

What is a real value of water used for irrigation?

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WICKED PROBLEM: WHAT IS A FAIR PRICE FOR WATER?

This paper outlines how water-pricing and water-allocation models can be integrated to provide a better understanding of the true value of water used for irrigation. The problem is considered in the context of the Goulburn-Murray irrigation district, where significant infrastructural changes are being implemented with the objective of increasing the efficiency of water use in the region and increasing the amount of water allocated for environment.

The over-allocation of water in the Murray-Darling basin has had a devastating impact on the environment in southeastern Australia. The number of entitlements to a share of water resources in the region has been capped, and the Federal Government is embarking on a large-scale buy-back of entitlements to restore environmental flows. The policy challenge for Australian governments, both state and federal, is how to restore environmental flows to stressed river systems while maintaining the economic and social benefits of irrigated agriculture in the region. In response to this challenge, a market where water allocations can be traded has been developed to allow water to flow to its highest value use.

A water entitlement is a right to a share of a consumptive pool of water. Water is allocated to an entitlement based on the amount of water currently available and forecasts of future water availability, based on projected rainfall and inflows into storages. Trading a water allocation means buying or selling water that is available for use in the current or subsequent season. Trading a water entitlement is buying or selling the right to receive water in future seasons. This paper focuses on water allocation trades for the northern Victorian regulated water systems.

Tools

As the market matures further and policy changes diminish, it will be possible to introduce new instruments to manage the risk. A theoretical framework in which derivatives based on the price of temporary water allocations was developed by Cui & Schreider (2009) and Schreider (2009). Derivatives will allow entitlement holders to manage the risk of low seasonal water allocations and the high prices that can result for the water that is allocated. The introduction of a derivative market, where lenders can hedge their exposure to the price of water, may open up new sources of funding for water entitlement holders. The reduced risk should also reduce the risk premium paid for the funding. This can provide further incremental gains to the efficiency of water use.

The policy framework that underpins the market and the potential for policy-induced price distortions will also be discussed. In particular, the benefits of a policy known as “carryover” will be covered. Carryover was initially introduced in March 2007 as an emergency drought response. The policy allowed entitlement holders to carry over water allocated in the current season for use in the subsequent season, subject to certain conditions. Before the introduction of carryover, water lost value as the end of the season approached, since any rights to the use of the water were lost at the end of the season. A chart of the prices paid for water under this policy regime shows that a megalitre of water available at the start of an irrigation season was worth more than a megalitre of water available at the end of an irrigation season. Thus, water was unlikely to be used in an optimal fashion late in the season. The positive jump in the water price between seasons caused by this trade-distorting policy also presented problems in modelling the price of water and the potential for the introduction of risk management tools, specifically derivatives based on the price

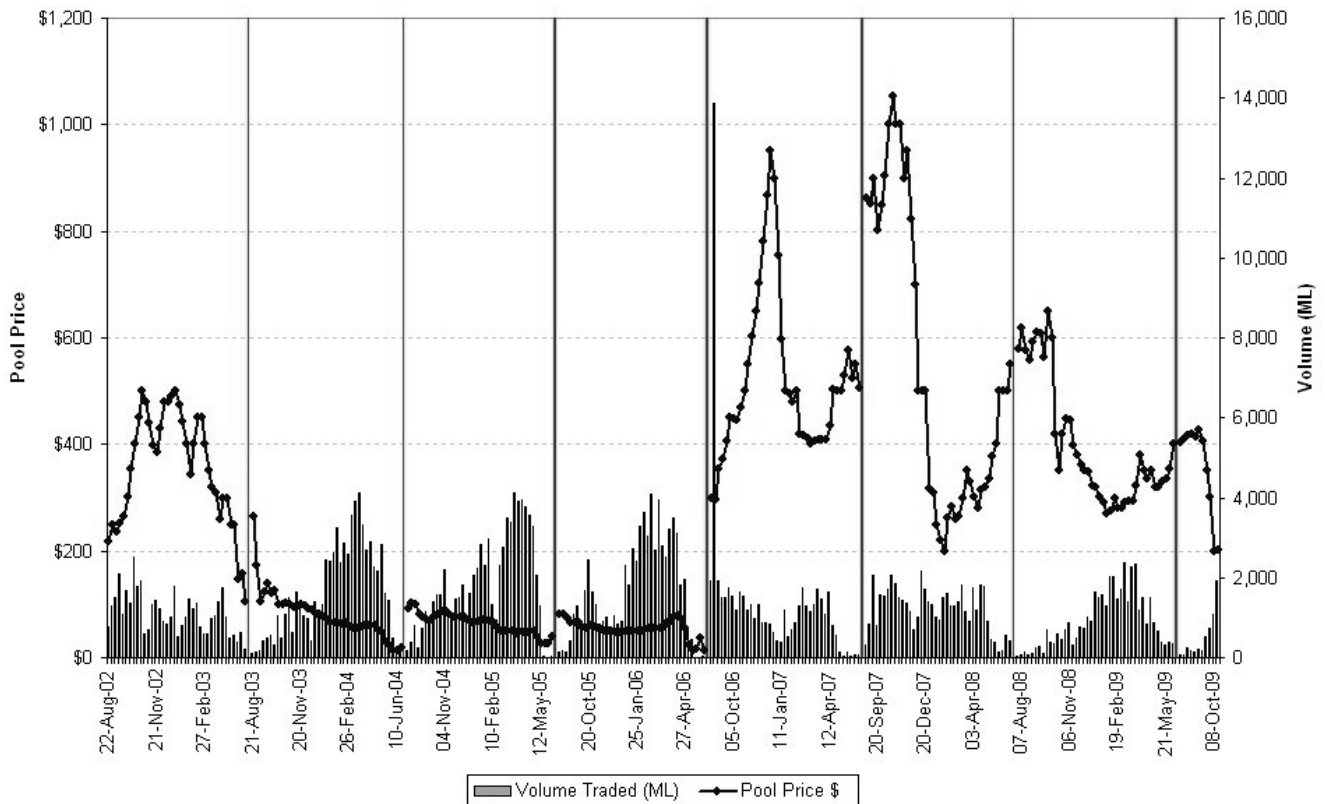


Fig. 1 Volumes of water traded and prices for seven seasons in the Goulburn irrigation system.

of water, was complicated. Figure 1 shows volumes of water traded and prices for 7 seasons in the Goulburn irrigation system.

Key lessons

By itself, carryover is an important risk management tool for entitlement holders and encourages the efficient use of water. However, future climate variability will still produce severe droughts, and to be fully effective it must be possible for water kept in storage by entitlement holders under the carryover provisions to be delivered to farms at precisely the time when water is scarcest. To ensure this is possible, in the 2010–2011 irrigation season a new reserve system will be introduced in the Goulburn-Murray Irrigation District that will allow the distribution system to be operated throughout the irrigation season, even under the most brutal of climate change scenarios. This will further enhance the use of carryover as a risk management tool and further reduce the policy-induced price distortion.

The market for temporary water allocations in the Northern Victoria regulated river system has operated for over two decades. Historically, the right to own, use and trade water in Australia was linked to the ownership of land. However, on 1 July 2007 land titles and water entitlements were unbundled and water entitlements can be held without any association to land. This is an important step in establishing a true market price for water in the region, as it frees the water resource from the region and allows it to move to other regions that place a greater value on it. It also allows a water entitlement to be mortgaged separately from a land title, something that was not possible before unbundling.

The infrastructure improvements being constructed in the region include a network of pipes that will be installed to form a water grid. This will open up opportunities for trade between regions that are currently constrained by geographic features, and reduce price disparities across regions. Increased opportunities for trade will deepen the existing market and add liquidity. The deeper and

more liquid a market becomes, the more accurate the price signals it produces. Increasing the opportunities for trade should result in a more accurate pricing of a megalitre of water.

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