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# Freight Rates and Competitiveness

Staff Paper
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# FREIGHT RATES AND COMPETITIVENESS

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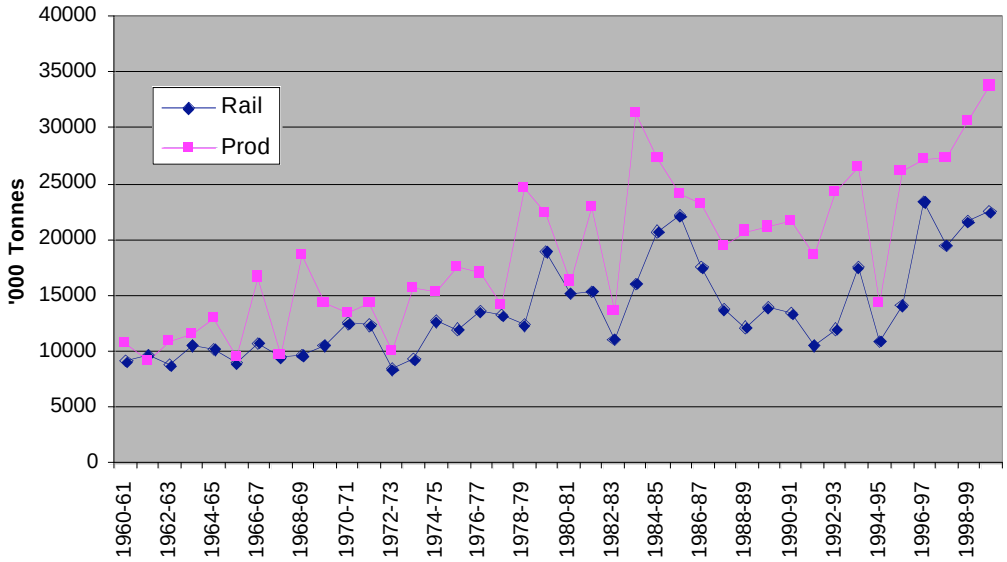
Rail and shipping freight rates have their place in the chain that links grain prices paid by our major customers to farm returns. This paper concentrates on examining the system linking Australian wheat producers and their overseas customers, and in doing so tries to put the place of freight rates into competitive context.

## The Rail System and Rail Freight Rates

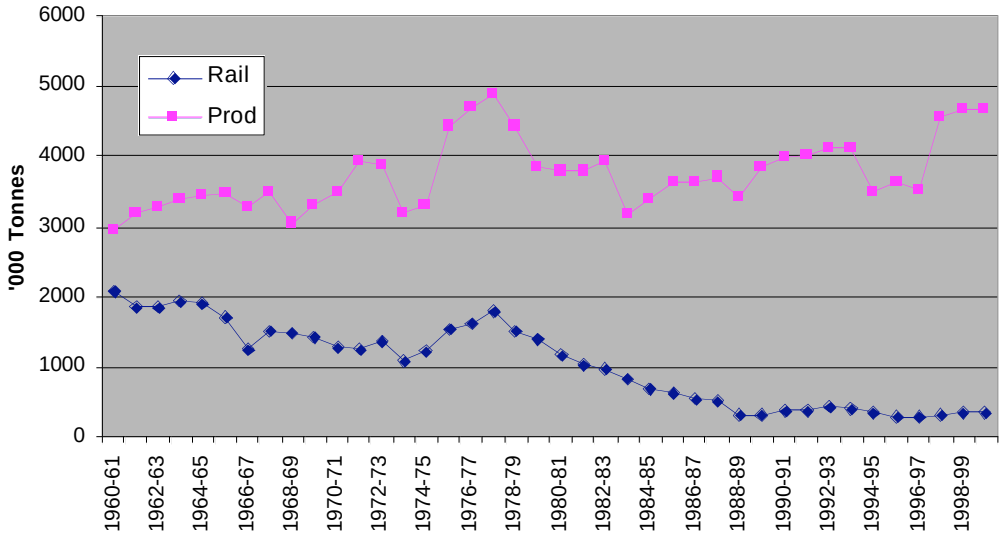
Rail has been, and continues to be, the major mode for transporting the Australian wheat crop to the ports. Figure 1 shows that rail has generally held mode share since the 1970s in the transport of grain. This is also the case with the bulk transport of minerals and coal to the ports, but is not the case with most other commodities. Figure 2 shows that rail carriage of livestock, which used to be substantial, has been taken over largely by road. Trends in the haulage of 'other agriculture', fertiliser, timber, cement and non-bulk goods also show road gaining mode share. But, for grains, rail still seems to be the logical mode.

Figure 1: Australian Production and Rail Carriage of Grain.




Source: Freight Measurement and Modelling, BTRE Report 112, forthcoming.

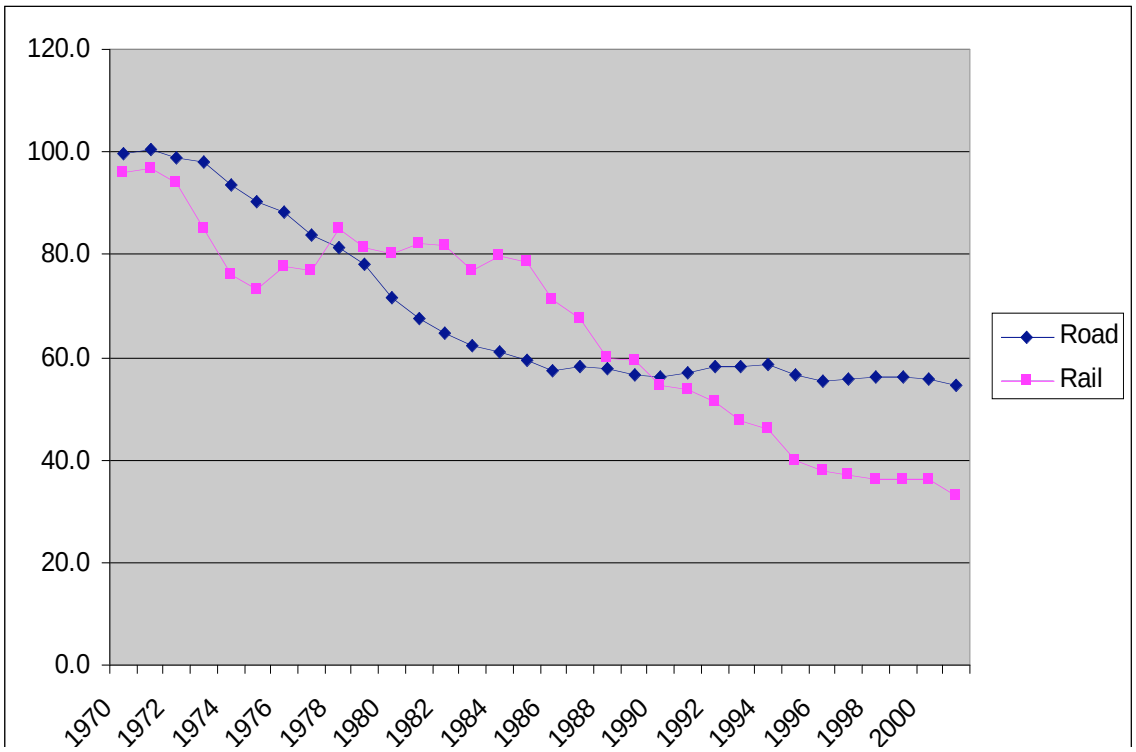
Figure 2: Australian Production and Rail Carriage of Livestock.




Source: Freight Measurement and Modelling, BTRE Report 112, forthcoming

Rail freight rates have undergone a revolution in the last 40 years, matching the same thing happening in road. Figure 3 shows the movement in non-bulk freight rates in the last 40 years. Road rates fell first, with the shift to larger trucks.

Figure 3: Real Non-bulk Road and Rail Freight Rates (index 1965=100)




Source: Freight Rates in Australia, BTRE Information Sheet 19, Canberra, 2002.

But in the mid 1980's, it was rail's turn, with huge system improvements worked through. John Georgiades, then the Manager Strategic Planning with Westrail and now with Edith Cowan University, remembers sitting down with the Traffic Operations Manager to redesign the train operations for the haulage of grain 'without any constraints'. The solution was called the "six-point plan". It involved running dedicated grain trains loaded to the full capacity of the locomotive (full coming down and empty going back), starting in the North of the State where the harvest ripened first. Theoretically it was desirable to run grain trains simultaneously from only 6 locations when previously Westrail had been running grain trains simultaneously from 30 locations. The Operation then moved progressively south, emptying storages in time with the grain harvest. This operation avoided the use of passing loops, eliminated all intermediate stoppages, and achieved turnaround times within the acceptable labour shift requirements - reducing labour costs and overtime payments. Concurrently, with changes in the handling of less than car load and parcels traffic, significant operational changes with staff reductions were achieved: country stations with three or four staff were no longer necessary and a Traffic Officer with a motor vehicle was able to service all the stations within a designated area. Such revolutionary changes brought about sizable reductions in real rail freight rates, allowing Western Australian farmers to remain viable in a competitive international market. But what place do rail freight charges have in the current price chain?

**The Wheat Competitiveness Price Chain**

We can place freight costs within a simplified framework of the price chain linking the cost of wheat in a customer's silo overseas to the farm gate return for wheat.

Simplified frameworks have the benefit of allowing us to orient ourselves to our world. For example, one simple framework that we in southern parts of Australia use is that of the four seasons – summer, autumn, winter and spring. Almost criminal in its simplicity, it is yet a very useful framework for orienting ourselves to our world – "If it's Christmas at the beach, this must be summer".

In this same spirit, and in a very simplified form, an attempt at a representation of the "wheat competitiveness price chain" is given in Table 1.

The figures for the "land-based" components (port charges, rail freight, silo handling, grower road freight costs, and yield per hectare) are for a mythical "average" Australian wheat farm, which, based on the relative split in production between East and West, is probably located somewhere in the middle of the Nullarbor! But the framework works equally well if figures specific to a single farm are input (e.g. yield and grower road freight costs), along with the figures for silo costs, rail costs and port costs from the Australian Wheat Board website corresponding to the grower's local silo.

**Table 1: The Wheat Competitiveness Price Chain**

| | | | |
|---|---|---|---|
| • | Landed OS Customer Price | 164 | US$/t |
| plus | Port Costs | 4 | US$/t |
| plus | Shipping Costs | 10 | US$/t |
| • | **FOB East Coast (World Market) Price in US$** | 150 | US$/t |
| Div by | **US$/$A Exchange Rate** | .76 | US$/$A |
| • | FOB East Coast OS Customer Price in $A | 197 | $A/t |
| less | Pool Costs | 3 | $A/t |
| • | Estimated Pool Returns East Coast | 194 | $A/t |
| less | Port Costs | 11 | $A/t |
| less | Rail Freight Costs | 20 | $A/t |
| less | Up-Country Costs | 13 | $A/t |
| • | Estimated Silo Returns | 150 | $A/t |
| less | Growers Road Delivery Costs | 8 | $A/t |
| • | Farm Gate Returns per tonne | 142 | $A/t |
| times | **Yield per Hectare** | 1.9 | t/ha |
| • | Return per Hectare | 270 | $A/ha |

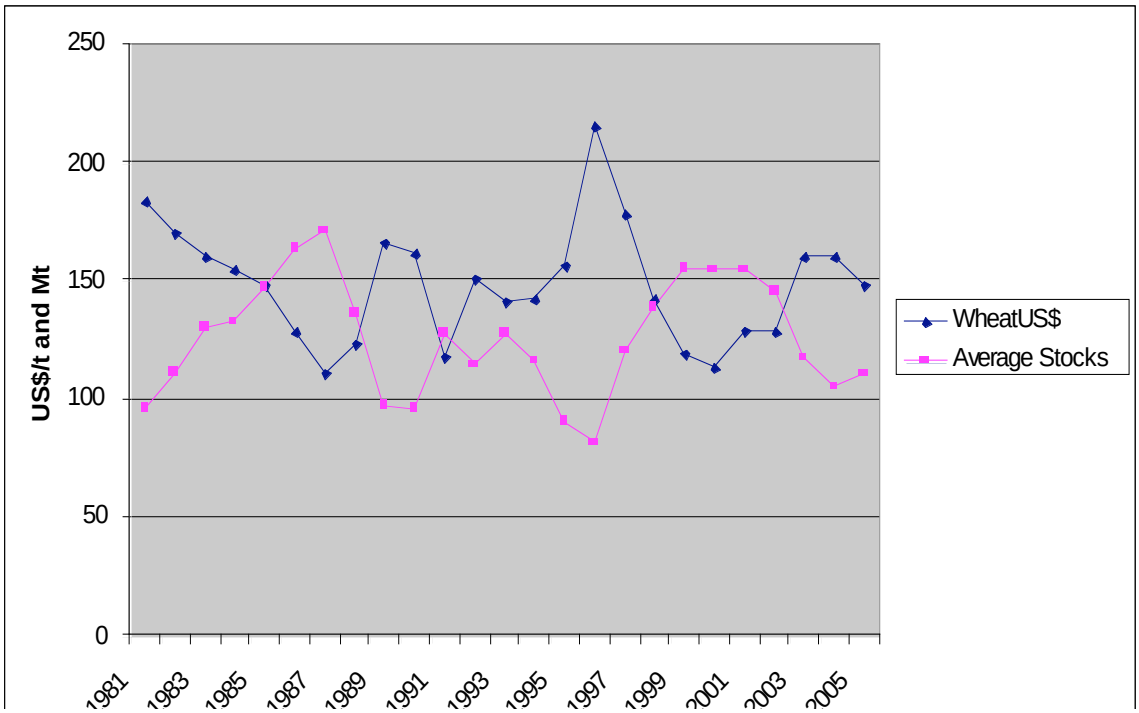
Source: Authors estimates based on data from ABARE, AWB.

## The World Market Price

The starting point for moving around this table is what I have called the 'World Market Price', FOB at the port, in US dollars (assuming zero final pool payments). The *average level* of this world market price for wheat at the various export ports around the world is set by scarcity on the world market. Figure 4 shows the fairly close relationship that exists between the world market price for wheat (in this case represented by the price of hard red wheat at US Gulf Ports in American dollars (US$)), and the average level of world stocks of wheat.

The FOB East Coast Price in US$ is a version of the world price, as much as that for hard red wheat at the gulf ports in the US. The world market price is set at these varying export ports by equilibration, relative to shipping costs. If world bulk sea freight costs doubled to US$20/tonne (as they did recently), the cost to the customer would rise by US$10/tonne, as costs of sourcing grain from any competing exporters would also increase. In this regard, the system is like an old-fashioned scale balance, where the customer is the fulcrum, the lengths of the arms are the transport costs, and the levels of the pans are the world prices. These will differ, but the average of their levels is *the* world price, set by stock scarcity levels. If the length of the arms doubles, what happens is that the customer fulcrum moves up, but the average level of the pans stay in the same place (as set by scarcity). To get to the customer's price from the FOB East Coast version of the world price, you thus add sea freight and port costs to get the customer's landed cost.

Figure 4: World Wheat Prices and Average (world and 2*exporters) Stocks




Source: Author's calculations and ABARE Australian Commodity Statistics 2004.

## The Australian Exchange Rate

Once the world price is set (currently at US$150/t in Table 1), we come to the Australian dollar ($A) exchange rate, which plays a crucial part in determining competitiveness down the chain. But what determines the value of the $A?

The Australian dollar used to be a commodity currency within the US dollar block of currencies. But since the introduction of the Euro in 1999, the $A has joined the ranks of the US dollar *alternative* currencies. Now its value is, for the most part, set by the value of the US currency in terms of a basket of Western currencies – the so-called 'Special Drawing Rights' (SDRs). As Figure 5 shows, there is an inverse relationship between the SDR values of the US and Australian currencies. Figure 6 shows what this means for the bilateral US$/$A exchange rate. When the US dollar depreciates 10 per cent against the basket of Western currencies (the SDR), then the $A rises 20 per cent against the US dollar. The strength of the US$ is what took our currency to 50 cents against the US dollar in 2001, and its subsequent weakness is what took the $A, just over two years later, to 80 cents.

To understand why this relationship holds, we need to consider the fact that the Australian dollar is the fourth most traded currency in the world. This is not due to the volume of our export and imports. To paraphrase Bill Clinton – "It's *not* the economy, stupid".

Figure 5: The $A as a US Dollar Alternative Currency

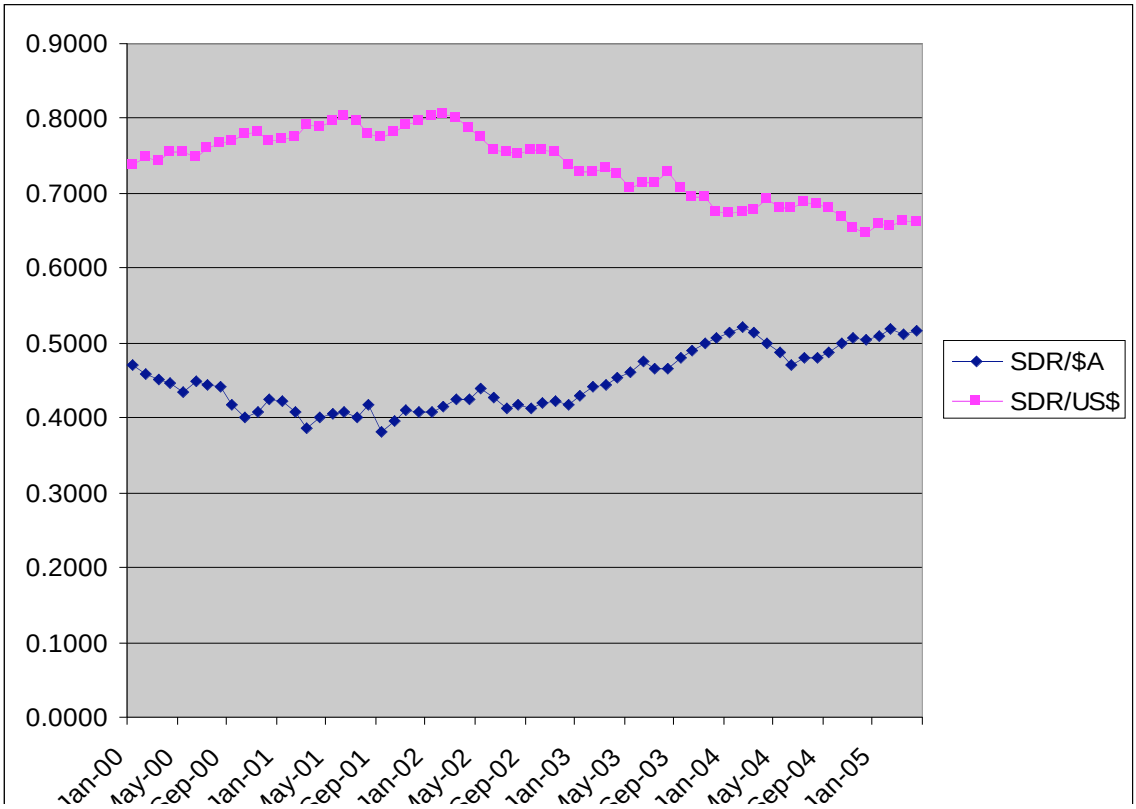
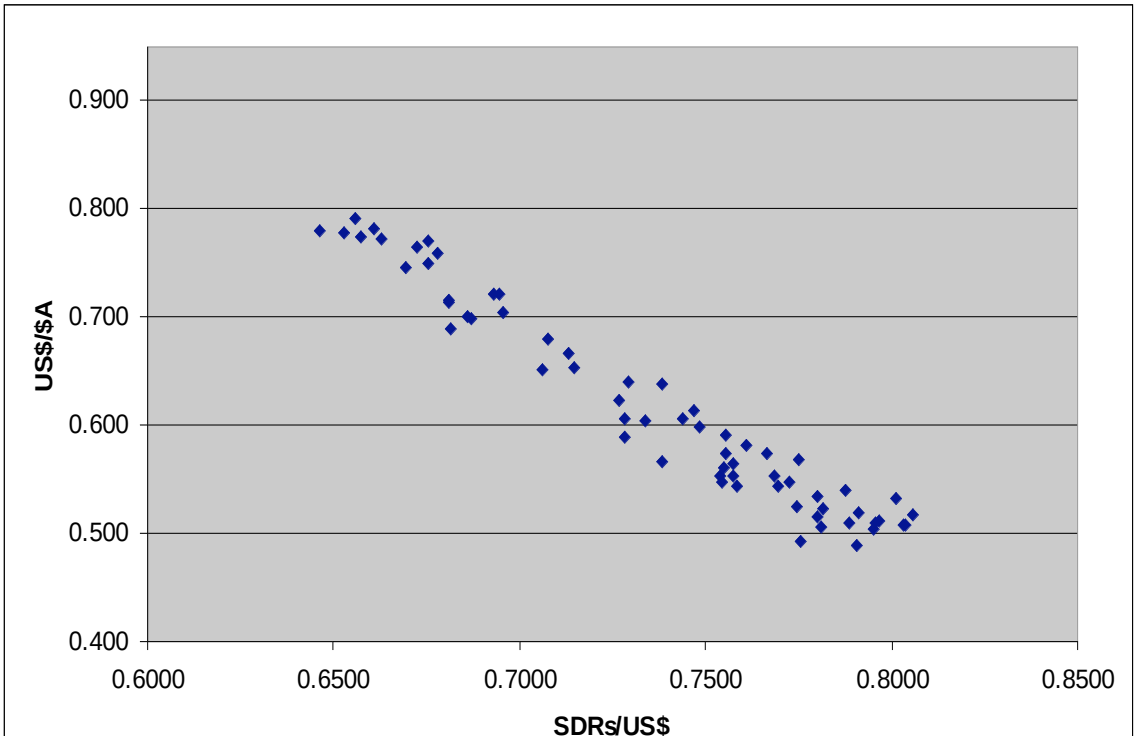



Figure 6: The US$/$A Exchange Rate as a Function of the SDR/US$ Rate



Rather, think of the Australian dollar as a parking station. Cars come in off the street, park in a parking space, and then leave back to the street. There is a constant flow in and out. But this parking station is special - the price of parking spaces rises when more cars are coming in than are leaving. The street is the US$, the cars are money flows, and the price of parking spaces is the value of the $A. When the US$ is depreciating, more money wants to escape the street and comes and parks in the $A, driving up its value, and vice versa. This is the best analogy I can think of, to explain the relationship shown in figures 4 and 5.

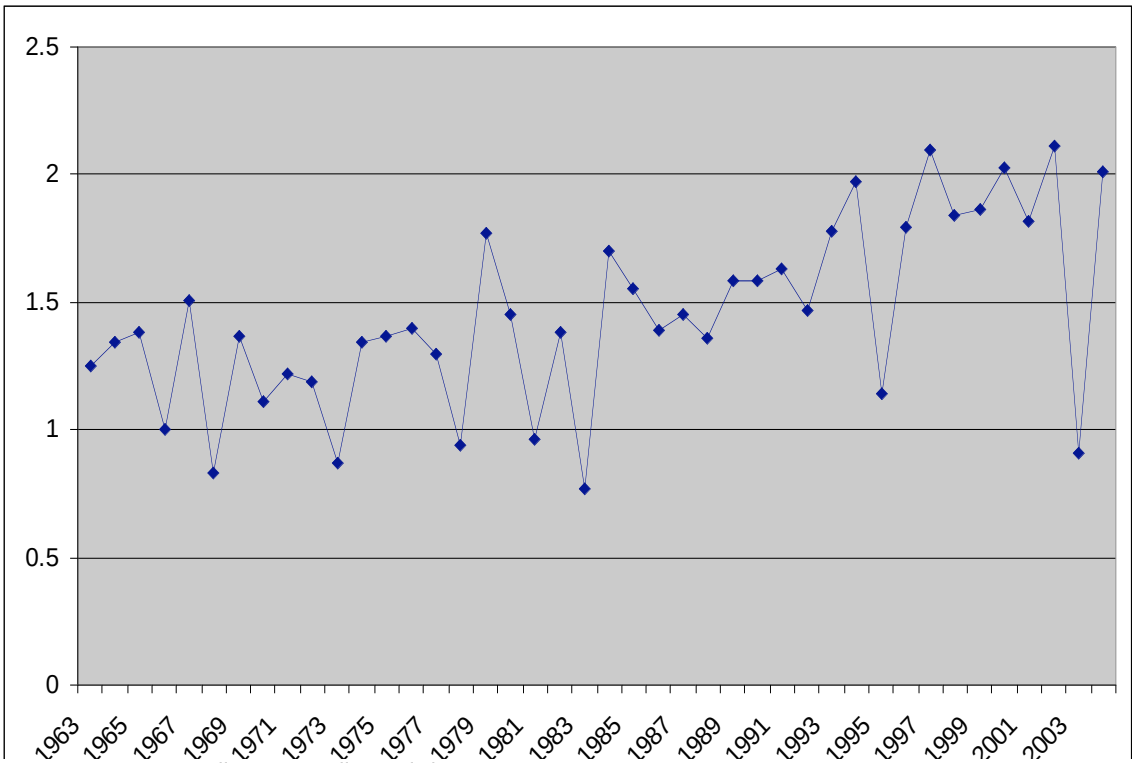
**The Land-Based Elements of the Price Chain**

So once the world price has been set and converted to Australian dollars, we can work backward along the land-based elements of the price chain. And remember, these are figures for the mythical Average Australian Wheat Farm.

Pool costs are about $3 per tonne. Port costs are about $11 per tonne. Rail freight costs are about $20 per tonne. Up-country costs are about $13 per tonne. Grower road haulage costs are about $8 per tonne. At the current world price and current exchange rate, this gives a farm gate price of about $142 per tonne.

The yield is very dependent on the weather, but on trend is about 1.9 tonnes per hectare (see Figure 7). This gives a revenue figure of about $270/ha from which to fund farm costs and farm incomes.

Figure 7: Australian Wheat Yield (t/ha)




Source: ABARE, Australian Commodity Statistics 2004.

**What the Price Chain Tells Us About Competitiveness**

This revenue per hectare figure is one of the primary measures we have of the competitiveness of Australian wheat growing.

Competitiveness, like the revenue figure, is not something that *varies* a lot because of the performance of the land-based part of the chain that Australians control (the farms, the trucks, the railways, the ports).

Rather, the really huge variations in competitiveness come from what I like to call the three Big W's of the grain price chain – which, by and large, Australians don't control:

1) The **W**orld Market (stocks and associated price)
2) The **W**eather ( and associated yields), and
3) The U-**W**es exchange rate (and our associated exchange rate)

As an example of the relative importance of sources of variation in competitiveness, let's take two scenarios, one for the US dollar and one for rail freight rates.

Recently, Newcrest Mining has forecast a further 15 per cent decline in the Trade Weighted value of the US currency (Australian Financial Review, June 11). Much of the devaluation is assumed to be relative to Asian currencies, so let's assume this means a devaluation, relative to the SDR value of the US dollar, of half that (i.e. 7.5 per cent). Let's also assume that this SDR devaluation only results in half that percentage being added to the world price of grain in US$ (the correlation of world stocks is in fact best with the price of wheat in US$ not SDRs). So our world price rises 3.75 per cent and our exchange rate rises 15 per cent, leaving our pool returns down by 10 per cent, and our returns per hectare down by 13 per cent.

In contrast, a scenario that has rail freight rates falling by 7.5 per cent, results in returns per hectare rising about 1 per cent.

Thus in terms of variation in returns, a percentage variation in the US$ gives about 12 times the effect of an equal percentage change in rail freight costs.

And the risks posed by the Big W's don't stop there, as they can all operate in the negative or positive direction at once (e.g. a devaluation of the US$, coupled with rising world stocks in spite of a drought in Australia).

So the Big W's are *the* major sources of fluctuations in our grain competitiveness.

As we've seen, sea freight rate changes (except insofar as we can quarantine the gains from lower shipping rates to ourselves) don't really affect our competitiveness.

As we've also seen, the effects of changes in rail freight rates are very small in comparison to those from the Big W's.

Furthermore, the days of large efficiency gains in rail are probably over, especially as the load-bearing capacities of the tracks do not support the wide-spread introduction of larger wagons (and it is the progressive introduction of larger and more efficient articulated trucks that has been causing freight rate reductions in road). In fact, the concerns now are likely to be over the state of, and functioning of, the branch rail network. The closure of much of the spread-out, low-volume, seasonal network of branch lines and receival points is probably in the railways' interest. And together with investment in storage (at receival points or on-farm) that could reduce peaks and troughs for the haulage of grain, a rationalization of the branch rail network is probably going to be in the interests of the competitiveness of the Australian wheat industry, providing lower rail operation and infrastructure costs. Limited funds can be concentrated on those lines and handling facilities where they can do the most good. It will not be a case of backing winners, but rather a case of backing survivors. However, whether any resulting lower rail rates would offset the additional costs to growers and governments (Federal, State and especially local) of having heavy grain trucks traveling longer distances on the rural road network is another question (as, indeed, is that of who should pay for supporting the two networks). There is also the issue of the practicality of providing the trucks and drivers for what is a very sharp but temporary seasonal demand, should the branch rail network not be sensibly supported.

In a very basic way, the problem for the Wheat Industry is growth. Look again at Figure 1 where it can be seen that Australian grain production has tripled since 1960. Look again at Figure 7, which still shows a clear long-term upward trend in wheat yield.

Now there are three types of growth that pose problems for infrastructure provision:

(1) Sudden or unexpected growth causing bottlenecks on networks
(2) Under-funded growth causing chronic constraints on networks, and
(3) Growth in confined spaces causing congestion on networks

Grain transport certainly has its share of the first type of growth. Harvests, by their nature, are sudden, even if the unexpected bumper harvests do not happen often enough.

But the intractable problems of the grain transport system are mainly of the second type. Increasingly there will be a premium on collaboration of industry

players and governments, not so much to force down freight rates, but rather to get the incentives right, and to foster imaginative solutions to the problems that growth and funding pose for keeping the grain transport infrastructure functioning efficiently and economically. The problem, however, is that fragmentation of players in the industry is actually making this more difficult.

**The Wheat Competitiveness Price Chain in the Long Run**

Over the long run, such efforts to improve the efficiency of the land-based elements of the competitiveness price chain (the farms, the trucks, the railways and the ports) are vital.

The most important thing that Figure 4 (on the World Wheat Market) tells us, is *not* about the relationship between fluctuations in world wheat prices and wheat stocks. Rather, it is that the trend in the *nominal* price of wheat in US dollars, at the midpoint of the stock cycle, is flat - at about US$135/t. It was US$135/t in the early 1980s and it still is $US135/t in 2005, a quarter of a century later! In the meantime, the US Consumer Price Index has more than doubled (2.4 times).

What that says is that, for Australia, the rest of the global wheat industry is very much a moving target, and sends an unrelenting negative pressure down the price chain.

One answer to this, as the 'Single Vision' research of the Grains Council suggests, is to move away from the production of bulk wheat for export, towards differentiated grains, to other specialty crops, or to feeding more grain to livestock and marketing dead animals instead of grain.

But to the extent that we do continue to produce bulk wheat for export, the message is clear - we must continue to try to make efficiency gains in every component of the land-based price chain that we control, simply in order to keep up. So the trend gains that we can make in the land-based components are very important.

However, at the same time, we also need to remember that the land-based components under our control are only part of a much larger price chain, key components of which operate quite independently of any Australian control and deliver large fluctuations in competitive returns to Australian wheat farmers.

As one farmer I saw interviewed lately said, "Why would you bother to buy lottery tickets, when you can plant a crop?"

That's probably an old joke to those in the industry. But looking at the vagaries of the grain competitiveness price chain I've outlined, dominated as it is by the 3 Big W's (otherwise known as the grain trader, the currency trader and the Big Fella), you can see why the joke gets re-treaded.

**Summary**

By applying our simple framework, we've learned:

- That the price of wheat in US$ FOB our ports is indeed a representative of the world price;
- That generally, the shipping costs going upward in the price chain are 'cost-plus' to get the customer's price;
- That the world price of wheat in US$ fluctuates with world stock levels, but has a flat trend in nominal terms;
- That thus it transmits down the price chain, both major shorter-term fluctuations in industry profitability, as well as unrelenting longer-term price pressures on the wheat industry;
- That the solution to this longer-term pressure is either to diversify away from bulk wheat exports, or to continue to make trend efficiency gains in all of the land-based components of the price chain;
- That the Australian dollar is a parking station for money coming out of the US$, and thus the value of our currency varies inversely with that of the US dollar in terms of a basket of Western currencies; and finally,
- That simple frameworks can be powerful tools for orienting ourselves in the real world, whether it be to the four seasons, or to the competitive pressures coming down the wheat competitiveness price chain toward the Australian Wheat Industry.