Submission on the Productivity Commission Draft Research Report, 'Market Mechanisms for Recovering Water in the Murray-Darling Basin' (dated December 2009)

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21 January 2010

1: Summary

This is an excellent Draft Report, with much to commend.

For the recovery of water in the Murray-Darling Basin, the Commission prefers voluntary sales by individual entitlement-holders, through markets or market-like mechanisms. Especially effective is section 6.2 on the huge and hugely-wasteful infrastructure upgrades.

However, I believe that the final Report could be somewhat improved by a further consideration of the costs and benefits of private collective action, relative to those of private atomistic actions; and this for two reasons.

The most important motivation for further consideration is that private collective action is central to the political economy of public policy. There is some danger that the Commission's reliance on atomistic markets will seem short-sighted, in that broader context.

Also, some potentially-efficient private collective sales may not occur, for reasons that the Commission neglects to discuss.

As to the first: the Commission dismisses (correctly, in my view) the direct relevance of 'pecuniary externalities' for the efficiency of the allocation of resources under atomistic trading: pecuniary externalities, in themselves, pose no threat to economic efficiency. But the Draft does not take full account of the likelihood that pecuniary externalities will trigger defensive political action on the part of those harmed; that is, that pecuniary externalities pose an indirect threat to efficiency.

The main lesson of the field of economics called Public Choice is that analyses of economic efficiency are at best incomplete and at worst incorrect, if they ignore rent-seeking and rent-protection. In this context, the Commission has too hastily dismissed the significance of 'pecuniary externalities'. The 'Swiss cheese' pattern of purchases, with which the Commission is comfortable, may prove to be a more expensive and difficult starting point for the negotiations of a Basin Plan, than would be a geographically more concentrated pattern, including one in which some districts are closed to irrigation. This is a difficult issue to resolve *a priori*, but is worth considering.

Thus, there may be good political-economy reasons for government to encourage or at least facilitate the collective sale of water, and not to rely solely and passively on atomistic decisions to sell water. It is worth considered if some degree of targeting or collective purchasing may assist in arriving at a Basin Plan which is acceptable politically, socially and economically. The yet-to-be-negotiated Basin Plan seems to be a more important policy question, than is the short-term issue on which are focussed the Draft's discussions of the virtues of well-regulated but atomistic markets.

Other than through 'political failure', the Draft deals with two ways in which atomistic markets may 'fail': externalities, like salinity; economies of scale (or non-convexities, more generally). However, there is a further source of inefficiency of atomistic trading, which is not discussed in the Draft. It involves the interaction of specific assignments of property rights and their associated differential transaction costs. If rights have not been assigned to the parties who value them most highly, then transaction costs may prevent the rights from being traded into the hands of those who do value them most highly.

It is this, rather than negative externalities or positive economies of scale, which explains why the over-allocation of consumptive water rights leads to persistent inefficiencies in the use of water, despite the advent of water markets and the regulation of externalities.

Section 2 outlines a set of central propositions for the Commission, about the virtues of atomistic markets, and the case against targeting of purchases. This leads to further discussion of two aspects of collective action, as opposed to individual action: firstly, how 'political markets' operate (section 3); and how ordinary markets can fail to place an asset into the hand of the party who values it most highly; and, in particular, why collective offerings may not occur in all cases in which they have efficiency advantages (section 4). Section 5 contains minor comments, including on the Draft's discussion of exit or termination fees.

2: Markets and targeting

The Draft relies heavily on a small set of general propositions about targets and instruments:

1. Programs should have clearly-stated, non-conflicting objectives, preferably in a hierarchy, or given weights.
   --The Commission advocates an over-arching objective of improving the welfare of the Australian community.
2. Instruments should be assigned according to their comparative advantages with respect to targets.
   --In the language of the Commission: use a 'direct' mechanism to achieve a specific goal.
3. Using one instrument to pursue multiple objectives can lead to inefficiencies.
4. Pursuing one objective with multiple instruments can also lead to inefficiencies.

In addition, the Draft puts the Commission's usual emphasis on transparency and accountability.

The central argument in the Draft is that it is difficult, even impossible to improve on the efficiency of the outcomes of atomistic trading in the water market, once an appropriate regulatory framework has been put in place to deal with non-pecuniary externalities. In particular, the Commission deprecates any

efforts to target purchases of water to compensate for salinity and the like (or, indeed, to address social and community issues). In addition, the Commission asserts that pecuniary externalities do not pose a threat to the proposition that atomistic sales will lead to economic efficiency.

Consequently, the Commission does not support the cases for targeting areas for rationalisation, nor for government encouragement of group sales: 'the market' will suffice.

Given the appropriate framework to regulate externalities, then, the Commission can see no good reason for government to intervene in the market for water, other than to buy for its purposes from those sources that offer the lowest delivered cost (whether through various forms of tendering or by investment in works).

This is the burden of the argument in the sub-section entitled 'The Restoring the Balance program should not be used to achieve related objectives' (pp. xxvii ff), and it pervades the Draft: all that is required are good regulation and atomistic trading—with the latter then setting the prices against which all other forms of water-recovery are to be judged.

Targeting and collective sales

In 4 below, I outline the case against the unconditional belief in the *ex-post* efficiency of atomistic markets. But first I want to suggest that the Commission is not fully convincing in rebutting two counter-arguments, those in favour of:

- targeting for rationalisation;
- governmental encouragement of collective sales (pp. 177-183).

The correct claim is made that irrigation could continue on properties or districts that have sold or alienated their water entitlements but not their rights to and infrastructure for delivery of irrigation water (pp. 180-181). But this is not an argument against targeting, but against ineffective targeting, if there is to be targeting for rationalisation.

The second set of arguments against targeting, raised by the Commission, is that "...any strategy of 'picking winners' in irrigated agriculture is likely to suffer from information problems for the Australian Government and may be undermined by absence of community support" (p. 181).

As to information, the Commission approvingly quote Young and McColl that "...the market place may well be such a powerful targetor that there is little advantage in attempting to develop a formal targeting process" (p. 183).

The claim that markets will solve the information problem, if there is a problem, is supported by the Commission's conclusion about the adequacy of private motivation for collective or group sales: "The irrigators and infrastructure operators already have a commercial incentive to submit group proposals..." (p. 177). This argument stands or falls on the validity of the general proposition, stated above, about the efficiency of well-regulated individual decisions to sell water entitlements.

However, this proposition ignores a considerable literature on what is called 'the hold-out problem' (sometimes called 'tragedy of the anti-commons').

In some circumstances, there may be more value in an assembly of assets into a parcel, than there is in the sum of the values of the individual components, when considered separately. In particular, the separately-owned assets may be complementary inputs into some form of production that requires aggregation of the individual assets. An entrepreneur may seek to buy all of the relevant elements, in order to make the more productive assembly. Unfortunately, such open-market efforts at aggregation may fail, because each individual owner has an incentive to 'hold out' in the hope of capturing a disproportionate share of the additional value created by assembly.

If some encouragement of collective sale increases the supply of water entitlements for sale, by more than it increases the demand, then it may reduce to costs of the recovery of water in the Basin. (The matter is discussed more fully in section 4 below).

The usual policy response to the hold-out problem is compulsory acquisition. Instead, the Commission would prefer for government to rely on atomistic and un-targeted market purchases.

The Commission identifies a second difficulty with targeting, namely, an absence of community support. However, one wonders if there will be greater support (or less effective resistance), from the relevant communities, for a program of atomistic purchases designed to reduce consumptive use of water, through the effects of such purchases on water prices. The Draft, more generally, provides a very incomplete analysis of the political economy of public policy.

3: Rent-protection

I want to make the following points:

1. There may be *indirect* efficiency costs of a 'Swiss cheese' pattern of purchases of water from atomistic sellers, arising from the pecuniary externalities generated. The process is via the political economy of reductions in water entitlements in the Basin, or via the Government's irrigation infrastructure program.
2. Possibly, these efficiency costs could be reduced if there were some collective sales of the water entitlements of whole districts or sub-districts.
3. And the Draft may be short-sighted in its attitude towards the pursuit of multiple objectives.

Pecuniary externalities occur when the actions of one individual or group harm the economic prospects of others, via the prices at which these others buy and sell; but not via direct impacts on production functions or utility functions.

There are various ways in which the sale of one irrigator's water or entitlements may impose pecuniary externalities on other irrigators in the district. For example, a reduction in the level of irrigated farming activity will reduce the demand in the district for the services of the suppliers of non-water inputs (e.g., servicing of machines). This reduction in demand may lead to a rise in the price of the services, or a reduction in service quality; or even threaten the financial viability of enterprises providing services into

the district: suppliers now have a smaller set of customers and the same overhead costs; or there may be a reduction in the opportunities to serve two or more nearby farms on the one service trip. The same may apply to the supply of final consumer products or services in the locality.

The Draft concentrates on another mechanism, whereby the sale of water outside an irrigation district can affect the financial viability of the district's irrigation authority or corporate body.

Irrigation districts rely on revenue from the charges levied for the release of water to the individual irrigators. Most of the costs of operating the irrigation district are joint or common to the 'customers': they are 'overheads', and not costs attributed to deliveries of water to a specific farm or farms at a specific time. The usual way to charge for water is via a two-part tariff—an annual fee, plus volumetric charges for delivery. If a farm sells its entitlements outside of the district, and if the purchaser does not remain responsible for the fixed charge, then the remaining irrigators in the district will be faced with higher charges, if the irrigation district is to continue to cover its costs as before the sale. Even if the liability for the fixed charge is transferred to the purchaser, those who do not sell their water can still suffer a financial disadvantage: the periodic charge may not cover the fixed costs of the district; or there may be fewer economies of scale or scope in delivery (see Roper, Sayers and Smith 2006).

For these reasons, irrigators have some financial interest in water sales made by others in the district, and this has been reflected in restrictions or charges imposed by some irrigation district.

At the general social and political level, governments have stated their determination to preserve rural communities, as far as is reasonable and feasible, from the deleterious effects on irrigators and their communities that could follow the large-scale transfer of water from its current use in or allocation to irrigation. This kind of governmental policy pronouncements echoes the strong feelings and opinions of many people and businesses in rural areas, be they on farms or in the regional villages and towns that service the irrigation farming communities; and, to a large extent, may also reflect the feelings of Australians generally.

In consequence, not only have some irrigation districts have placed restrictions on water sales, but the governments of Victoria and New South Wales have also. And it would be most unexpected if the Commonwealth Government proved immune from the pressures that led to these public-policy restrictions. (Relevant is that rural economic interests are better translated into political action, because they are more salient and less diverse, than are the interests of city folk.)

Although the Draft in places seems complacent about the 'exit or termination fees' levied by irrigation district—suggesting that they have no detrimental consequences of the efficiency of the allocation of water (see section 5)—elsewhere it criticises such arbitrary limits on trade, as leading to inefficient allocation of economic resources.

So, via the indirect mechanism of politics, pecuniary externalities do have efficiency effects. Can these be reduced and how?

What the Draft Report calls 'Swiss cheese effects' occur when geographically-dispersed farms move out of irrigated agriculture. In particular, this is the likely result of the approach advocated by the Commission for government purchases designed to recover water in the Basin.

It is an open question, one of considerable importance, whether the political consequences of a 'Swiss cheese' pattern will prove more or less economically-costly than a patchwork pattern in which entire irrigation districts or sub-districts have lost or sold their water entitlements.

There is another public program to consider, namely the $5.8 billion Sustainable Rural Water Use and Infrastructure program (SRWUI). The Draft reports that 'The majority of infrastructure projects recovered water at a cost that was over 55 per cent higher than the average cost of recovery through market purchases' (p. 122). Once again, there is a question of whether the extent of wasteful expenditure would be greater or less, if purchases for water recovery were concentrated geographically, rather than occurring adventitious in a 'Swiss cheese' pattern.

Multiple objectives

Here I should address the pursuit of multiple policy objectives. The Draft argues that it is likely inefficient and maybe ineffectual to attempt to attain multiple objectives with a single policy instrument. In particular, if water is to be recovered in the Murray-Darling Basin through government purchases, then the Draft suggests that those purchases should not be targeted to address social and community issues (p. xxix and 8.2).

This argument is correct, so far as it goes. However, if government has more than one objective, then, when choosing between policy instruments, it is sensible to take account of the incidental effects that the various alternative instruments have on goals other than the primary goal to which an instrument is targeted or assigned.

The Draft Report gives early prominence to the fact that a Basin plan is to be drawn up, to reduce the consumptive use of water by reducing total entitlements (which have proven excessive in consequence of increases in the partial-productivity of consumptive water use, and of drought). I suspect that the economic significance of the Basin Plan far exceeds that of the recovery of water prior to the introduction of the Plan. Gaining political acceptance of a Basin plan will prove to be a difficult political exercise, and costly. It is desirable to minimise the costs of adjustment assistance required; and buying some water entitlements from collective sellers, rather than solely from atomistic seller, maybe could reduce those future adjustment costs. In this context, closing some irrigation districts or parts of districts may need to be considered, to supplement dispersed reductions in entitlements.

Thus, in the immediate context of recovery of water in the short-term, the argument made in the Draft may well be correct, namely, that any 'Swiss cheese' effects should be managed in ways other than through the pattern of water purchases. But it does seem a little short-sighted.

4: Collective sale of water

My propositions here are that governments may be able to buy water more advantageously through a combination of collective and individual sales, rather than through individual sale alone; but that collective sales may need government assistance.

The Draft Report discusses two circumstances in which atomistic trading may not lead to optimal results—namely, when there are technical externalities, and when there are non-convexities in production or consumption. However, there is a third scenario, due to information asymmetries and transactions costs.

RH Coase's famous 1960 article about the nature of social cost should be read to say that the theoretically-best allocation of resources may not arise when ownership of property rights have been assigned to or acquired by a party who does not value them as highly as do others; and when (as always) 'transactions costs' are to be incurred in arriving at and enforcing a voluntary exchange. This seems to me to be the point of Coase's 1960 discussions of various legal cases; and has led to the common recommendation from the field of law and economics that judges in tort cases should award rights to the party judged to value them most highly.

The 'transaction costs' argument was given formal proof in the 1983 impossibility theorem of Myerson and Satterthwaite: see http://nobelprize.org/nobel_prizes/economics/laureates/2007/info.pdf. Even in the simplest example of one object with one owner and one potential bidder, both persons having private values, there exists no mechanism with the following desirable characteristics:

- The mechanism ensures that the object will end up with the party who values it highest.
- The mechanism is incentive-compatible.
- It does not involve compulsion.
- And it does not require a subsidy or tax.

That is to say, even in the absence of externalities and non-convexities, atomistic trading will not necessarily put assets into the ownership, control or use of those who value them most.

A relevant instance involves the' tragedy of the anti-commons,' in which atomistic sellers of complementary inputs do not necessarily arrive at efficient outcomes, due to the 'hold-out' problem. Each owner has an incentive to hold out for a larger-than-average share of the extra value created by the assembly. This can lead to failure of efficiency-improving assemblies; or uneconomic delays.

From where could extra value spring, such that aggregating entitlements for sale within an irrigation district or area increases their value above that of the total value of the entitlements considered separately?

For prospective buyers, a 'lump' of water may be needed to justify the making of 'lumpy' complementary investments—for example, a pipeline. Alternatively, a minimum amount of water may be needed to achieve a desired result, for example, watering an environmentally-sensitive area; or, the

alternative use of the land—e.g., as a wild-life sanctuary—may not be economical or feasible if some parts of the district remain in irrigation.

I recognize that these effects are not as dramatic as can occur through the assembly of land for developmental purposes. Nonetheless, they probably exist and should at least be considered in designing policy regarding the reduction in the consumptive use of water in the Basin; and in the proposed reduction in entitlements to consumptive water.

As these effects tend to increase the non-irrigation demand for water, they tend also to increase the market price of water. However, if the benefits of aggregation are worth the extra price to government, then it would be efficient for government to encourage collective sale, if that can be done at relative low cost.

There are also supply side considerations (discussed in Pincus and Shapiro 2008): encouragement of collective sales may reduce the reservation prices required by sellers.

The effects on the price of water may occur either directly through government purchase of collective offering, or indirectly if facilitating collective sales generally changes the market demand and supply of water: a broader efficiency point-of-view—broader, that is, than that focused solely on myopic efforts to source the cheapest water— suggests that government should be interested in improvements in market processes that enhance the demand value of a resource.

The Draft reports on a proposal for an auction mechanism for collective sale of water which involves a mixture of coercive and voluntary engagement (Pincus and Shapiro 2008). Irrigators would be coerced into engaging the mechanism; but each would freely set the price below which he or she would not be forced to sell. Pincus and Shapiro show that this mechanism has attractive properties: incentive-compatible, requires no subsidy or tax, and involves less coercion than does eminent domain; but it sometimes fails to transfer assets to higher-valued uses. I think that it has a wider application than the Draft suggests. The auction mechanism is designed as an alternative to simple resumption-with-compensation, and could encourage sales of entitlements generally. To a large extent, it reduces the information problem that the Commission fears, regarding targeted sales, because it reveals irrigator's reservation prices. But the argument in this section does not depend on the actual techniques used by government to encourage the sale of all of a district's entitlements.

5: Other comments

5.1: Exit or termination fees

The Draft suggests that sales of water by a sub-set of the irrigators could throw, on to remaining irrigators, greater financial burdens of contributing towards infrastructure-related capital costs: 'There would be some potential for atomistic buybacks to cause inefficiencies if they enabled irrigators to renege on existing commitments to contribute towards infrastructure-related capital costs.' (p. xxix).

However, the Draft goes on immediately to note that 'But irrigation infrastructure operators are able to levy termination fees that negate this potential.' These sentences left me a little confused; and are not easily reconciled with the matter of section 10.2.

It is standard economics, outside of Public Choice, to argue that, once capital has been installed, then there is no case in economic efficiency to fund sunk costs. This position is confirmed by a later sentence in the Draft: 'But such 'pecuniary externalities' occur frequently in the economy and generally do not call for a policy response' (p. xxix; see also p. 214, n. 1). So I interpret the Draft as agreeing with the common presumption of economists, about the efficiency-irrelevance of sunk costs.

Nonetheless, the wording in the Overview could leave the impression that the Commission is neutral to or approves the levying of 'termination fees' on individual sellers of irrigation water, to facilitate the continued servicing of 'existing' capital costs.

Possibly, what the Draft has in mind is capital expenditures that have been agreed but not yet spent. Alternatively, what the Draft may have in mind is that infrastructure can have recurrent *common* costs; for example, periodic maintenance of the distribution system.

In either case, the argument for a levy does not depend on the spending being capital-related, but on the general requirement that individuals fulfil promises or contracts (see p. 214 on supply contracts); or on the idea that a failure to insist on servicing of past capital costs will encourage political pressure for further uneconomic infrastructure, in the future.

In the absence of such arguments, termination fees would seem to have negative efficiency consequences: traders are discouraged by an efficiency-irrelevant charge from selling to someone with a higher valuation of the water. I think that this is the Commission's position, but the Overview was not clear.

5.2: Equity and efficiency

I was especially taken with an argument on page 110: if two catchments, A and B, could each supply a downstream environmental site, then maybe the fairest and most efficient policy would be to draw from each on a *pro rata* basis, and allow subsequent market trading between catchments to minimise the efficiency cost. However, I suspect that there needs to be closer integration between this argument and those leading to Draft Findings 6.1 and 7.1.

References

Coase, Ronald H. (1960), "The Problem of Social Cost", *Journal of Law and Economics* **3** (1): 1–44.

Roper, H., C. Sayers, and A. Smith (2006), *Stranded Irrigation Assets,* Productivity Commission Staff Working Paper, Melbourne, June.

Pincus, Jonathan and Perry Shapiro (2008), "Between forced resumption and voluntary sale: a mechanism for the collective sale or transfer of irrigation water". *Economic Papers* **27** (4): pp. 303–314.