat over time

Source: Ben Riensche

I have also met with representatives from one of the major global mining companies and they follow a similar approach. In the past, these companies have used hedging quite extensively but after a number of "blowups" in hedging accounts, they now don't hedge currency and their commodities, but rather aim to sell regularly and over a wide marketing window in an attempt to achieve an average price. As was explained to me "the market price is the market price and there is nothing we can do about it." Rather, these businesses attempt to influence the factors they can control, such as cost of production and other operational issues.

The question now is how to sell this crop? I believe that we need to use a mixture of futures, options and cash contracts to achieve our desired outcomes. A discussion on these is outlined below

2.3.6 Futures, Options & Cash Contracts

Descriptions of futures and options contracts (including their size and how they work) can be obtained from most grain merchants, advisors or your local banker, along with a number of textbooks.[40] In the interests of space, I will assume that people are familiar with these tools.

Of the three tools, I would argue that grain futures contracts or OTC Swaps (marketed through banks or grain merchants) are the most popular form of pre-harvest risk management for wheat. Whilst futures are a "low cost" grain marketing tool (in that they can be entered into with counterparties where the margin risk is borne by the counterparty, not the grower), I believe that their use is too risky for new crop marketing in most parts of Australia. This is because:

- Our production risk is too volatile and what was a conservative amount of grain that has been forward sold can quickly translate into more than anticipated production with a dry September
- Upside risk is unlimited, whereas downside risk is limited.

If I may diverge for a moment, I have recently read a book that I would argue has a number of important lessons for Australian grain growers. Unfortunately I was unable to meet the author but I will attempt to explain his concept and how I feel it applies to grain marketing in Australia.

Nassim Nicholas Taleb authored a book called "The Black Swan – The Impact of the Highly Improbable".[41] His book commences explaining how prior to European settlement in Australia; it was thought that all swans are white, since all swans in the Northern Hemisphere are white. After Europeans arrived in Western Australia, this thesis that all swans are white was immediately invalidated. What he argues is that this illustrates "a severe limitation to our learning from observations or experience and the fragility of our knowledge."

Taleb uses this story of the "Black Swan" to describe events with three unique attributes:

- The event is an outlier (i.e. it lies outside the realm of regular expectations);
- It carries an extreme impact; and

[40] An excellent description can be found in Kolb, R.W. *Futures, Options & Swaps.*

- We are able to concoct explanations for its occurrence *after* the fact, making it explainable and predictable.

These Black Swans can be both positive and negative, but I would argue that in 2007 most of Australia was blindsided by two of the negative Black Swans. These were:

- CBOT wheat futures rallying past their all time previous highs of $US 7.20/bushel, eventually topping out at $US 13.20/bushel;
- Australia having back-to-back droughts, with our farm at Parkes having our lowest growing season rainfall on record, when 2006 was our lowest annual rainfall on record.

Essentially, what Taleb is arguing is that an absence of evidence does not translate to evidence of absence. For example, CBOT wheat futures had never rallied past $US 7.20/bushel, but this didn't mean they couldn't. Furthermore, just because CBOT wheat futures had only been over $US 5.00/bushel 4 times in 20 years doesn't mean that it was a great price. Secondly, just because Australia had had an extreme drought in 2006, didn't mean that we couldn't have another one the next year. It is these events that have extreme impacts that I would argue preclude the use of futures contracts by Australian farmers, especially for new crop wheat, because futures are a zero-sum game and farmers simply don't have the balance sheet capacity to handle extreme moves in price, particularly to the upside when production is so volatile. To quote John Maynard Keynes, the renowned economist, "The market can stay irrational longer than you can remain solvent."

A good example of the volatility that growers have faced in grain markets, and which I would argue we will witness in the future, can be seen in Table 8 below

[41] I would argue that all Australian grain farmers should read this book when it comes to thinking that they can beat the market.

Table 8: Swap Results and Year on Year Moves in Futures and Australian Wheat Prices

Year	March/April Swap Sale ($A)	Swap Expiry ($A)	Swap Outcome ($A)
2004	$201.22	$135.13	$66.09
2005	$166.13	$147.21	$18.92
2006	$198.59	$228.31	-$29.72
2007	$227.88	$355.50	-$127.62
2008	$399.58	$301.60	$97.98
2009	$313.36	$203.83	$109.53
Average	**$251.13**	**$228.60**	**$22.53**

Source: Bartholomaeus, M. "Keep the Forward Focus." The Land, p 98, September 10, 2009

The interesting facts to note in Table 8 are the volatility in the past three years. It is for these reasons that I would argue that growers need to start to consider using option strategies (even in conjunction with futures) as the risks of margin calls coupled with declining production make a straight futures strategy simply too risky for many grower's balance sheets. The other benefit of options is that purchasing a put option leaves the upside uncapped, so in years like 2006 and 2007, losses can potentially be smaller than a futures strategy.

Options can be regarded as a form of insurance, since essentially when they are purchased; a premium is paid giving the owner "the right, but not the obligation, to purchase a futures contract." Many people are against the use of options, because they are deemed to be too expensive. Urcola & Irwin (2008) studied the efficiency of corn, soybean and wheat options markets and found that these markets are "efficient and that mispricing claims are caused by biases in the agent's perceptions of futures price distributions." What this essentially means, as Kenyon (2001) found, is that farmers expect higher than actual prices and underestimated the future price volatility. Given the new trading range for corn, wheat and soybean futures that I believe is now upon us, I think farmers have to become a lot savvier with options strategies, and this is where market advisors could have a real role in the future.

Furthermore, when it comes to insurance, many farmers will insure machinery or their property against fire, insure crops against hail or fire, or even insure themselves for life or medical insurance. The question I would pose is why can't we insure the price risk for our crops, particularly when the price is so transparent every day? Yes it does cost money, but as the saying goes, "there is no such thing as a free lunch."

Another important consideration is the cash flow required for executing these option strategies. Whilst payment can be deferred to maturity through an OTC contract with a bank, these do entail extra cost as opposed to payment up front. As Zalauf et al. (2001) found, "substantial cash flow may be incurred, either to establish the strategy or meet margin calls. Therefore, assessments of pre-harvest pricing strategies should include cash flow needs, along with return and risk."

3.0 Recommendations

After a review of the academic literature on the subject of low risk hedging strategies for grain marketing, in conjunction with the meetings and people I have visited during the course of my Nuffield Scholarship, I believe that as growers we need to diversify our grain marketing portfolio, similarly to what many people may already be doing with their superannuation. This would include some passive tools like a grain index or market averaging mechanism, possibly in conjunction with some active management and on-farm storage in addition to marketing over a 2 or even 3 year cycle to try and capture a better price and to capture some of the attractive carries in the market at present. An excellent study on this new approach is provided by Good & Irwin, (2008), who recommend a four step approach to grain marketing:

1. Select the appropriate time window for pricing your crop (i.e. one month to two years);
2. Determine your set of crop pricing strategies (passive style, active style, futures, options, cash contracts, storage etc);
3. Decide on the proportions of the crop to be marketed using these strategies; and
4. Evaluating the performance of the strategy after the marketing window is completed.

However, the recommendation to utilise a grain index could prove to be difficult. My fear with this recommendation is that for smaller growers the benefits of this strategy could be undermined by the transaction costs required to perform it. Thus, I would like to see products similar to Cargill USA's "Pacer" product, which essentially is a market averaging product where the grower nominates the average pricing period and receives a market average. This product is also quite reasonably priced, costing $US 3c/bushel (approximately $A 1.50/tonne). This style of product may also be available in Australia through the OTC market with your local bank. My initial thoughts are that it may cost more to undertake this strategy through the bank than through a grain merchant, but the benefit would be that through a bank the product is cash settled and you have no commitment to deliver to that particular grain merchant.

Another option is through the company Agfarm, who are introducing a market average product (called Agfarm Advantage) this harvest where the grain in the "pool" is marketed over a five or 10 month period (i.e. 20% or 10% per month) at the discretion of Agfarm with the proceeds being paid every month. Whilst this product is charging 2% of the port track price (as opposed to FOB like many other pool operators), I feel that the costs at this stage are

excessive and can still be reduced further. The introduction of Agfarm's Advantage product may be the start of more marketing alternatives for grain growers in Australia especially if the other major grain traders introduce similar products and competition brings the cost down further. An example of this product has been included in Appendix 5.

The second recommendation is that growers reassess the Australian Stock Exchange (ASX) contracts for wheat when evaluating grain price risk management. Although these contracts don't offer anywhere near the liquidity of the CBOT wheat contract, the use of these contracts would help overcome the foreign exchange and basis risks (not to mention the convergence issues on CBOT wheat as well) that growers are currently exposed to through directly hedging off the CBOT wheat contract. In particular, I would like to see the ASX wheat options market develop further to give growers a choice to hedge their price risk in their local market. Maybe as growers, we need to start pushing our grain merchants to start offering these contracts and utilise them for 10-15% of our crop hedging requirements.

Since one of the principal risks that Australian grain growers face with respect to hedging their crops is their production risk in filling their contracts, another recommendation is for the Federal Government to investigate the potential for a yield insurance product to become available. Having examined this product in the USA and the benefits it offers to their producers (even with their relatively small volatility in yield relative to Australia), I believe that if the Federal and State governments rolled all their drought support into a partially subsidised but commercial yield insurance scheme, it would help growers manage their business risk in a far more efficient manner than the schemes and support currently on offer.

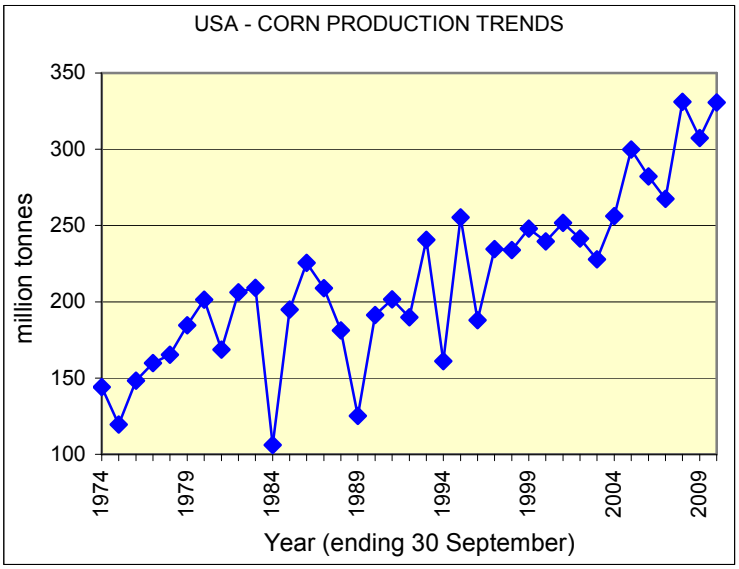
Amongst the academic literature, Patrick (1988) examined the potential for a rainfall and multi-peril crop insurance program and found that "producer participation in either program would be limited." Whilst the issue of the potential of crop insurance isn't the subject of my Nuffield and space precludes a further discussion of this topic, I believe it is time to revisit this issue amongst agri-political and government circles.

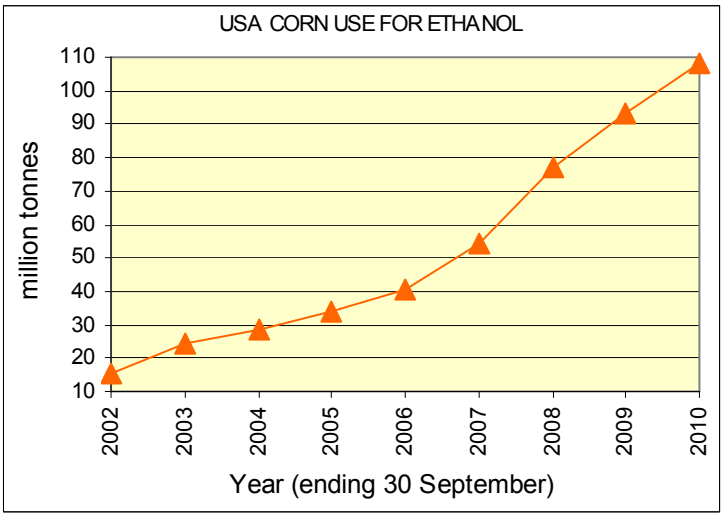
I will finish with perhaps what has been the most startling discovery about the prices we receive for our crops. A study was undertaken by Nivens & Kastens (1999) and it examined the impact of four management practices on profit per acre for farmers in Kansas. It examined

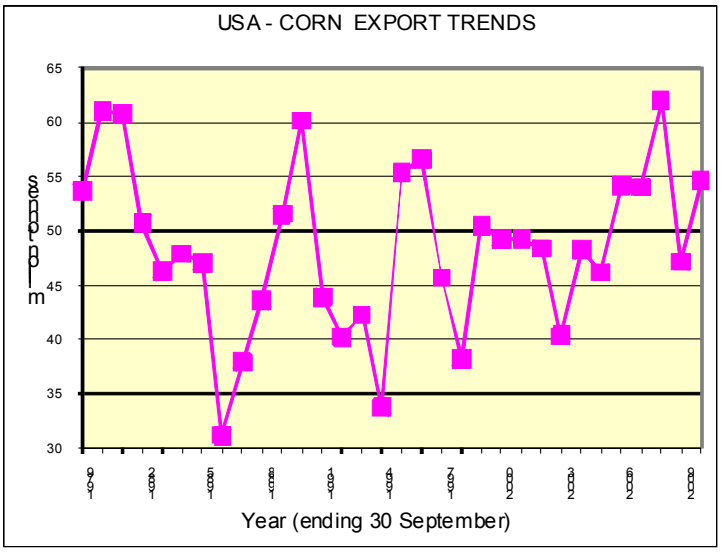
price management, cost management, technology adoption (no till) and yield management. Of the four practices identified, cost management and technology adoption had the biggest impact on profit/acre, with yield management being moderately significant and price management having the smallest impact of all. Thus, I believe that as grain farmers we should focus on being low cost producers on the international market and accept average price for our commodities. In other words DARE TO BE AVERAGE!!

4.0 Appendices

Appendix 1: US Corn Production, Ethanol Use and Exports






USA - CORN EXPORT TRENDS
65
60
55
50
45
40
35
30
Year (ending 30 September)

Appendix 2: Climate Change or Climate Shift?

Much has been made on what the weather is going to be in the immediate and medium term future. I for one profess no climate expertise and offer very few opinions other than my observations having travelled through the northern hemisphere this year. If climate change means that we in Australia will be experiencing warmer temperatures and less rainfall, compared to the Northern Hemisphere which over the past two years have had cool, wet summers, topped off with an extra 5-10 growing days at each end of spring and autumn, then we may as well give grain growing away in large portions of Australia. We will find it exceedingly hard to compete with their production potential (and especially their security of production) and our lack of both. It is amazing that we have moved from a position of relative scarcity in grain stocks to relative abundance in two short years, which to me just shows that the world can grow grain if the price signals are there, and that northern hemisphere weather (as a generalisation) is far more conducive to growing grain than what we have in most of the grain growing areas of Australia.

As a side note, the sceptic in me notes that one of the reasons that God invented weather forecasters was to make economist forecasters look good!

Appendix 3 – GSCI Weights

Commodities	Dollar Weights
Energy	
Crude Oil	31.98%
Brent Crude	12.69%
Unleaded Gasoline	3.39%
Heating Oil	4.82%
Gas Oil	4.44%
Natural Gas	7.85%
Sub Total	65.18%
Agriculture	
Wheat	5.20%
Kansas Wheat	1.23%
Corn	4.93%
Soybeans	3.19%
Cotton	1.06%
Sugar	1.84%
Coffee	0.90%
Cocoa	0.45%
Sub Total	18.80%
Industrial Metals	
Aluminium	2.58%
Copper	2.29%
Lead	0.33%
Nickel	0.68%
Zinc	0.56%
Sub Total	6.43%
Livestock	
Feeder Cattle	0.63%
Live Cattle	3.36%
Lean Hogs	1.79%
Sub Total	5.78%
Precious Metals	
Gold	3.49%
Silver	0.33%
Sub Total	3.82%
Grand Total	100%

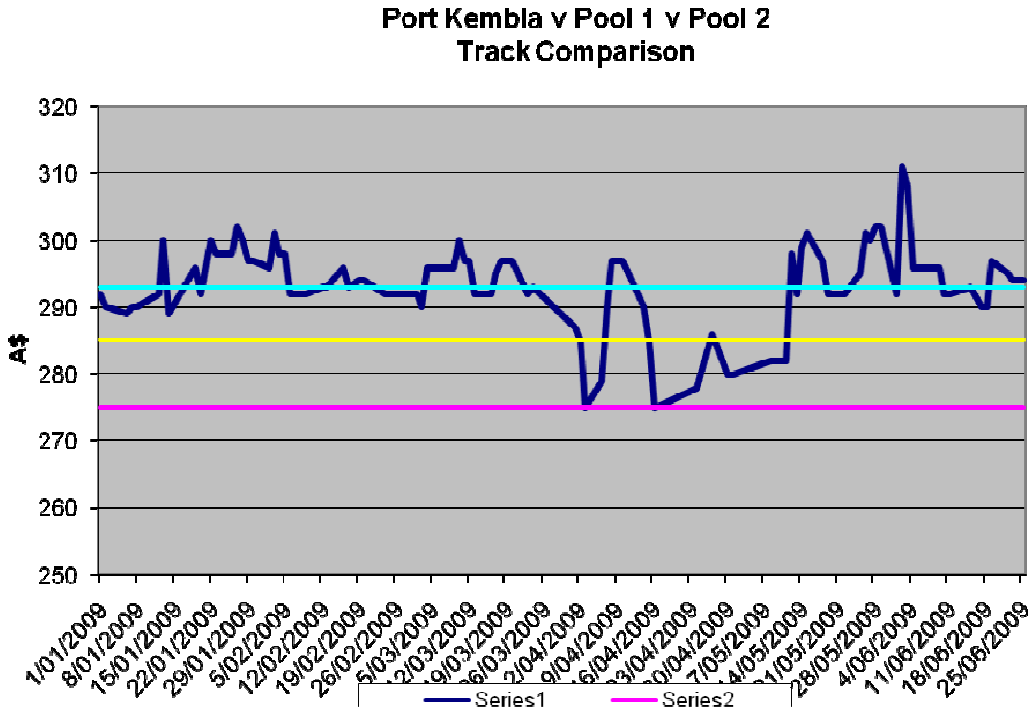
Source: http://www2.standardandpoors.com/spf/pdf/index/SP_GSCI_Factsheet.pdf 31 December 2008

Appendix 4: The Rogers International Commodity Index Composition

Commodities	Dollar Weights
Crude Oil	21.00%
Brent Crude	14.00%
Wheat	7.00%
Corn	4.75%
Cotton	4.20%
Aluminium	4.00%
Copper	4.00%
Soybeans	3.35%
Gold	3.00%
Natural Gas	3.00%
RBOB Gasoline	3.00%
Soybean Oil	2.17%
Coffee	2.00%
Lead	2.00%
Live Cattle	2.00%
Silver	2.00%
Sugar	2.00%
Zinc	2.00%
Heating Oil	1.80%
Platinum	1.80%
Gas Oil	1.20%
Cocoa	1.00%
Lean Hogs	1.00%
Lumber	1.00%
Nickel	1.00%
Rubber	1.00%
Tin	1.00%
Canola	0.77%
Soybean Meal	0.75%
Orange Juice	0.66%
Oats	0.50%
Rice	0.50%
Palladium	0.30%
Azuki Beans	0.15%
Greasy Wool	0.10%
Grand Total	100%

Source: http://www.beelandinterests.com/The%20RICI.html

Appendix 5: Agfarm Advantage Managed Pool



In this example the dark blue line is the best cash bid for the Port Kembla Zone, the pink line is one pool provider, the yellow line is another pool provider and the light blue line is the average price. It should be noted that these pool estimates are only for this point in time and may or may not improve in the future. However, I think this graph shows the potential role of a passive marketing program to a grain grower. It also raises the question of whether pool operators in Australia can out-perform the market average, especially after the costs for running the pool are taken into account.

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6.0 Plain English Compendium Summary

Project Title:	Commodity Price Risk Management in Australia – A Dare to be Average!
Nuffield Australia Project No.:	0901
Scholar:	Bruce Watson
Organisation:	Kebby & Watson
Phone:	+61 26853 8141
Fax:	+61 268631119
Email:	watson.woodbine@gmail.com
Objectives	Investigate the reasons why global grain prices increased in 2007/2008. Additionally, an examination of the current risk management procedures by Australian grain growers is undertaken given the production risk in Australia coupled with the recent volatility in grain prices/
Background	Global grain prices unexpectantly took off in 2007 to mid 2008. There was a great deal of speculation about why this happened and what were the fundamental reasons behind this rise? Many grain growers were asking themselves will this increase in grain prices be part of a "stronger for longer" phenomenon or will prices revert back to their previous levels? This increase in grain prices was in many ways a double edged sword as many grain growers hedged a percentage of their crop in 2006 and 2007 only to see production fail and prices continue to climb, causing large losses on hedging accounts. Furthermore, with the increased levels of volatility, many grain growers are now unsure what the least risky method of hedging now is, with many now deciding that forward contracts are not for them. However there still is an interest in managing price risk so an examination of the most suitable risk management tools for Australian grain growers is undertaken.
Research	The research commenced in February 2009 and continued until December 2009. Research included international and domestic travel and meetings with key stakeholders in the various components of the grain supply chain both domestically and globally.
Outcomes	The increase in global grain prices was driven by a number of factors that converged into a "perfect storm." These included: • Strong economic growth, particularly in developing countries leading to an increase in demand for grain and protein; • Supply issues caused by adverse weather coupled with trade policies that interrupted global trade flows; • A rising crude oil price which fed into ethanol and corn prices; • Rapid $US depreciation, which made grain more affordable globally; • "Irrational exuberance" in commodity markets, as market sentiment changed towards commodities. However, purchasing decisions of index funds did not have a significant impact on global grain prices Australian grain growers need to better understand their price risk exposure in the face of the volatile grain prices that we will see in the future. In particular, they need to adopt the use of options and adopt a passive marketing program into their grain marketing program because very few people can accurately and consistently predict grain markets and to speculate on future movements as part of a selling strategy is foolhardy.
Implications	Volatility in global grain markets is here for the immediate future. Australian grain growers need to desist in attempting to pick the tops of grain futures markets and instead adopt a passive marketing style for a significant portion of their anticipated production, preferably using options and definitely for new crop production considering the production risk in Australia.
Publications	