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This Too Will Pass: Farm Land and the Animal Spirits that Bedevil It

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Abstract

Farmers today are managing a farming business and a farm land (real estate) owning business. Of late, the real estate component of farm returns has been extraordinary. History, and reversion to the mean, indicates this is not always the case and rather the recent bout of exceptional farm returns too will pass. In this paper a range of approaches or methods in determining agricultural land valuations are discussed, or put another way, what a farmer or investor might pay within the context of current land prices.

In theory, what a farmer or investor might pay for some land can be based on sales of similar property. Other methods on how much to pay are determined by economic thresholds and financial constraints, including a desired return on capital and values they could pay based on debt servicing ability. All of this information gives a guide as to when to stop bidding in order to have a good chance of earning the required rate of return and, more importantly, to be able to service the debt. In practice, current market prices and what can be financed, are the key bits of information in decisions about land value.

But the decision to buy does not only rest with these considerations. When buying farm land there are significant layers of complexity, where each case can have its own unique 'angle' on the land purchase decision. Other factors to consider include family situations, longer term goals, growth objectives, long-standing informal arrangements between buyers and sellers, taxation and legal complexities, risk considerations, marginal returns from expansion, development potential, 'animal spirits' and future beliefs of optimism and pessimism on the outlook for agriculture.

As to the current state of affairs, the authors view the combination of the recent past pattern of runs of rising commodity prices, underpinned by negative real discount rates and very low nominal borrowing rates, accompanied by exceptionally good seasons, as a trifecta of uncommon rarity. Given the recent strong confluence of factors at play, chances are the extraordinary period of farm returns too will pass. Rational buyers of agricultural land at current valuations can ask 'how much of the recent good times is now capitalised into land values and what are the chances of a repeat of the enticing combination of high prices, good seasons and cheap capital over the next 10, 15 or 20 years?' Investors' answers to this question will determine where they sit regarding the next phase of valuations and price trends for Australian farm land.

Keywords: Farm land prices, land valuation, agricultural prices, Australian agriculture

Introduction

Things change. Agricultural land, an asset long held in high regard by the knowing, has in the past three decades found even stronger favour and wider recognition in the agricultural, and wider, economy. In the previous century land for agricultural production was known as being a decent source of profit in the hands of the best managers, and also as a decent store of wealth in that the price people were willing to buy and sell it for kept up with inflation. In the past three decades farm land in Australia has, with some ups and downs, grown annually in value in real terms, at a much higher rate than it did in the latter half century of the 20th century (see Figure 1).

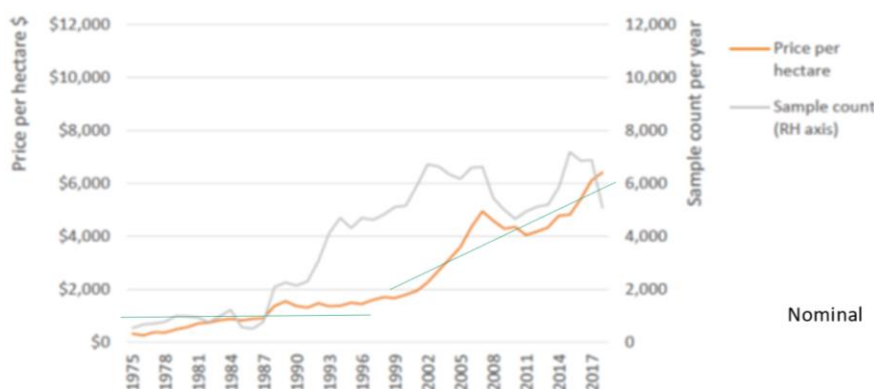
Things change. Entrepreneurs in the rest of the economy, and the world, have woken up to what astute farmers have always known about land that can be used for farming: they don't make it anymore. That realization, along with three billion more people on the way and just around the corner, and with growing incomes world-wide, means that today's farmers are managing a farming business and a farm land (real estate) owning business.

Just owning farm land though, is not the main game in town: it is more useful to think instead in terms of 'land has good value when used well for farming' and, so, to think in terms of 'acquiring the services of farm land', one way or another. In the rest of this paper, the changes that have occurred in the price investors in land for agriculture are prepared to pay to obtain the use of it are documented, and questions about the price to put on owning land to use for farming are raised and some answers proposed.

What Has Happened With the Value of Farm Land Over Recent Decades?

The ABARES recently released results of research into the value of agricultural land in Australia (Boult *et al.*, 2023). In Figure 1 is shown the changes in the prices paid for land for farming, as an average price per hectare since 1975 in nominal dollars (the dollars of the time, including inflation).

Figure 1. Average nominal price per hectare versus sample size



Source: authors estimates, custom CoreLogic dataset

Source: Boult *et al.* (2023)

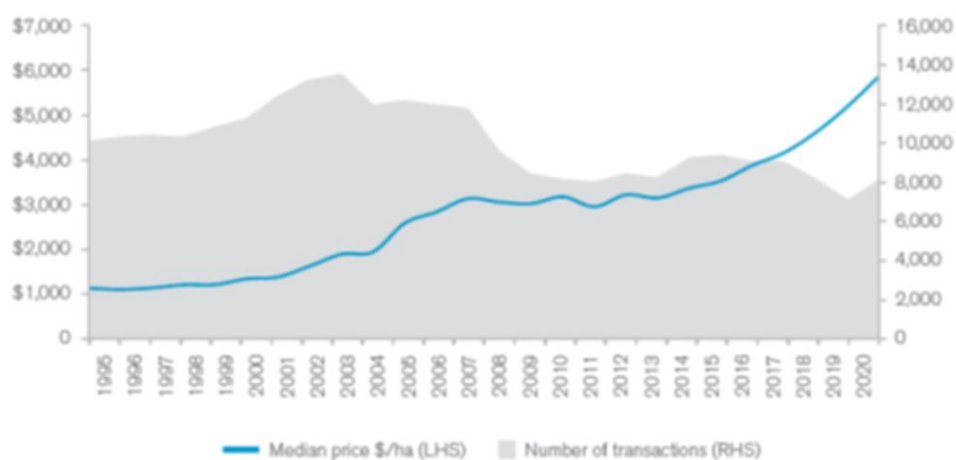
Historically, looking across all farm land in Australia, average prices were relatively flat after-inflation, that is, in real terms, during the latter half of the last century, although fluctuating with seasons and commodity price booms and busts. As shown in Figure 1, from 1990-2000, farm land prices on average across Australia increased at around 3 per cent p.a. compound. This was around the annual inflation rate. From 2000 to 2008, the increase in farm land price was over 10 per cent p.a. nominal compound.

This was quite a bit more than inflation. From 2008 to 2012, the average nominal land price declined by around 4.5 per cent p.a. compound, while from 2012 to 2017, nominal farm land prices on average across Australia grew at around 8 per cent p.a. compound: again, more than inflation which averaged around 2 per cent p.a.

For broadacre farm land, nationally, across the whole country, from 1992 to 2018, Boulton *et al.* (2023) used land sales data that shows the average price per hectare of Australian broadacre farm land increased in nominal terms from \$375 to \$2,524. In the high rainfall zone, the average nominal annual rate of growth of was 7.38 per cent; an average increase in price from \$577/ha to \$3,409/ha. The average price of land in the wheat-sheep zone increased from \$294/ha to \$2,193/ha, while the average price increased from \$67/ha to \$1,292/ha in the pastoral zone.

In Figure 2 is shown the median price trend in \$/ha of price of land for farming across Australia since 1995, in nominal dollars (the dollars of the time). The Rural Bank data shows that the median nominal price per hectare of land used for farming in Australia increased by 12.9 per cent in 2020, reaching the highest ever median price in nominal terms of \$5,907/ha, recording seven consecutive years of increases in the median land price, and achieving a rate of compound annual growth in nominal land prices of 7.6 per cent p.a. This represents growth in real terms that is significant and well worth having, as the nominal compound rate of inflation over this time was much less than this. In Victoria the story was even more dramatic (Figure 3) with the five years to 2020 showing compound annual growth in nominal farm land prices of around 10 per cent p.a. nominal, representing 2-3 per cent inflation and 7-8 per cent real annual gain in value.

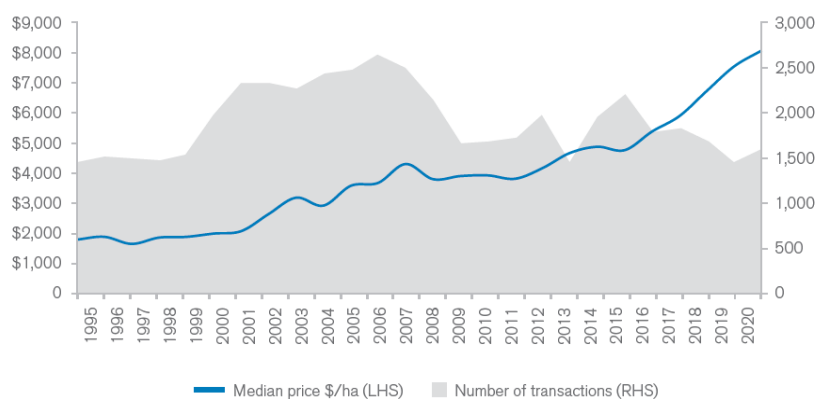
Figure 2. Median land price across Australia (\$/ha) and number of transactions



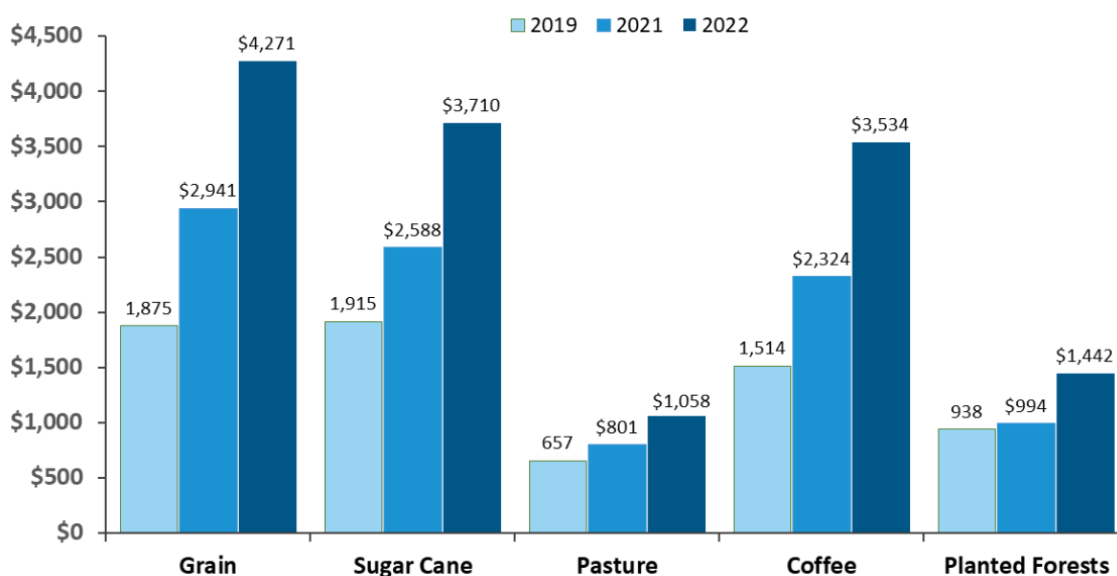
Source: Rural Bank (2023)

In the past three years, the growth in price was even greater. Median farm land prices have grown most in the high rainfall zone, increasing by 125 per cent over the last three years to almost \$9,000/ha. Increases in land prices in the wheat-sheep zone were also high, increasing by 80 per cent over the same time to \$3,465/ha. Coming off a lower base, the average price of Australian pastoral zone farm land increased by 130 per cent since 2020 to reach \$1,528/ha in 2023 (Rural Bank, 2023).

For an international comparison, farm land prices in the Americas have appreciated strongly. For example in Brazil, agricultural land prices have more than doubled in the last three years, with significant appreciation in land used in broadacre cropping and sugarcane production (Colussi *et al.*, 2023) (Figure 4).

Figure 3. Median land price across Victoria (\$/ha) and number of transactions

Source: Rural Bank (2023)

Figure 4. Brazil farm land values in recent years in US dollars per acre

Source: Colussi et al. (2023)

The main message here is that in real terms (inflation adjusted) prices of agricultural land can go up and they can go down, but in recent years the only way has been up. This is not a trivial matter. In the next section the reasons why farm land prices have gone to record high levels in recent years are explored.

Why?

Below is a list of real phenomena that influence the prices farmers pay to obtain the services of land to farm in recent years, noting the most optimistic bidder wins. These include:

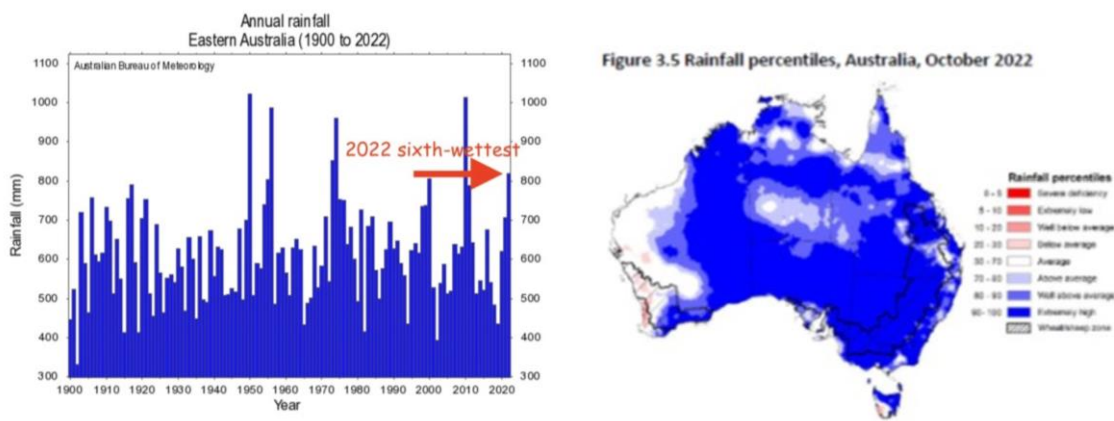
- Climate, rain, temperature, soil, yields, prices, costs
- Expected future cash flow and capital gains (total returns)
- The degree of optimism or pessimism towards the outlook for agriculture
- Finance-interest rates, access to capital, debt servicing capacity
- Agricultural land as an asset class and international capital inflows from Pension Funds
- New business arrangements – capital aggregators, owning and leasing, owning and managing, etc.

- Exchange rates, inflation rates, credit supply
- Size of the 'parcel' of land in a sale, future economies of scale
- Multi-sales (aggregations)
- Land availability
- Location, distance, infrastructure
- Houses, buildings
- New technology - new activities, new crop and livestock systems
- Recent sales, past growth in real asset values
- Macro-economic cycle, GDP growth, monetary policy, fiscal policy
- Markets and policies, export access, trade policy, carbon policy
- Land being added-on, often adjacent to existing land: extra gross margin = addition to profit
- Environmental value including biodiversity, remnant native vegetation and wetlands.

A look at how some of these factors have changed over the past few years helps to explain why land prices have trended up in real terms, albeit with fluctuations around the rising trend. Key contributors that explain much of the changes to valuations are shown from Figures 5 to 16.

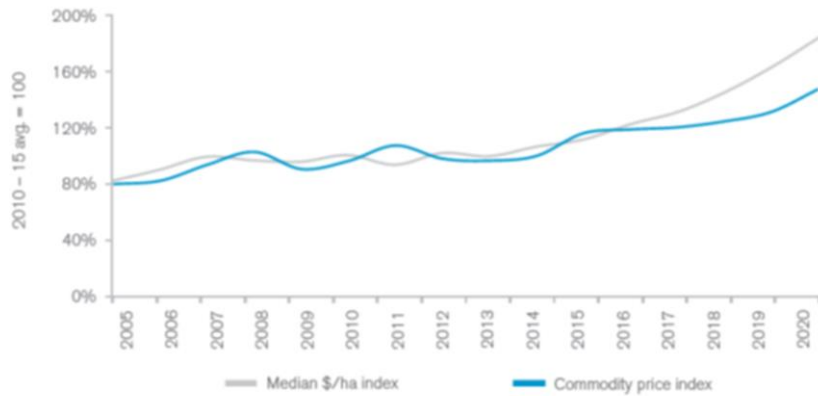
In summary, the increase in agricultural land values can be attributed to strong periods of farm revenue growth driven by multi-year La Nina events and two periods of particularly strong commodity and agricultural prices over the last 15 years. In recent years, both high local Australian agricultural prices and good seasons have coincided in key regions around Australia. A low Australian dollar has boosted export values more recently while trade access for agriculture has generally been improving as new free trade agreements are entered into by the Australian government. Other important medium-term factors include solid productivity growth in broadacre Australian agriculture (after adjusting for climate effects, productivity growth has averaged 1.4 per cent annual growth) and falling interest rates both globally and in Australia.

Figure 5. Annual rainfall over time (noting that 2022 is the sixth wettest year since 1900) and rainfall percentile in October 2022



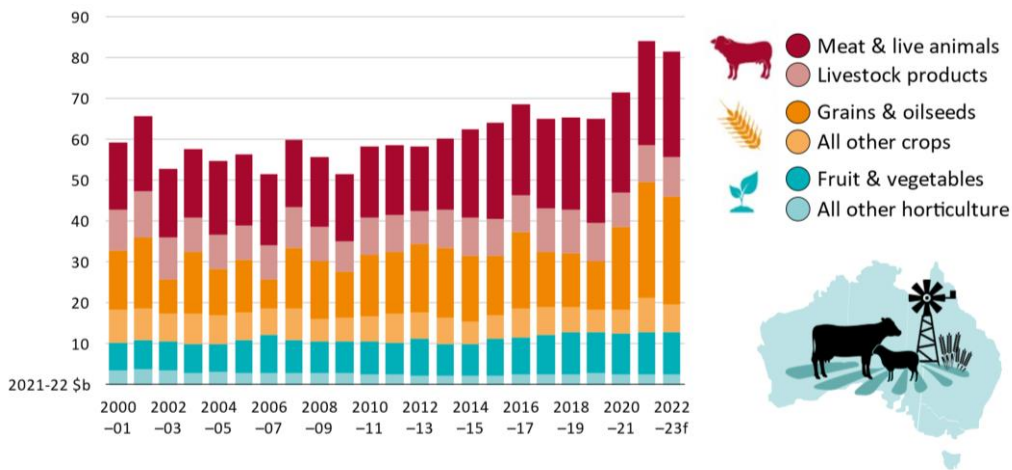
Source: Bureau of Meteorology (2022)

Figure 6. Comparison between commodity prices and median land price for Australia



Source: Rural Bank (2023)

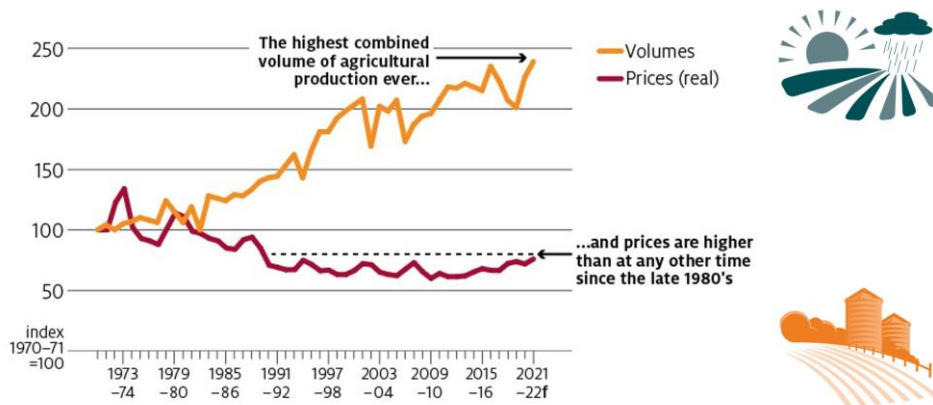
Figure 7. Gross value of Australian agricultural production



Source: (Greenville, 2023)

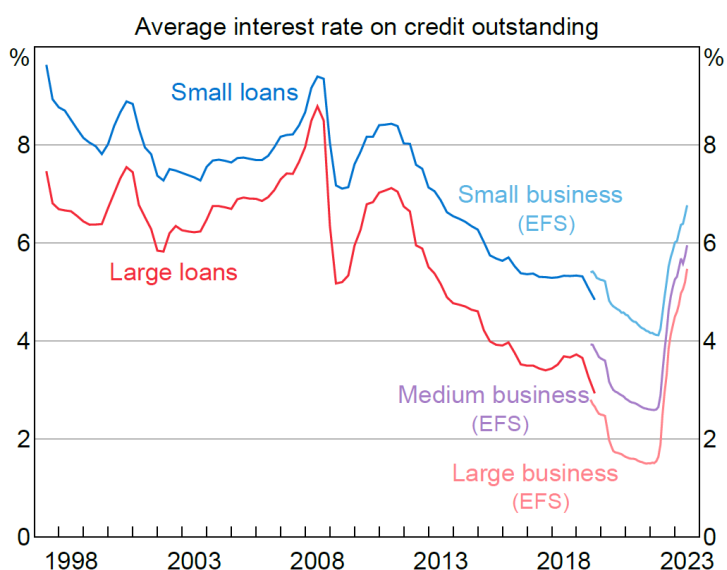
Figure 8. Volume of agricultural production and prices

Bumper back-to-back seasons driven by high prices



Source: (Greenville, 2023)

Figure 9. Australian business lending rates*

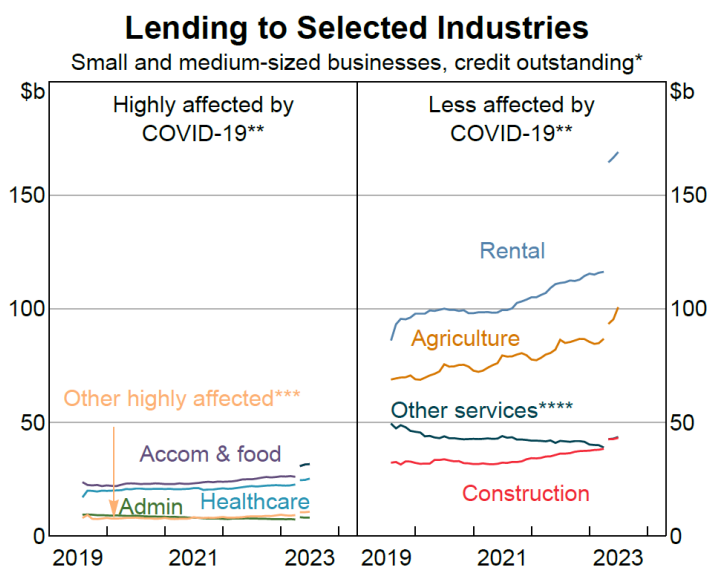


* Small loans are loans less than \$2 million; large loans are loans \$2 million or more; new series from July 2019 are from the Economic and Financial Statistics (EFS) collection (see Statistical Table F7). Changes to business size definitions in April 2023 resulted in some large business credit being reclassified as medium business credit and some medium business credit being reclassified as small business credit.

Sources: APRA; RBA.

Source: RBA (2023)

Figure 10. Lending to small and medium-sized businesses



* Changes to business size definitions in April 2023 resulted in some large business credit being reclassified as medium business credit and some medium business credit being reclassified as small business credit.

** Highly affected industries had the highest share of businesses report a fall in revenue of greater than 50 per cent in a June 2020 ABS survey; less affected industries are the top four by value of SME lending.

*** Education & training; arts & recreation; information media & telecoms.

**** Other services includes a broad range of personal services, selected repair and maintenance activities and households employing staff.

Source: RBA (2023)

Figure 11. Australian dollar trade weighted index

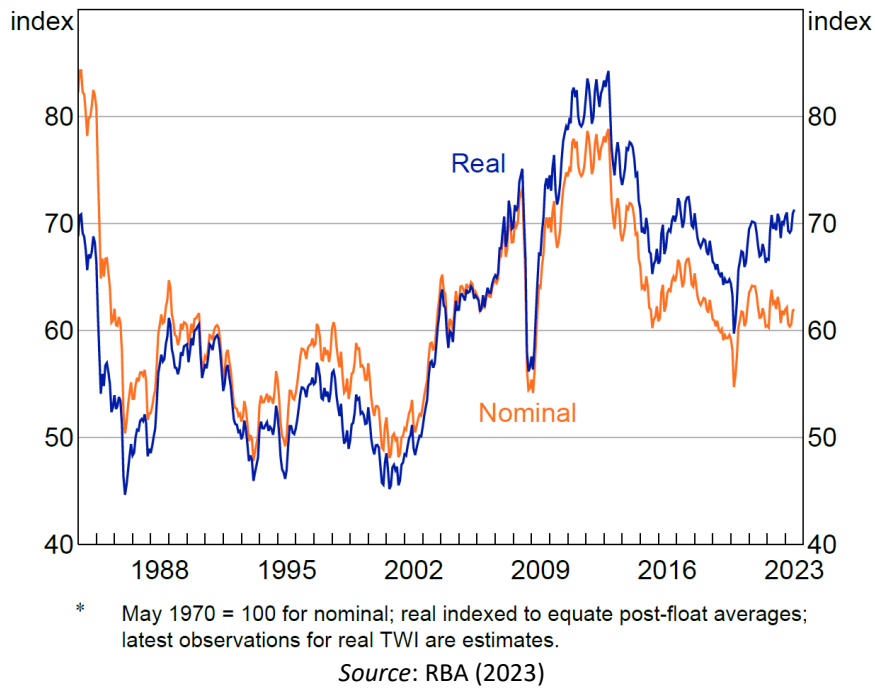
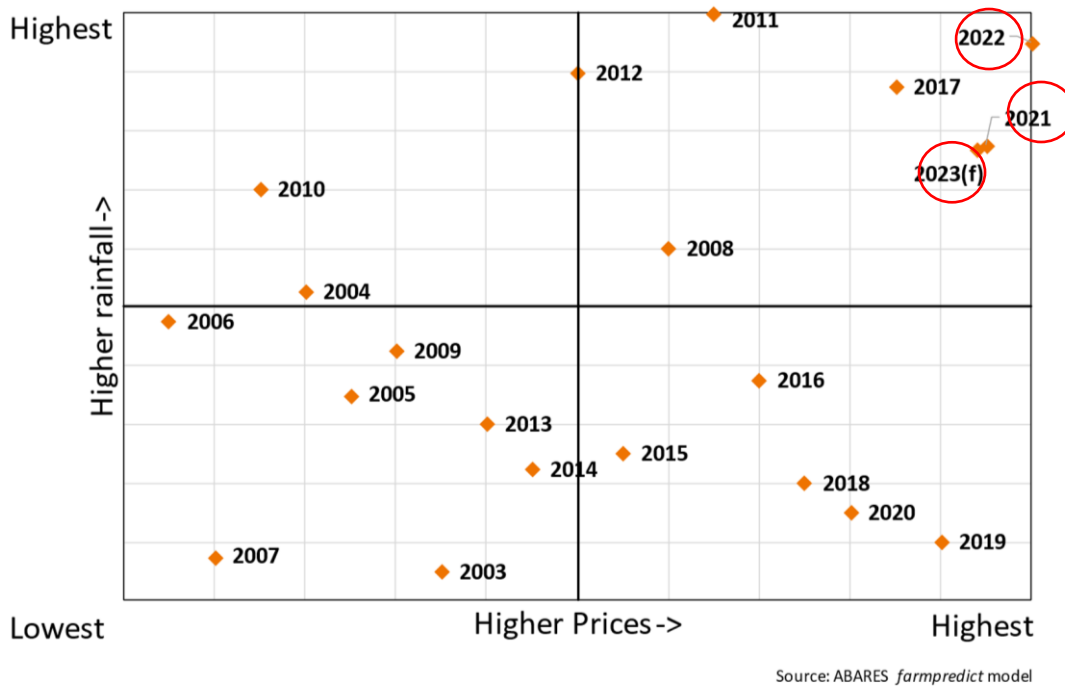
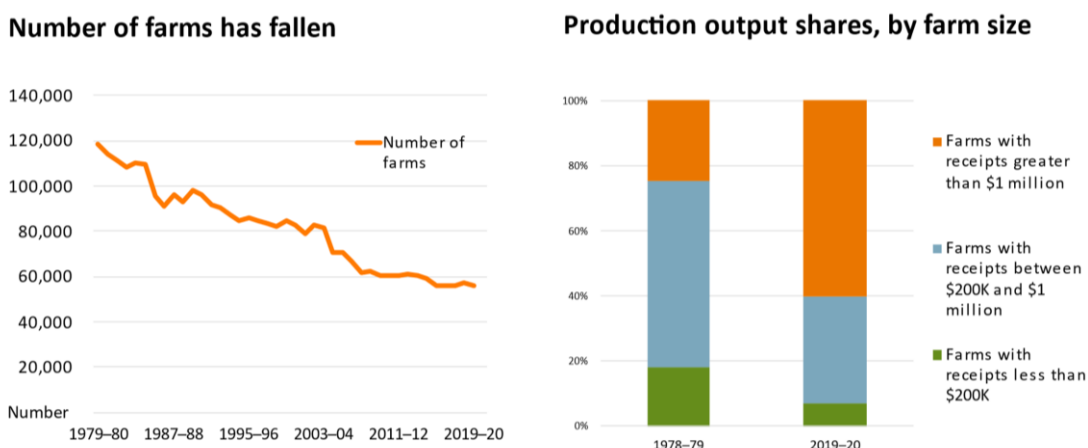


Figure 12. Annual rainfall and prices by year (note recent high prices and good conditions)



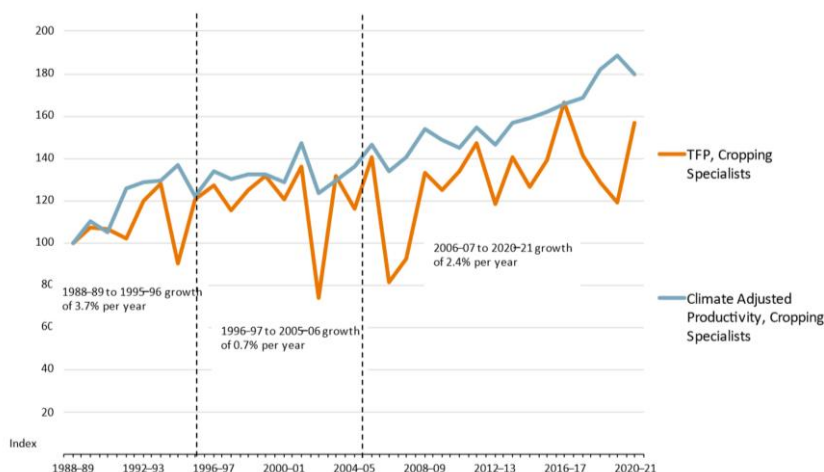
Source: (Greenville, 2023)

Figure 13. Structural change (which is boosting sector productivity)



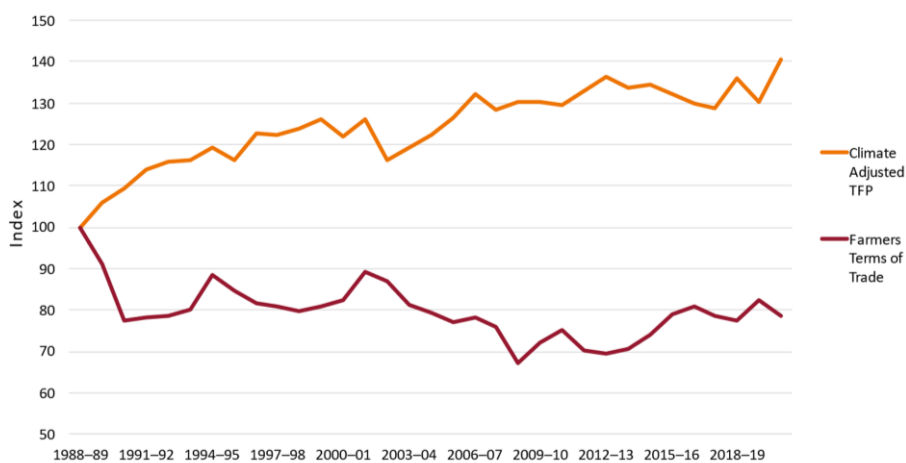
Source: (Greenville, 2023)

Figure 14. Productivity growth (adjusting for climate effects, productivity growth has been solid)



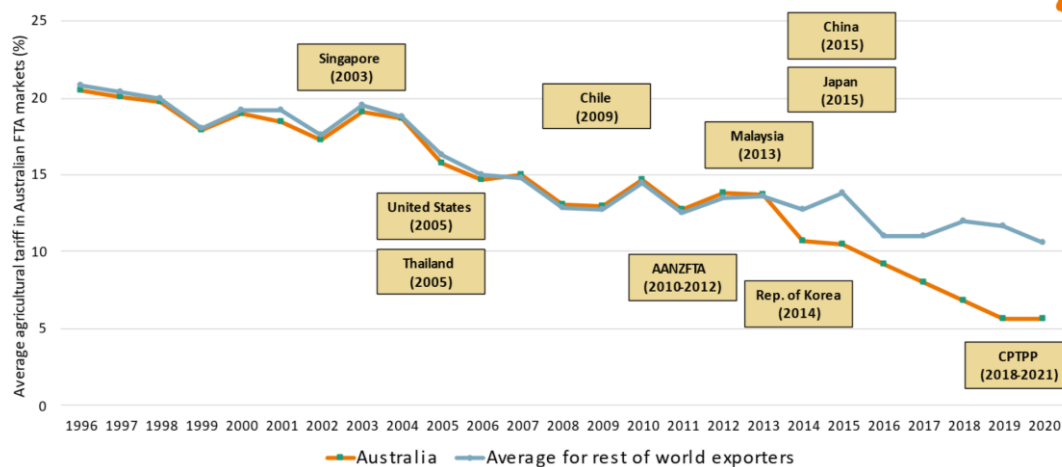
Source: Chancellor et al. (2021)

Figure 15. Terms of trade (productivity growth has helped to offset declining terms of trade)



Source: (Chancellor et al., 2021)

Figure 16. Average agricultural tariff in Australia's FTA markets (%) (Australia's export market access has increased relative to our competitors)



Source: (Greenville, 2023)

The main message is that there are many natural and economic and social phenomena that are hard at work combining to influence the prices farm buyers are willing to pay. Not all, such as optimism or the extrapolation of the recent 'good times' as continuing, are amenable to inclusion in the economic models that are used to analyse the investment decision, though the winning bidder is inevitably the most optimistic bidder.

Always, family situation and medium-term goals are critically important in the decision to try and buy more farm land. Explicit consideration of current and expected inflation too cannot be avoided. Expectations about inflation and the future directions of land prices, as well as current and recent past nominal commodity prices, production costs, interest rates, are all considerations included implicitly when using similar recent sales as a base for forming an offer price. Explicit recognition of cost of capital is critical too.

In a study of farm buying decisions, King and Sinden (1994) found that the bid prices of farm buyers are influenced by:

- Having children wishing to go farming;
- The state of the farm and its unrealized productive potential;
- Proximity to major population centres; and
- Farm size - the size of the currently owned farm and the size of proposed additional land.

In all land purchases, the prices paid for similar land in recent sales play a large part in the thinking of the farm land buyer. This raises the question about the processes involved in forming offer and acceptance prices of these sales of similar land. Critically important too is the ability to finance the purchase and service the new debt that is taken on. A clear view about the physical production possibilities, current and in future with development, of the extra farm land in which the potential buyer is interested, is the foundation of any offer. The expected extra production is translated into some approximate ideas about the corresponding extra annual 'profit' from the whole business with the added land that is likely, and annual extra net cash flows, that might eventuate. What has changed is that nowadays, more so than a couple of decades ago, the prospect for picking up real annual capital gains from owning the land is part of the thinking too.

Farmers know well the results that they have achieved in the past by farming similar country, and what they expect to be able to farm with development and similar success on the farm land they are interested in buying. Theory has it that implied expected real returns per annum after tax on extra capital invested, considering risks, is one guide to where the price offer can stop. This is an economic efficiency criterion. Cash considerations though, liquidity, is most likely trumps: 'we need it, we can finance it, let's do it'.

In summary, there are significant layers of complexity associated with the valuation placed on farm land by any buyer. Each case has its own unique 'angle' on the land purchase decision. There are family situations, long-standing informal arrangements between buyers and sellers, tacit agreements between the neighbouring potential buyers, financial, taxation and administrative angles and complexities, vendor finance at below market interest rates, risk considerations, marginal returns from expansion, development potential, government policy, compensation subsidies, growth objectives, and future beliefs including optimism and pessimism on the outlook for agriculture.

Animal Spirits? Irrational Exuberance?

The effects of the activity of buyers of farm land on the unprecedented rise in farm land prices in recent years brings to mind John Maynard Keynes' evocative description of 'Animal Spirits'. Lord Keynes the famous macroeconomist spoke of the 'animal spirits' of players in the economy, the spontaneous need to act without rational decision-making (Akerlof and Shiller, 2010), contributing to the boom times and the busts that follow. While Keynes was trying to explain cycles in economic activity, the phrase 'animal spirits' in economics has come to mean the ways human emotions and instincts and urges to act and 'group think' are all at play influencing decision-making about investing in the always uncertain future which will always have volatile times.

'Animal spirits' can refer to pessimistic-panic or excessive optimism – exuberance even – influencing financial decisions and actions, most famously culminating in 'Asset or Speculative Bubbles', or 'Busts'. Partly such events are attributed to the extrapolation of recent factors driving a particular market up as continuing. 'Irrational Exuberance' is a more recent phrase for the same concept. In the 1990s, Nobel Prize winner in economics Robert Shiller with the then Chair of the US Federal Reserve Board Alan Greenspan coined the term, 'irrational exuberance' to describe the behaviour of participants in the infamous 'dot-com bubble'. Greenspan described the bull market in 1990s and the rapid escalation of asset prices as potentially a bubble. Acknowledging the difficulty of judging if an asset bubble is occurring Greenspan posed the question in a speech "but how do we know when irrational exuberance has unduly escalated asset values...?" (Greenspan, 2008, 177).

Today the term 'animal spirits' is used in behavioural economics and the study of the psychology of markets. The psychology of the buyer of farm land, including the perspective taken, is naturally important. It is worth keeping in mind that the historical and memory-free view that 'Things are good, so they can only get better' is an outlook not completely unknown in farming circles. The counter perspective is that if a multitude of factors influencing agricultural land values are simultaneously positive, chances are these factors might 'revert to the mean'. Consistent with this belief is 'this too will pass'. Booms bust. Recent runs of exceptionally good seasons and extra-ordinary (in the literal sense) commodity prices (Figure 12), accompanied by historically negative real interest rates and very low nominal borrowing costs (Figure 17), may explain much about the 'perfect storm' that has resulted in the almost unprecedented increases in the prices being paid for land for all types of farming in Australia.

Some of what might appear as exuberance in pricing agricultural land (and some other asset classes) likely derives from a generational macroeconomic trend of falling 'risk-free' interest rates world-wide

(Figure 18). The strong tailwind of falling real and nominal interest rates across the longer term has buoyed asset valuations throughout the economy. Investment returns are presented in Figure 19 for various asset classes. Agricultural businesses owning land have equally benefited from the global downward trend in interest rates. All boats float on a rising tide.

Figure 17. Australian cash rate and 90-day bill yield

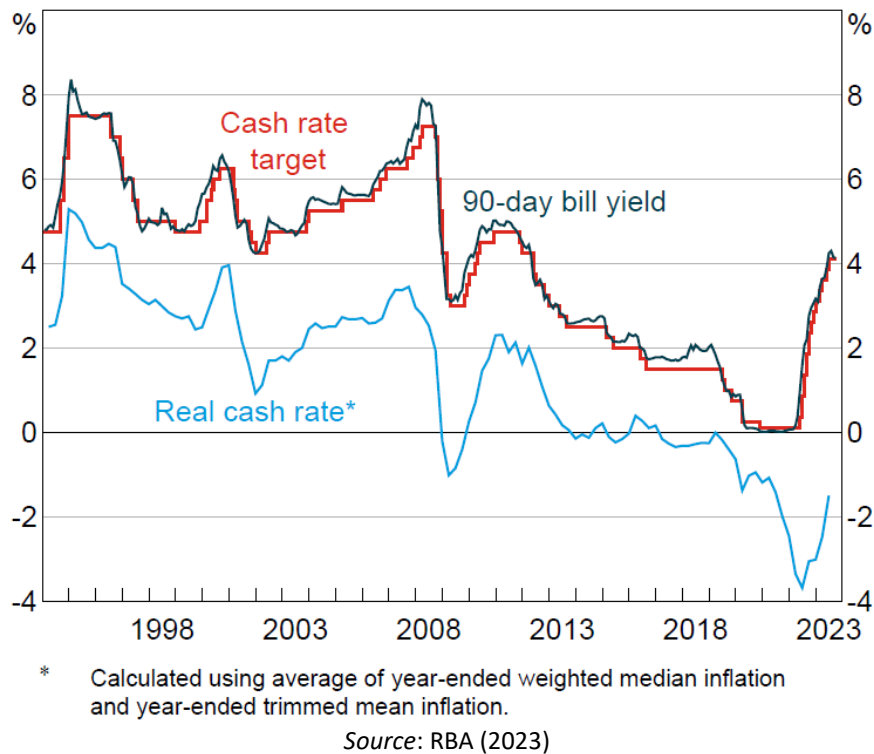


Figure 18. Global 10-year government bond yields

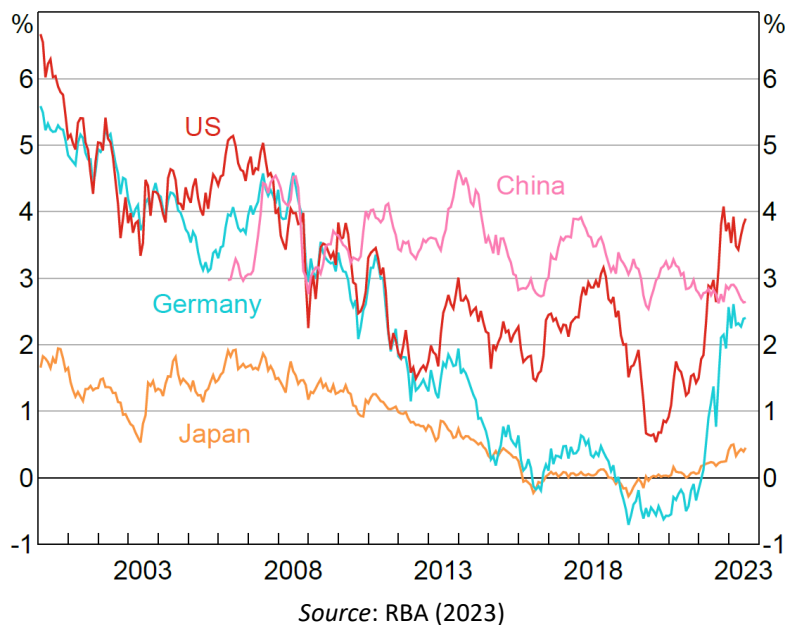


Figure 19. Australian investment returns by asset class

Returns		1 Year	5 Years	10 Years	20 Years	30 Years
% per annum	— U.S. Shares ²	23.5	14.7	16.5	10.1	10.0
	— Australian Shares ³	14.8	7.3	8.8	9.0	9.2
	— International Shares ⁴	22.6	11.5	13.2	8.4	7.5
	— Australian Listed Property ⁵	8.1	3.5	7.7	5.2	7.3
	— Australian Bonds ⁶	1.2	0.5	2.4	4.2	5.5
As at	-- Cash ⁷	2.9	1.2	1.7	3.5	4.2
30 June 2023 ¹	... CPI ⁸	6.0	3.4	2.7	2.7	2.7

Source: Vanguard (2023). Notes: 1. Per annum total returns to 30 June 2023. 2. S&P 500 Total Return Index (in AUD). 3. S&P/ASX All Ordinaries Total Return Index. 4. MSCI World ex-Australia Net Total Return Index AUD Index. 5. S&P/ASX 200 A-REIT Total Return Index. 6. Bloomberg AusBond Composite 0+ Yr Index. 7. Bloomberg AusBond Bank Bill Index. 8. ABS Consumer Price Index.

Regression to the mean is a handy concept in many life activities, including when facing strategic decisions such as asset allocation as a farm manager and owner. Probability theory tells us that the tendency for phenomena at the extreme (and rare), or combinations of phenomena pushing outcomes to the outer limits of distributions, will set in train forces that culminate in dragging the phenomena back towards the more common levels near the medium-term mean or central tendency - unless other fundamental and lasting change has occurred.

It is hard to argue that all the traditional circumstances of agriculture have fundamentally changed for the future forever. The alternative conclusion is that exceptionally good circumstances are unlikely to last. Looking back at the past several years and the prices being paid for agricultural land, whether for whole farms or for individual blocks being added to existing holdings, the 'perfect storm' nature of what has happened may well be obvious. The combination of the recent past pattern of runs of rising commodity prices, underpinned by low discount rates for economic analysis and interest rates for financial analysis, accompanied by exceptionally good seasons, is a trifecta of uncommon rarity. This too will pass.

Rational buyers of agricultural land at current valuations can ask 'how much of the recent good times is now capitalised into land values and what are the chances of a repeat of the enticing combination of high prices, good seasons and cheap capital over the next 10, 15 or 20 years?' Investors' answers to this question will determine where they sit regarding the next phase of valuations of farm land. If the belief is that there is a low probability of the recent past continuing, the historically ultra-low risk-free discount rates are history, and valuations have already incorporated recent 'good times', then plateauing agricultural land prices and opportunities created by falling prices during coming years will likely loom large in their thinking.

Financial markets and some asset classes are already in the midst of a re-calibration, taking into account the view that future risk-free rates of returns are sustainably higher and will likely be closer to longer term levels, rather than the trend of recent decades. Consider that risk-free 10 and 20 year Australian government bond yields hit a peak of 4.5 per cent p.a. and 5.0 per cent p.a. respectively in early October 2023. Dry weather, commodity market collapses in some sectors and rising interest rates should prompt recognition by analysts and commentators that the rises in agricultural land values of recent times may also stall. Time will tell, but down the track, natural and commodity market and financial circumstances will assuredly prove that some decisions to purchase farm land in recent years could well fall into the category of 'asset bubble, speculative bubble, or irrational exuberance'.

Land and Finance: The Principle of Increasing Financial Risk and the Principle of Constant Risk

The rapid price appreciation in agricultural land values has had major implications in terms of wealth accumulation and the use of debt to buy land enabling a farm business to grow faster than otherwise would be the case. As the ratio of debt to equity in a business rises, gearing increases. Depending on the ratio of debt to equity, the business is exposed to the possibility, when the business earns an annual profit that exceeds the annual debt servicing interest payments, of having the equity grow more rapidly than if the business had less debt. This arithmetic reality begs the question: 'Why don't businesses just have more and more debt and grow bigger and bigger?' which the economist Michal Kalecki (1937) answered with the 'Principal of Increasing Financial Risk'.

With this principle hard at work in a business, the converse of the situation where annual profit is less than interest means when an equivalent annual operating loss is made, the equity of the business is reduced by the sum of the operating loss plus the interest payments that are due on the debt. The decline in equity in this situation is greater than the growth in equity when the equivalent operating profit is made. And, as losses come along as well as profits, there is an asymmetrical response in the consequence of using debt. At any gearing more equity is lost in the bad times than is gained in the good times. This is the reason that a business cannot just have more and more debt. When the loss is made and the loss plus interest payments erode equity more rapidly than when growth occurs, this means, for a given probability of making losses, there is a level of debt beyond which it would not be prudent to go.

However, the operation of the principle of increasing financial risk also means that during good times, with higher gearing equity will grow at a more rapid rate than it would grow under the same conditions with lower gearing. Hence the incentive during good times in farming to use debt to achieve more rapid growth in equity can be strong, where rising land values, decent profits and low interest rates can mask the asymmetry in using debt.

If interest rates fall and nothing else changes, at any level of gearing the business is in a safer position because the annual interest obligation is reduced relative to the profits. This means profits can fall further before equity is eroded than was the case when interest rates were higher. The reverse occurs when interest rates rise and nothing else changes. If profits go up and nothing else changes, then profits have further to fall before interest is not covered and equity is eroded, and so the business is in a stronger financial position.

Lastly, as land values rise, the proportion of equity rises for the farmer relative to debt or gearing, reducing the risk of insolvency or the risk of default for the creditor. For example, suppose a farm business has \$20m in assets, with \$16m equity and \$4m debt charged at 7 per cent p.a. The gearing ratio is $\$4m:\$16m=0.25$ or 80 per cent equity. Now suppose asset values fell, such as during a recession, seriously reducing the profits of farming. Suppose asset values fell 25 per cent, from \$16m to \$12m. The new gearing ratio is $\$4m:\$12m=0.33$ or 75 per cent equity. Suppose also because of the bad economic conditions the farm business has been forced to incur a further \$1m debt. The gearing of the business is now higher, $\$5m:\$12m=0.42$ or 70 per cent equity. The business is more exposed to further losing equity than previously, with a larger interest bill than before.

But consider the opposite situation where a boom in asset values, such as rising land values, increases the previous equity from \$16m to \$20m. With \$20m equity and \$4m debt the business gearing is lower at 0.2. The business' equity is larger and debt as a proportion of equity is lower, and so the business can weather a decline in equity when the loss occurs better than was the case before assets grew in value from \$16m to \$20m. If the farmer had the business sitting at a gearing level that they were

comfortable with before, with the increase in land values taking the total assets from \$16m to \$20m, then there is the chance the farmer will take on more debt, another \$1.34m debt would keep the gearing at 0.25, the level the farmer wanted for their business.

There is evidence to suggest this type of thinking occurs in farming, which is consistent with the theory of the principle of constant risk (Gabriel and Baker, 1980) where people 'balance risks across the business to retain an overall level of risk', including the amount of financial risk incurred. If this additional debt was used to say buy more land at the new higher price, or an even higher price, but adding \$1.34m to farm debt, the new asset to debt situation is \$21.34m:\$5.34m and gearing is maintained at the same level as before the rise in asset values. The rising land values have enabled further borrowings to buy more land at the higher prices prevailing and maintained the gearing of the business at 0.25.

One consequence of this example and the idea of constant risk with rising asset values, is a compounding effect on land values. The example described above would contribute to land values that are rising, continuing to be purchased, and even bid up to the new higher prices, as now wealthier farmers go into the market to use their increasing equity to acquire more land whilst maintaining the gearing that they are comfortable with.

In conclusion, while the level of debt a business can sustain varies case by case, depending on the goals and situation and view about risk of each farm-owner, recent rises in the values of agricultural land, profits and low interest rates have left many farm businesses in a potentially stronger financial position. This may have encouraged farm expansion through land purchases resulting in land values to be bid up. This in turn further strengthened the financial position of farm business by reducing their gearing. This lower gearing allied to the higher ratio of profit to interest payments led to further debt and investment in land at the now higher and rising prices.

Working Out How Much to Pay to Acquire the Services of Farm Land

There are two main forms of acquiring the services of farm land: either buy it and own it using your own or borrowed capital, or obtain the services off a landowner using leasing or share-farming or an outside-equity capital arrangement. The first, most obvious question, and the most difficult question to answer, is 'What are the services of farm land worth?' This question has long been a worry to economists, not to mention the farmers who use it.

Buying farm land

The goals and objectives of farm families are the key to the farm land valuation question. To a considerable extent the land purchase decision is one that involves long term objectives, such as the desire to firstly continue farming because that is what farmers love, know, and do best. There is the imperative to grow the size of the business, simply to keep up with the competition. Then there is the wish to grow to an adequate size to enable heirs to continue farming. Such generational wealth accumulation might have to allow for other non-farming siblings to inherit some wealth in the future, while also to build up an adequate-sized 'superannuation' for future retirement. If farmers are contemplating buying more land, there are a number of ways of working out and deciding on how much to offer for a piece of farm land; ways which use different criteria.

The full benefits of land ownership are difficult to measure. Some of the benefits can include the fulfilment of some deep-seated intrinsic wants, or they could be the more practical advantage of proximity. As most farm land is sold in parcels to neighbours the effect of proximity and competition

between neighbours on purchase prices can be marked. The size of the parcel of land is also important, with smaller blocks of land selling for more per hectare than larger areas.

The size of the land purchase in terms of total capital required and size of new debt assumed can have important risk implications for the farm business. The consequences of overpaying for a smaller neighbouring block, which becomes available once in a generation or two, may have few consequences for wealth and liquidity. However, too optimistic an outlook for medium-term farm profits which justifies paying high land values for a major expansion of the farm business using debt may come at a severe cost, albeit a hidden cost in the initial stages. A run of poor years may cause both liquidity and equity problems, with the worst case being the general reluctant intervention by the lender. Another less extreme scenario, but still costly to the aim of building medium term wealth, is that even if the debt servicing costs can be met, higher gearing ratios and the state of the balance sheet may be such that future investment opportunities need to be foregone for a considerable period. In the highly uncertain Australian farming environment, keeping a reserve of borrowing capacity has always been one of the rules of both survival and of successful growth.

Examples from history emphasise the importance of large strategic ('portfolio') decisions made in farming relating to high commodity prices or 'price spikes', and especially when coupled with the even rarer combination of having good seasons at the same time. Kingwell (2000) described the risk of periods of high profits as to 'lull some farmers into a false belief about the profitability of agriculture' (p.8). Perhaps too, there may be lessons from the experience in the 1970s in Australian agriculture and the foolhardiness of extrapolating near term price (and income) trends on medium term equity:

- Makeham *et al.* (1979) described the 'recession' in land values in Australia in the early 1970s following a grain price and beef price boom. The number of farm sales collapsed and land prices fell by 20 per cent to 30 per cent relative to just two or three years earlier, but great opportunities opened up after the boom. They explained that 'in many cases, high equity farmers use the recession in land values to invest in extra land...a decision which paid off handsomely within two years.' (p.72).
- Kingwell (2000) described the behaviour that followed the commodity price spike of the mid-1970s, where significant capital investments were common. However what followed post the investments in land and machinery was a tendency towards a run of poor seasons, average prices and higher interest rates, with some farmers who made expensive purchases during this period bankrupt by the early 1980s.

Another attribute of land value that is difficult to assess is farmer preferences for longer-term wealth over short- to medium-term operating profits and net cash flows. There may be merit in taking a medium-term perspective on maintaining or enhancing economies of scale to achieve higher growth in productivity. To a considerable degree it is likely that farmers are as much or more 'maximizers of wealth' or 'net worth maximizers' as they are motivated by motives of getting the most short-term profit. Maximising wealth in the medium term among other factors includes the ability to maximise productivity growth. Among other reasons, building wealth and thus equity, is valued because it reduces risk by reducing gearing and by increasing liquidity.

From a purely economic perspective, productivity is the main game. To achieve adequate productivity growth across the entire farm business, the ability to adopt new technologies may be contingent on the financial and management capacity or resources of the business. In addition, the economic merit of some investments will only be justified with adequate business scale. While there may be costs in 'overpaying' for small pieces of land (the opportunity cost of investing elsewhere is small because 'bet size' is small relative to total wealth), the benefits of adequate productivity growth on farm performance medium term can well outweigh any shorter-term concerns of valuations or overpaying – provided the cash flows of the business can sustain the extra debt-servicing obligations incurred.

This illustrates the importance of goals, objectives and a 'portfolio' approach for any one land purchase. A focus on what a piece of land sold for, without the full context of that purchase, is not useful. An apparent 'ridiculous' price for a moderate-sized parcel of land may well make good farming and economic and financial sense in a context of it being a valuable productivity-increasing, economy-of-size-benefitting 'add-on', in which the total capital involved does not increase overall gearing of the business excessively and the extra debt servicing required is well manageable. It depends. Every sale is a unique circumstance.

In essence, there are a number of ways to identify some numbers that inform us about what farm land is worth to us. The methods are summarised into four ways of tackling the question as given by Malcolm et al. (2005):

- Comparable sales in the market: how much we **have seen others pay for similar land** in similar circumstances to yourself and therefore we might have to pay in the market for the land in question.
- How much we **should pay** according to strict economic criteria. This is the price that gives a good chance of earning a return on the capital invested that is comparable to the earnings from alternative uses of the capital involved, after taking account of the different risks that might be involved.
- How much we **could pay** according to the capacity of the land plus our existing ability to service the debt we will have to take on to acquire the land. This is the most important and ultimate criteria, in that if we get this wrong, we can lose possession of the purchased land as well as some other assets we had before we bought the new land.
- How much we **are prepared to pay** for the land, given the whole situation, the family goals and circumstances, with all things considered, including the economic, finance, risk and the all-important non-pecuniary factors involved in the decision.

What others pay: market price

The market value method is the most common approach used to work out how much to pay for farm land. This method requires the potential buyer to explore the market prices received in recent sales of similar types of properties. This figure then has to be adjusted considerably for a number of important factors. These include:

- the method and conditions of the sale. When a seller has provided vendor finance at below market rates the sale price has to be adjusted to an equivalent market price without vendor finance, or to an equivalent market price under the terms of the proposed sale of the land which is under consideration for purchase.
- the differences in the size of the property, the type and state of improvements (especially the house), the management history (well farmed and maintained or run-down and neglected), the different types and state of the soils, pasture and topography.
- the different timing of the past sales compared to the present.
- changes in expectations about future commodity prices, inflation, interest rates and the related local and international economic conditions.

Recent prices paid per hectare for similar farm land that is used in similar forms of production to the systems the intending buyer will employ is an indicator of current land values. However, all parcels of land are unique. Great care is needed to allow properly for important differences between market prices and the characteristics of sales of particular parcels of farm land. For example, housing, improvements, topography, slope, aspect, history, buyers' and sellers' motives, vendor finance terms, and so on.

Such adjustments are critical but are difficult to calculate. Also, only genuine sales are worth looking at. All up, the adjusted market value gives some indication of what a potential buyer might have to pay for a property. Like the discounted cash flow investment appraisal method, it provides additional information, or a starting point to use in the decision on what to pay.

The economic criterion: what you 'should pay'

The 'should pay' economic value of the investment is the maximum amount the buyer can justify paying in order to earn a minimum rate of return on capital invested considering risk, that is required by the investor from the investment.

This 'should pay' land price is based on the expected operating profit, after interest and tax, on the investment, plus the expected real annual capital gains. The way to calculate how much an investor should pay is to use the standard discounted cash flow method of investment analysis. The essence of this approach is the notion that the true value of an asset depends on the future streams of net benefits that the asset is expected to generate and the rate of return on the investment that is required, risk taken into account.

A simple example: Suppose an asset promises to provide a net return of \$100 per year. If the buyer wants to earn 10 per cent on investments, then the farm buyer could pay \$1000 for the asset, and the \$100 earned would represent the 10 per cent required return on capital. This is called the income capitalization method of valuing an asset, and is the economic approach used in valuing farm land according to expected net earnings.

Things are more complicated than this though. Nowadays, it is realistic to include an expected annual increase in the value of the land from anticipation of both inflation or expected real gains arising from anticipated future gains in the net benefits of owning land. Trends such as increased productivity or increases in food demand arising from growing global populations and wealth may justify different future assumptions to the past. Or, from a desire of an investor to hold agricultural land as a store of wealth.

The capitalisation rate is usually the opportunity cost of capital in the economy. In the case of farming, it is more realistically the required rate of return from the capital of the prospective land buyer, adjusted for risk of the investment in agriculture compared to non-agricultural uses of capital, that the investor would realistically consider. A deduction also needs to be made from the capitalization rate used to estimate the value of farm land of an annual percentage that accounts for the non-pecuniary 'way of life' benefits the prospective land buyer receives or expects to receive from owning farm land. This means that while an 'uninvolved' investor in the economy might consider the opportunity cost of their funds as relating directly to risk free rates of say 4 per cent real and risk-adjusted rates of say 6 per cent in the economy over a very long run, a farmer is not usually in quite the same position. This is because far from being 'uninvolved', they are passionate: they are what they do, they do what they are.

Hence while at typical economy-wide capitalization rates assets in farming usually appear somehow 'overvalued' to an extent, the true farm land capitalization rate is likely to often include at least a couple of per cent for the 'way of life', 'a farmer is what I am and farming is what I do' phenomenon. The real risk adjusted rate might be 6-7 per cent but as a passionate farmer I am happy to play around with real 4-5 per cent capitalization rates.

Below is an application of the farm land capitalization formula to value farm land, using nominal annual profit and nominal rates of return. The prospective farm land buyer might consider they would

want to earn a nominal 10 per cent annual return on their capital if they put it into commercial real estate or equity markets. Alternatively they might expect 5 per cent nominal appreciation in farm land p.a., which they would deduct from their required capitalization rate, making it 5 per cent. They may also add say 2 per cent for the extra risk of farming compared with many other ventures, making for a nominal 7 per cent p.a. required capitalization rate. And, loving farming as they do, they might deduct 1 per cent p.a. for that benefit, leaving a farm land capitalization rate of 6 per cent nominal.

The formula for capitalisation of net return to land (ignoring any tax) becomes:

(Net return to Land \$1000/ha)/((Required rate of return based on opportunity cost 10 per cent) plus (extra risk allowance 2 per cent) minus (expected annual capital gain 5 per cent) minus (1 per cent annual benefit prepared to forego from non-farming opportunity cost for non-pecuniary benefits of farming)) equals $\$1000/0.06 = \$16,667/ha$.

This example is summarised in Table 1 which estimates the accumulated value of the net earnings from farming the land (net benefits to the value of it from owning it and it subsequently appreciating in value). Note that in the above analysis the tax part of the story has been ignored, but there is always a tax part of the story.

Table 1. Capitalisation formula and example for land valuation

Variables	Symbol	Example
Expected annual operating profit in current dollars minus opportunity interest on the non-land capital invested in the farm	R	\$1000/ha
Capitalization Rate (Nominal opportunity earning rate of the capital invested in the land)	C	10%
Expected annual rate of capital gain in the value of the land	G	5%
Non-monetary benefits from farming	F	1%
Percentage required return to adjust for the risk of investing in agriculture compared with alternatives	X	2%
Net Annual Return to the Land	V	
$V = \frac{R}{(C + X - G - F)} = \frac{1000}{(10\% + 2\% - 5\% - 1\%)} = \frac{1000}{(6\%)} = \$16,667/ha *$		

*Note: If there was no expectation of any annual capital gain the land value would be $\$1000/(10\%+2\%1\%) = \$9,091/ha$

This method of capitalizing the expected net return to the land gives one, somewhat theoretical value, to consider and is extremely sensitive to the rate of interest that applies. This simple income capitalization has limitations compared to the more complete way of analysing the value of an asset, the discounted cash flow method. This is because there is usually the need to take account of real-world complications such as inflation affecting net returns over time, subsequent capital investment, interactions with the existing farm business and thus also affecting the salvage value of the investment. The risk too can be better captured using probabilities of key variables when using the discounted cash flow method.

These phenomena mean that the more complicated method of investment analysis, called discounted cash flow analysis, has to be used to properly value farm land. A planning horizon of the likely life of the investment in the buyer's hands is used in such analyses, and the opportunity rate of earning of the capital invested, called the discount rate, is critical. At low discount rates more can be paid for an asset – as recent low discount rates in the economy attest; at high discount rates less can be paid for

the asset. The likelihood of higher discount rates in the economy in the future from recent low rates, suggests in theory at least, that less would be paid for farm land in the future than for the same cash flow from operating a farming business over the last decade.

The value derived using income capitalization and discounted cash flow methods is treated as giving one 'fixed point' for the potential buyer to focus on. It is not the 'correct' value of the land because there are a number of factors not yet counted, and there is always uncertainty associated with the future assumptions used. However, a range of potential land values and related returns to the investment can be estimated in this way. The aim is to construct a profile of possible values and returns to capital for possible scenarios, based on the 'measurable' elements of the decision. Then this profile acts as a basis for adjustments for the important other factors involved in the decision.

The final caveat to the economic criteria is that for many reasons, short term alternative rates of earnings from a similar sized investment may not loom large in land valuing decisions. Apparent capitalization rates used by farmers often seem low. Anomalies abound. For instance, in the past rising land values have coincided with apparent falling net returns per hectare. This can be explained partly by expectations about inflation and changes in the real cost of borrowed money. The availability of credit to farm buyers affects their bidding power. Thus a more accurate relationship explaining land values might be the relationship between not just expected net cash flow, land value and implied capitalization rate, but also between net cash flow plus borrowings (which is discussed next), and land value and capitalization rate.

The financial criterion: 'could pay'

How much a buyer 'could pay' for farm land refers to the financial feasibility of the investment, whereas the 'should pay' criterion defined a maximum offer price that is consistent with minimum acceptable return on capital. 'Could pay' defines the maximum offer price according to how much capital - equity and debt - is available and can be serviced. The financial feasibility of investment in farm land, at various possible prices for the land, is one of the keys to appraising the land price a particular potential buyer could offer.

In any year the farm family is concerned with generating sufficient cash to meet operating expenses, living expenses, replacement costs, taxes and interest and principal payments. The annual cash surplus after all the annual cash sources have been accounted for and have been met, but before new interest and principal payments, indicates how much extra debt from purchasing the land could be serviced, for various types of loan and terms of loan servicing. To estimate financial feasibility, expected annual cash surplus from production, before new debt, is estimated first. This expected annual cash surplus is the amount available to meet annual interest and principal repayments. For an amortized loan the expected annual cash surplus represents the annuity available to meet the amortization payment (interest and principal). Note here that in using the expected availability of annual cash surplus for servicing extra debt it is valuable to base this on servicing an interest and principal loan - even if interest only debt is involved. This is because by including principal repayments as a component of debt servicing needs, we are building into our financial arrangements the capacity to build equity, instead of relying on 'market luck' to do this as is the case when servicing interest only debt.

For example, 500 hectares of land is under consideration to buy. The expected annual cash surplus expected to be available from all sources and after all cash uses, but before new debt servicing, is \$350,000, though this will be sometimes more, sometimes less. To be on the safe side, say, as financiers are prone to do, that \$300,000 of this cash surplus can be confidently expected to be available in any year to service interest and principal of new debt every year. This sum is a nominal value and is expected to increase at the rate of inflation over time. The debt terms are calculated using

nominal, not real, interest costs. The amount of an amortized loan which can be serviced by this sum is given by the present value of an annuity. With no initial deposit, \$300,000 could service an amortized 15 year loan, at 7 per cent interest, of $\$300,000 \times \text{PV Factor } 9.1079 = \text{around } \2.7m . As a check on this, $\$2.7\text{m} \times \text{Annuity Factor } 15 \text{ years, } 7 \text{ per cent, is } 0.1098$. A debt $\$2,700,000 \times 0.1098 = \$300,000$ annuity of principal and interest. Considering the available own capital, the buyer could offer a price for farm land involving taking on a new debt of \$2.7m and be confident of servicing this debt, most years. When equity capital is available the financial feasibility of an investment is assessed as follows:

Maximum Offer Price = Equity Capital + [Cash Surplus available to service i&P of debt x Present Value of Annuity] The annuity is calculated as: $[(1+i)^n - 1] / [i(1+i)^n]$, where 'i' is interest rate and 'n' is the number of years.

This maximum offer price based on debt servicing capacity is a critically important number as it tells you when to stop bidding!

Is prepared to pay – 'all things considered'

So far we have discussed deriving some values a buyer, in theory, might pay for some land based on sales of similar property, and some values they should pay determined by constraints or thresholds, including a desired return on capital, and values they could pay based on debt servicing ability. All of this information gives a guide as to when to stop bidding in order to have a good chance of earning the required rate of return and, more importantly, to be able to service the debt. In practice these two considerations, current market prices and what can be financed, are the key bits of information in decisions about land value. The potential buyer knows, at the very least, how much they might have to pay, how much they could sensibly pay, and how much not to pay.

When thinking about the value of parcels of farm land and the potential value of the services farm land provides to particular users, a point to note is that every piece of land, every person acquiring the services of such land, and every transaction has many unique characteristics. As discussed earlier, simply observing that a price per hectare has been paid for some land somewhere by somebody has very little information value. Details matter. It is always possible to pay a higher than appears price for some extra land, when that land is being added to an existing holding. Benefits such as proximity and scale are important, especially if the extra land can be farmed without incurring any extra overhead costs including investing in extra plant and equipment or from needing extra permanent labour. In this case, the extra gross margin is the net return to the land and as such can support a higher value for the land than say the value of the land of the existing farm.

When the adjusted return to total capital is calculated over the whole of the larger farm, the average return to total capital can be maintained or may have increased. In this situation, the main criteria for the apparently high price paid for land 'added-on' is to do with cash flow: can the extra debt taken on be confidently serviced year in, year out? If so, the investment can be sound, despite having paid a price for the extra land that appears at first glance to be somewhat 'over the odds'. As ever, how much a buyer is prepared to sensibly pay involves consideration of the whole context of the decision, of all the factors involved, including some that are not easily amenable to definite dollar values, but which are highly important.

What Have We Learned?

Allocating capital and answering ‘what to pay’ for agricultural land is fundamental to the medium-term success and goals of many farm managers and owners. The recent run of good seasons and prices in agriculture, along with macro-economic trends in exchange rates and interest rates, may explain much of the recent exceptional performance in agricultural land values. Whether such gains will be repeated over the next decade remains to be seen. If the buyers’ beliefs consist of concepts such as reversion to the mean or in the rarity of the recent confluence of factors driving farm returns, then chances are ‘this too will pass’. Farm land purchases driven by ‘animal spirits’ beware.

While ‘crystal ball’ gazing is always risky territory, the future land price performance lies with the answer to the two-part question ‘how much of the recent good times is now capitalised into land values?’ and ‘what are the chances of a repeat of the enticing combination of high prices, good seasons and cheap capital over the next 10, 15 or 20 years?’

The paper re-states the main methods, for how to evaluate and answer the question of ‘what to pay’ for farm land. The methods are summarised into four ways of tackling the problem:

- **Comparable sales** in the market: how much we have seen others pay for similar land in similar circumstances to yourself. This may also provide a guide as to what others might be prepared to bid up to.
- How much we **should pay** according to economic criteria where based on the price paid there is a good chance of earning a return on the capital invested that is comparable to the earnings from alternative uses of the (risk-adjusted) capital involved.
- How much we **could pay** according to the cash flow capacity of both the new land plus the existing farm business. Surplus cash flow, including the potential volatility of the cash flow, gives the borrower and lender the understanding of how likely the business is to service the debt (assuming debt is used). This is the most important and ultimate criteria, particularly if the amount of debt is large relative to total farm assets.
- How much we are **prepared to pay** for the land, given the whole situation, the family goals and circumstances, with all things considered, including the economic, finance, risk and the all-important non-pecuniary factors involved in the decision.

The economic and financial criteria methods – what we should and could pay – are also the approaches needed to help us answer how optimistic current buyers are on future prices and yields in agriculture, including to what degree ‘animal spirits’ are alive and well in the current prices being paid for farm land.

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