RITSO SOCIETY

Trends in Tradable Irrigation Shares

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Crighton Anderson

Property & Infrastructure

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1.0 INTRODUCTION

1. We, Crighton Anderson have been commissioned by the Ritso Society to provide an analysis of the price trends in tradable irrigation shares. We understand this is to be provided to potential investors in the proposed Central Plains Irrigation scheme.

2. We have examined and compared the price trends in tradable irrigation shares in the wider Canterbury region. There are now a significant number of schemes in which shares are traded, these include:

- Waimakariri
- Ashburton / Lyndhurst
- Mayfield / Hinds
- Valetta
- Opuha (South Canterbury Farmers Irrigation Society)
- Lower Waitaki
- Amuri
- Blind River

3. We note, however, that some of these schemes have had little open market trading of shares and the prices are simply the original cost of the shares established by the scheme itself.

4. Information has been gathered on all of these except Valetta and Lower Waitaki. The Valetta scheme is the smallest of the Rangitata Diversion Race schemes and no real trades have occurred (the only movement of shares was the result of an irrigator taking shares to another property). Unfortunately it has not been possible to obtain information on the Lower Waitaki scheme as key people have been unavailable.

2.0 KEY DIFFERENCES IN SCHEMES

5. Key differences between the schemes can be summarised as follows:

- Total water availability;
- Water availability rate;
- Scheme reliability; and
- Annual water charges.

2.1 TOTAL WATER AVAILABILITY

6. The schemes range in total water availability per year from 4,000 m^3 to 12,000 m^3 per hectare. This appears to have a significant effect on the value of shares.

2.2 WATER AVAILABILITY RATE

7. The rate at which water can be applied has been compared by assessing the respective return periods (at a 50mm per application spray rate) of each scheme for which data is available. The return period theoretically varies between 10 and 14 days for the majority of schemes. In general terms, a scheme with a 10 day return period will provide irrigation for the most intensive land uses while a 13-14 day return period will tend to limit the intensity of land use depending on soil characteristics in conjunction with evapo-transpiration rates.

2.3 SCHEME RELIABILITY

8. A key factor which is difficult to analyse is the reliability of the scheme. Reliability can be as a result of the design of the works and/or a factor of the water availability and any constraints placed on it. This affects the water's value to the irrigator. An intensive water user is very reliant on having the water when they need it; particularly in the case of the cropping farmer where there will be certain critical periods where water must be available for the crop yields to be optimal and any unreliability can have a significant economic impact. Unfortunately, meaningful information on the imposition of water restrictions is scarce and, at this point in time, we have been unable to gather sufficient data to make any meaningful analysis in this report.

2.4 ANNUAL WATER CHARGES

9. Annual Water charges vary from $20 to $92 per hectare per annum across the schemes. Higher rates tend to include repayment of loans and will fall over time.

3.0 OTHER KEY CONSIDERATIONS

3.1 EFFICIENCY OF WATER USE

10. Older irrigation schemes were developed for a border dyke irrigation system. Due to the flooding method of application this system makes relatively inefficient use of the water, although it is a low cost method of application. Spray irrigation on the other hand, allows for far greater flexibility in the quantity of water applied with a consequent increase in the efficiency of water usage. .The high pressure spray systems will use more energy in the application process but this requirement is being reduced in the more modern low pressure systems. As the value of irrigation water increases there is a growing trend for irrigators to convert from border dyke to spray system (or combinations of) to increase efficiency of water use. This change is allowing greater proportions of the areas involved in those schemes to be effectively irrigated.

3.2 LAND USE CHANGE

11. Irrigation allows changes in land use as demonstrated by the number of dairy conversions and the development of the more intensive cropping systems where irrigation water is available. The change to a higher and better economic use of the land is a necessary consequence of the development of an irrigation scheme as without this the full economic benefits of the work will not filter through to the district and national economies.

3.3 LAND VALUE

12. There is a discernable relationship between the value of the shares and the value of irrigated and non-irrigated land. Irrigated land has a significantly higher value than non-irrigated land with this increment in value attributable to increased returns from irrigated land. The irrigating farmer's first requirement is that this additional profit should cover all the additional costs of irrigation. It is also expected to show an adequate return to the capital invested on farm. Furthermore, there is off farm investment required for these irrigation schemes, and the additional returns must also show an adequate return on this expenditure. It is this latter cost that initially sets the cost of the shares.

13. Over time, inflation and improved technology has, and is, expected to continue to increase the amount of the additional returns due to irrigation. In many instances this increase is significantly more than the amount required to provide the required return on the initial cost of the share. This additional return will create additional value to the shares.

14. Historically, the value of the shares in an irrigation scheme has been limited by the alternative cost of securing ground water for irrigation, which was readily available by applying for the necessary consents. With the consent in hand, the landowner then developed his own water source with no charge for the water itself.

15. Historicallly the majority of the additional value created by profits over and above the cost of servicing the access to the water and the on-farm costs, accrued to the land. But if, in the future, access to ground water is not freely available to virtually any land owner on the Canterbury plain this value will accrue to the '"right" to the water and for the shareholders in an irrigation scheme, this will likely accrue to the value of the shares. There is not sufficient market evidence yet available to determine how much the value of the"right" to water may eventually be.

3.4 UNDERLYING ECONOMICS

16. The underlying economics suggest that the price of the shares will reflect the ongoing costs and the water value. The water value in turn will be the minimum of the "marginal cost of water" and the "marginal value of water".

17. The "marginal cost of water" is the cost of the next cheapest available supply of water in the area for which the shares are available. If the scheme is not fully subscribed, then this will be the cost of the scheme. If it is fully subscribed it will reflect the next cheapest alternative to the scheme. In some areas this is the cost of bore water, in others the cost of new schemes.

18. The "marginal value of water" is the value obtained by the irrigator from the last unit of water used. This will depend on the use to which the water is being applied. Where an irrigator has a limited amount of water, they will apply it to the crops for which they receive most value. Where there is an efficient market for the water shares, the trades will reflect the water being applied to the areas where it can result in the highest value.

19. At the point of optimal irrigation, the marginal cost of water will equal the marginal value of water. This is because if the cost is lower than the value there is value to be gained from further irrigating. Thus, provided a scheme does not have a total cost in excess of the best value use of the water, the shares in the scheme will rise in value until they reflect that best value use.

4.0 TOTAL SCHEME COSTS AND ANALYSIS

4.1 ANALYSIS

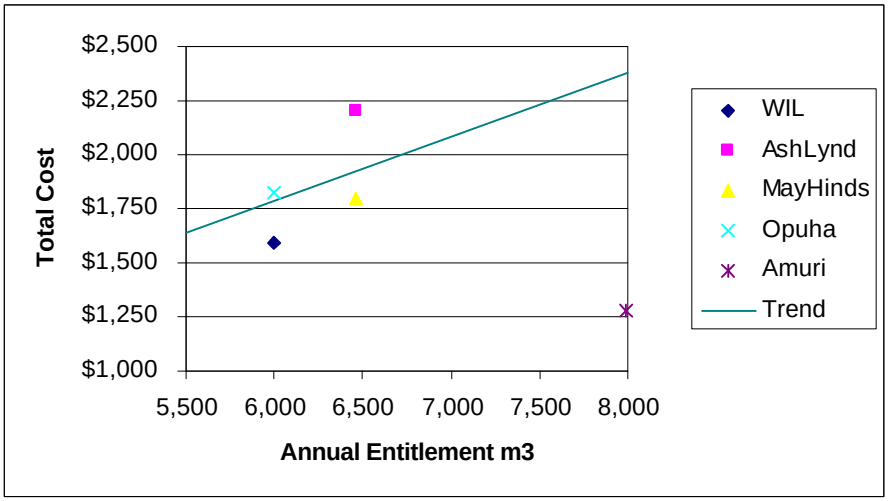
20. To compare total scheme costs, annual water charges have been capitalised at an assumed cost of capital of 10%. Table 1 summarises the total costs and water entitlements for each of the schemes considered. The reliability column gives an estimated score out of 10, where 10 is completely reliable.

Table 1. Cost and Entitlement Summary

Scheme	Price /ha	Annual Charge	Capitalised	Total Cost	Annual Entitlement	Return Period	Reliability
WIL	$1,000	$59	$590	$1,590	6,000 m3	12.8 days	7.0
AshLynd	$2,000	$20	$200	$2,200	6,458 m3	14.1 days	7.0
MayHinds	$1,600	$20	$200	$1,800	6,458 m3	14.1 days	7.0
Opuha	$1,250	$92	$570	$1,820	6,000 m3	14.0 days	9.0
Amuri	$600	$68	$680	$1,280	7,983 m3	9.6 days	8.5
Lower Waitaki	$1	$20	$201	$202	n.a.	5.8 days	10.0
BRIL	$550	n.a.	$1,650	$2,200	4,198 m3	43.5 days	n.a.

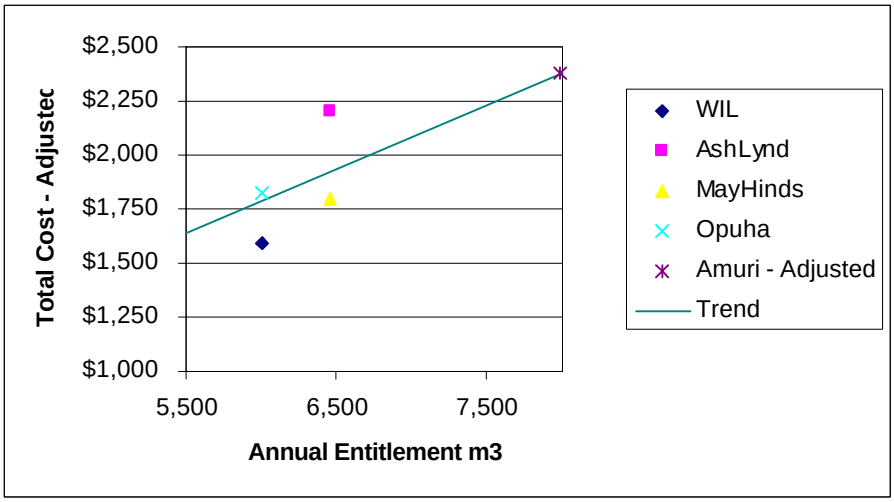
21. The following graph shows the relationship between annual water entitlement and total cost. Note that Lower Waitaki and Blind River have been excluded. Lower Waitaki shares are not tradable and Blind River is a smaller scheme in Marlborough utilised for viticulture purposes. A simplistic expected trend line (indicated by the trend line in the graph) has been calculated from the four schemes which have been traded. This trend equates to around 30 cents per m3 per hectare per annum. However, given the limited data, this is not statistically significant.

Figure 1. Entitlement Cost Relationship Graph



22. The Amuri scheme is still under subscribed and the share price is still only reflective of the cost of the scheme rather than the value of the water. While the trend line does not have sufficient predictive power to extrapolate to Amuri, the share price at which this scheme would be consistent with the trend is $1,700 (resulting in a total cost of $2,380) as shown in the following graph:

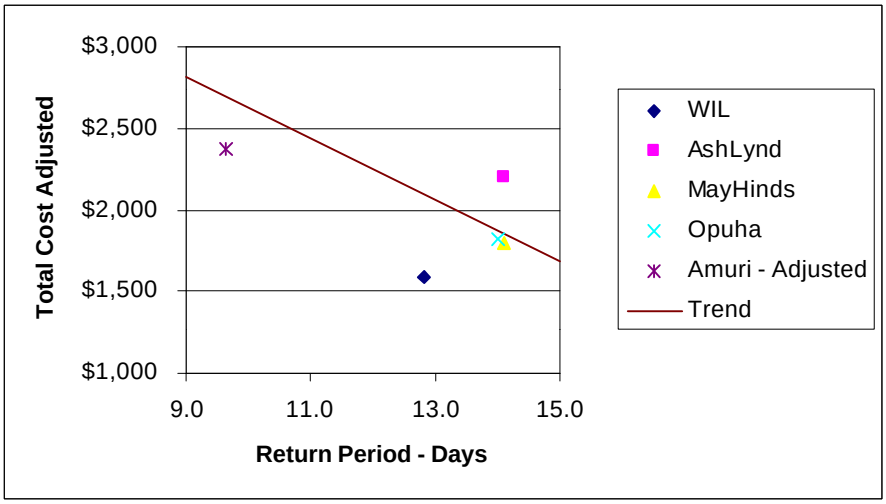
Figure 2. Entitlement Cost Relationship Graph – Adjusted



23. This relationship between cost and annual entitlement would be affected by all the other factors that determine the economic value of a land use – the soil characteristics, climate (including rainfall) markets etc. For example, the Ashburton Lyndhurst scheme has exactly the same characteristics as the Mayfield Hinds scheme but the water shares have quite different value.

24. A similar relationship could be expected between total cost and the theoretical return period, where it would be expected that the total cost should decline as the return period increased. However, this relationship is not clear as demonstrated in the following graph where there is significant variance from the expected trend line.

Figure 3. Return Period Cost Relationship Graph



25. Note that the Amuri scheme is included here at the value suggested by the total water – cost relationship, but was not used to calculate the expected trend. This relationship equates to a value for the daily maximum irrigation of $50 per m^3 per day.

4.2 SUMMARY

26. Analysis of the total cost and water entitlements for the irrigation schemes considered in this analysis provide an expected trend line (for the relationship between costs and water entitlements) that is less reliable than we would require for any meaningful extrapolation. However, there does appear to be a relationship between the share price and the annual entitlement.

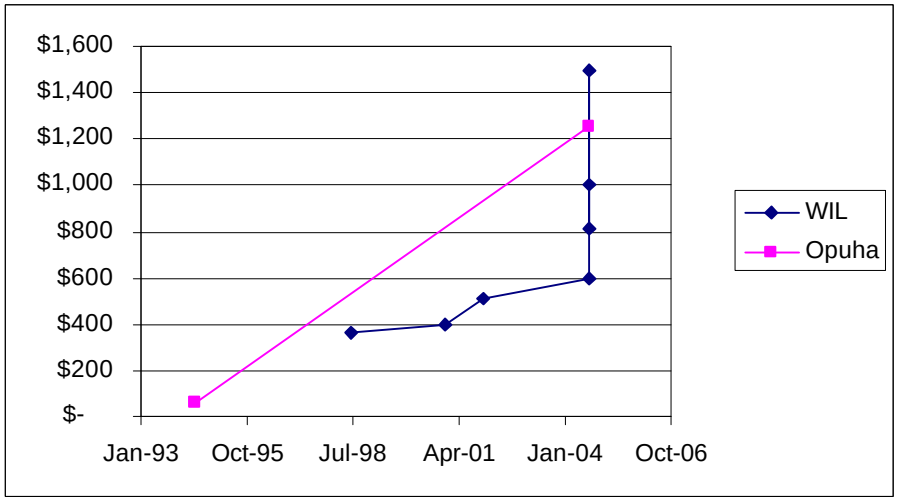
27. The market does appear to be demonstrating that a key value driver in an irrigation scheme is the water entitlement; in terms of annual volume. This follows what could be expected from the underlying economics, but it is only recently that separately identifiable values can be observed for irrigation shares. The market is quite immature, but as supply of irrigation water is taken up by increased demand, which has been occurring now for a number of years, we would expect this market to mature relatively quickly. This is discussed further in the next section.

5.0 TRENDS IN PRICES

5.1 ANALYSIS

28. Only two schemes have much in the way of pricing history, these are Waimakariri and Opuha. The following graph shows the trends in prices for these two schemes:

Figure 4. Share Price Trends



29. Early prices reflect the schemes initial offerings and are indicative of the scheme's cost. Over time, as the scheme becomes fully utilised, this moves up to the cost of the next best irrigation scheme. As all potential irrigation schemes are utilised the price will move to the value that the water has to users – the economic benefit that can be achieved with the water – and will move away from the initial cost based pricing.

6.0 CONCLUSION

30. Unless cheaper irrigation schemes can be identified or the economic uses of the water falls below the cost, share prices of irrigation schemes are unlikely to fall below original offer prices (assuming that these are based on costs). Once the scheme is fully subscribed, we would expect the share price to begin to rise, firstly to the cost of other available schemes, and in the long run to the value of the best possible use of the water in the region being served. Therefore, there is a low risk associated with ownership of water scheme shares.