Carrying coal to Newcastle: Talking to Australian economists about water marketing in Australia and California

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The nexus: water marketing and water rights

- The larger context is improved management, allocation and use of water.
- But that depends, in turn, on water rights.
- Water rights can be (are definitely) part of the problem.
  - The problem can be that existing water rights have not been comprehensively determined (adjudicated).
  - It can be that water rights are not enforced.
  - It could also be that existing water rights seem poorly suited to contemporary conditions, generating some need to modify or revise them.
- In these cases, ushering into existence a better defined or more comprehensive set of water rights, or a more flexible set of water rights, or a new set of water rights, may be a key building block towards creating an improved water management system.

Conclusion 1. This is about politics

- In the context of international trade policy, Dixit (1998) emphasizes the primacy of politics.
  - “An economic policy proposal is merely the beginning of a process that is political at every stage – not merely the process of legislation, but also the implementation, including the choice or formation of an administrative agency and the subsequent operation of this agency.”
- Attempting to create a market for water and changing the system for the abstraction of water is (i) a process, a journey rather than a single step, and (ii) a political act as much as an economic one.
  - To succeed, it requires a political strategy along with an economic one.
  - Creating a winning coalition, compensation, side-payments etc
- Moreover, the succession of steps over time creates path dependence, a phenomenon that Dixit characterizes as posing a political constraint as much as an economic one.

Conclusion 2. The conventional economic mantra is wrong.

- Focus: getting the price right
- The problem: price of water is too low
- Solution: Establish water markets
- Secondary solution: Fix property right to water, as needed.

- Misleadingly simple!
- The issue is more property rights and less pricing

Conclusion 3: Setting quantity limits explicitly are at least as important setting price.

- What is needed is the right price structure (some type of block rate), not the right price.
- The price structure implies a quantity limit – if you use no more than x it won't cost a lot. If you want to use more than x, you can but it will cost you a lot.
- This has to be seen as fair. Fairness matters.
- The price has to be such that consumers see (i) they are getting something worth that price, and (ii) the price is fair.
- Fairness is about distribution and politics.

How transferable is Australia's success to California?

KEY FACTORS FOR SUCCESS OF WATER MARKETING IN MD BASIN	
FACTOR	LIKELIHOOD OF ADOPTION IN US WEST
Quantified property rights	Yes inColorado; long resisted in California
Volumetric accounting of water use	Ultimately achievable, but political opposition
Comprehensive & easily accessible register of rights ownership	Done in Colorado; may happen in California
Streamlined transfer process	Only for short-term leases.
End power of irrigation districts to veto transfers	Uphill battle; failed so far in California
Unbundling water rights	Impossible
Framing water right as a share, not absolute amount with seniority	Impossible
Ending water right status as personal property	Impossible

Conditions under which exchanging water is seamless

1. Good (simple) physical connectivity.
2. No issues or entanglements regarding water right. Right of seller to sell and buyer to acquire is well accepted and not challenged.
3. No cost issues or entanglements with regard to financing of the water being exchanged.

- If these conditions are met, water transfers are seamless.
- Examples of where they *are* met
  - Exchanges among customers of a retail or wholesale distribution system
  - Water vendors
  - Groundwater sales by richer farmers in the Punjab
  - Traditional water supply systems such as qanat system
  - This explains the “paradox” that informal markets flourish around the world and temporary (short-run) trades are also commonplace, but *not* permanent trades.
- My focus is on where these conditions are *not* met

We started in the same place – as subjects of the British empire endowed with Common Law

- That meant originally the riparian right to water.
- But then we both decided to abandon riparian right because of the aridity of our climate.
  - California: ~1853
  - Australia (Victoria) 1880s (Deakin Commission)

- I am here to tell you what you left behind

The Achilles heal of water marketing in California

- Is the property right to water
  - For surface water
  - Even more so for groundwater

The basic story

- For water marketing to function effectively, water rights need to be well defined, sufficiently flexible and readily transferable.
- In many cases – especially in California – this is not the case.
- Failure to clarify -- and modify – water rights is the key impediment that restricts the scope of water marketing in California.
- In general, the difficult of obtaining agreement on the allocation of rights to water is the obstacle to creating an effective water market.
- This failure is a failure of bargaining – an inability to obtain a solution to a cooperative (bargaining) game.

Bargaining failure is the key in California

- Transaction costs are *not* the key to what is going on with California water.
- The key, rather, is unresolved disputes where the parties have divergent, and often opposed, interests.
- Prolonged, and unresolved disagreements can cause high transactions costs. High transaction costs are the consequence, not the cause, of prolonged failure to resolve disputes.
- Water marketing occurs within an accepted framework of property rights; the continuing conflict over property rights is itself an impediment to water marketing in California.
- Why no Coasian bargaining? Because (some) parties refuse to accept their existing property right. They would rather strive to change their property right than to live with it and make an accommodation.

When can a bargaining solution arise?

- A key factor for each party in a bargaining game is his Best Alternative to a Negotiated Agreement (BATNA).
  - This is the outcome for him if no agreement can be reached.
- If a party's BATNA changes for the worse, he is more likely to prefer having an agreement.
- An outside, higher-level actor could alter the BATNA's
  - Offering reward for joining the agreement
  - Threatening punishments if no agreement is reached.
- Therefore, by manipulating the BATNA's and outside party can intervene – if he so chooses – to increase the likelihood of agreement.
- But, without an outside higher-level actor (e.g., the State Engineer) altering the BATNAs, the disputes will remain unresolved.
- This is a political failure.

Establishing a property right to water is inherently difficult

- It is a variable resource.
- The major use originally was intermittent (irrigation).
- The use of water, especially for irrigation, generates major externalities (return flow).
- The use right to water is treated as private property under English common law.
- New ways to use water that benefit society arise over time, and new users show up in any given location. The issue is dynamic re-allocation.
  - Demsetz has a nice story about the initial creation of a property right. It doesn't really work for the re-allocation of a property right.

The property right to water in California

- Distinguish the property right to divert water from the *contractual right* to receive water from a water supply organization.
  - About 20% of the water used in California is obtained through supply contracts with the two large water projects in California, the federal Central Valley project and the State Water Project.
- Distinguish surface water from groundwater, since they are subject to different legal regimes.
- The right is a usufructuary right. It is a right to use (divert) water from a water source. It does not convey ownership of the water resource.
  - The water in California is owned by the state of California in the interest of the people of California.

Two types of surface water right: riparian, appropriative

Riparian right

- Adopted by all eastern states, taken from English common law. Also adopted by California.
- Riparian rights entitle the owner of land bordering a surface water body ("riparian" land) to use the water flowing past his property.
- Riparian right applies only to the water that would *naturally* flow in the stream.
- It does not allow the water to be put to use on any *non-riparian* land.
  - Riparian rights remain with the riparian land regardless of changes in ownership.
  - Nonuse does not terminate the right.
- It thus combines ownership of (riparian) land with access to water.
- No specific quantity attaches to a riparian right. If a riparian originally applied *X*, this does not preclude him from applying 5*X* later.
  - There is no recording of the volume diverted.
- No institution administers the riparian right.
  - Riparian right requires the issuance of no permit or license.
- The right is shared equally among all riparians: they own access to the stream as "tenants in common."
- They can divert water as long as this does not impair the rights of other riparians.
- Disputes are resolved through litigation among the riparians – including at a time of drought.

- The riparian doctrine was logical where it originated, in a humid region with plentiful streamflow.
- It is ill-suited to an arid region like California, where rivers can run dry by the late summer and annual streamflow can vary by an order of magnitude.
  - There needs to be a specific mechanism for allocating limited streamflow. The riparian right lacks this.
- It was ill-suited to hydraulic mining in the gold country of California.
  - The land was not owned by water users – it was owned by the federal government.
  - In many cases, they were using the water to mine at some distance from the stream (i.e., not on riparian land).
- Starting around 1851, a new type of water right emerged in California known as an *appropriative* water right, adapted from the rules developed by miners for the right to a mining claim.

To be efficient, a property right needs to be well defined and it needs to be enforced

- Riparian rights fail this test.
  - Under riparian rights, riparians along a stream are like tenants in common.
  - The only mechanism for resolving disputed (in times of shortage or otherwise) is private litigation.
  - The riparian right can be exercised only by the owner of riparian land and only on riparian land.
    - That works in a well-watered region, but not in the arid West.
- Therefore, in the California gold rush, the appropriative right was invented.

Appropriative water right (the right of first possession)

- The right to divert water is based on the time and quantity of the initial diversion creating that right.
- As with a mining claim, one obtained the right by posting a sign at the point of diversion stating the details (date, volume, identity of diverter).
  - This would be posted on a stick in the ground, or a nearby tree.
- The locations of water diversion and application can be different. The link between ownership of land and ownership of water is severed.
- If there is too little streamflow, the senior appropriators divert their full quantity until the stream is exhausted, while the remaining (junior) appropriators receive nothing.
- To perfect the right, the water user has to initiate the diversion with diligence and the water must be applied to beneficial use.
- Disagreements are resolved through litigation

The appropriative right was copied from the arrangement applied to mining claims

- In theory, it is better suited to conditions in an arid region.
- It severs the link between land and water – water can be applied on non-riparian land.
- The imprecise riparian sharing of water is replaced by a specific priority ranking based on seniority.

- However, the orderliness of appropriative right existed only in theory, not in practice.

While the appropriative water right was modeled after the right to a mining claim, there were some crucial differences which made the appropriative right problematic for water.

1. Different spatial interaction among rival claimants.
   - Rival miners would be seeking to explore the same piece of land. You would know it if someone else had posted a claim there.
   - Rival water users diverting water from the same river could be 100 miles apart and they would not see the claim posted by other users.
2. Different use of the resource
   - Miners primarily interested in determining whether the claim was valuable. Most claims weren't, and the miner would move on. The focus was not so much on regular production, as with irrigation.
3. No mechanism for enforcing rights and resolving conflicts
   - The miners relied on local mining camps as a forum to resolve differences. There was no analog for water claims. Instead, disputes resolved by litigation.

Applying the system for mining claims to water was a category error

- There needs to be a clear quantity associated with a right and a transparent record of the right.
  - With mining, there were mining camps, mining districts, and mining codes.
  - Claims were created by leaving a tool in your area – but they also had to be registered with the mining district Recorder.
  - There was nothing like a mining district system for water.
  - The only way to resolve a dispute about a water right was private litigation in the county court.
    - This was slow, costly, piecemeal, and often inconclusive or inconsistent

Key differences between mining and water use

- Prospecting was a transient phenomenon; miners would occupy a claim for 2-3 weeks and then move on. It was not an ongoing production activity like agriculture.
- With mining, little chance of unintentional interference with another miner's claim.
  - Claim size was small, 10 to 30 feet square. You would be well aware of another miner's presence. With water, a rival diverter could be 10 miles upstream and entirely out of sight.
  - Therefore centralized recording of claims to water is crucial.
- There is no production externality with mining. There is a massive externality associated with water diversion due to return flow (and sometimes downstream water quality).

- The result in California was a high degree of chaos.
  - Appropriative rights claiming diversions totaling multiple times the amount of streamflow that had actually occurred
  - A crazy amount of litigation.
    - The law suit was binding only on the parties to the suit, not on other diverters.
    - The result was wildly inconsistent legal rulings.
  - Monopolization of water and land.
    - Some acquired water rights and squeezed land owners who needed water.
    - Some acquired vast landholdings and squeezed water users.
  - When the Deakin Commission visited California in 1885, it was appalled.
- As they emerge, other states copy California's system
  - Colorado 1858-61; Nevada, 1859; Idaho 1860; Montana 1862-64; Arizona 1863
- They experience the same chaos as California.
- But, then, they modified their appropriative system

Other states

- Other western states became populated often through mining discoveries - Colorado (1858–1859), Nevada (1859), Idaho (1860), Montana (1862–1864), Arizona (1863).
- They followed California's trajectory. Some first adopted riparian water rights. But (unlike California) these states soon switched to appropriative water rights and eliminated the riparian right to water.
- With the appropriative right to water, the copied California – posting the claim on a stick at the point of diversion, relying on litigation to resolve disagreements, etc. They experienced the same type of chaos as in California.
- Quite soon, they moved to resolve the chaos.

Administrative reforms in other states

- An administrative agency was created to record new claims to an appropriative water right – prior claims were exempted (grandfathered).
- The new agency established an administrative apparatus to ensure that diversions complied with the amount and seniority of a right – district inspectors who would go around checking on local diversions.
- In many states, the water rights agency had the power to resolve disputes about water rights it had granted; in some cases (especially Colorado) disputes other than those dealt with the district inspectors were still resolved in court.
- After some time, the pre-existing water rights that had been exempted were subsequently brought within the purview of the water rights agency.
  - This was often accompanied by the equivalent of a general stream adjudication.

What happened in California

- A codification of appropriative rights in 1872 left the system intact, including the posting of a claim at the point of diversion.
- Following a legal conflict between a riparian and an appropriative water user, the California Supreme Court in 1886 declared that riparian rights were still valid. They coexist with appropriative rights.
- Support grew for water law reform following drought in 1898-99, but this was blocked by water users.
- Finally, over the opposition of water users, California established an administrative system for issuing appropriative rights. It went into effect in December 1914.
- There have been suggestions for a General Stream Adjudication of the Sacramento-San Joaquin River systems, including in 1939, 1942 and 1951. This was opposed by water users, and no such adjudication has been conducted.

HOW LONG AFTER THE CREATION OF APPROPRIATIVE WATER RIGHTS DID THE KEY APPURTENANCES OF A PROPERTY RIGHT EMERGE?

	COLORADO	CALIFORNIA
When did appropriative rights start?	1861	1851
Establish centralized recording of new water rights	After 20 years 1881, 1887	After 60 years
Terminate grandfather status for pre-existing water rights	After 20-60 years 1881 1903, 1919	Not yet after 165 years
Establish local apparatus on the ground to monitor diversions and enforce seniority	After 18-38 years 1879 1899	Not yet after 165 years. Since 2012 we have *self-reporting* of water diversions.

Take-home message for California

- Until we establish a comprehensive for recording all surface water rights in major river basins, and quantifying them, we are not equipped to deal with the challenges of the future.

- We rely primarily on short-term leases (which are exempted from the rigor of proving up a property right).
  - That will not be adequate for the long-run changes that we face.

Two remaining entanglements of property right

- No injury rule

- Public interest in water

Result: Property rights to water in the western US are entangled

- This occurs because of externalities associated with the use of water.
  - Return flows and no-injury rule
- It occurs because of the legal property right.
  - “Unlike almost every other form of property, water has always been vied as something in which the community has a stake and which no one can fully own.” (Sax, 2008)
- It occurs because the supply of water (especially surface water) involves shared infrastructure that is jointly financed.
  - Irrigation districts financed distribution infrastructure – or took it over after original investment went bankrupt.
  - Typically, the district owns the water, not the individual water users.

No-injury rule

- In Colorado and many other western states, any impact no matter how small or far in the future, constitutes an injury.
- It is *not* a matter of applying a cost-benefit test.
- Proving there is no injury can create huge costs.
  - Have to (i) prove historical diversion and consumptive use, (ii) calculate the division of return flows between surface runoff and deep percolation, (iii) quantify the timing for deep percolation to reach a stream, and (iv) determine aquifer and recharge characteristics.
- If you could eliminate or simplify the determination of third-party harm that would remove a significant obstacle to water marketing.

- In the Colorado-Big Thompson project, because this is water imported via a trans-mountain diversion from the Colorado River in western Colorado to the Northern Colorado Water Conservancy in eastern Colorado, the water is (i) no longer subject to prior appropriation and (ii) the no-injury rule does not apply. It has become a *standardized* commodity.

No-injury rule

- The issue is more profound than one of transaction costs.
- It is that the no-injury rule creates inherent uncertainty regarding your ability to transfer your property right.
- There is an inherent conflict of interest that would need to be resolved.
- In practice, both Colorado and California have dealt with this by ducking the issue – by waiving it for short-term leases.
- Especially in California, this has skewed the water market heavily towards short-term leases.

- This highlights a larger issue in environmental economics.
- I reject Coase's notion that private bargaining among the parties will – or even could – resolve in most cases the problem of an externality.
- I also reject the notion that – for water – distributive concerns should be set aside and the focus should be solely on efficiency.
  - Therefore I reject the Coasian notion that whether the party that generates the externality is or is not liable does not matter and makes no difference to the solution.
- Taking a Pigouvian perspective, the larger issue is that not all externalities generate a market failure that should be seen to require public policy attention.
  - We need to identify de minimis externalities (return flows) that we choose to ignore.
  - That itself is a political challenge.

The public interest in water

- As specified in the California Constitution, all water is owned by the people of California.
- Reasonable and beneficial use. The general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable.
  - Multiple uses are favored; reserving water for a single-purpose use is disfavored.
  - The California water rights agency is expressly directed to determine whether proposed water transfers will have unreasonable effects on fish, wildlife, or other instream beneficial uses.

Reasonable and beneficial use

- Up to now, this has been relatively vacuous.
  - You would have to exercise great imagination to violate it, e.g., flooding land to kill gophers.
- But, courts have recognized that it is inherently dynamic. What is reasonable may change over time.
- They have also recognized that it requires a balancing test – the evaluation of reasonable use involves “not only the water right holder’s own uses but also the competing demands (both consumptive and ecological.”
- My speculation: the path to reform in California lies through courts’ expanding the power of reasonable & beneficial use rather than directly modifying water rights law through the passage of new legilation.

Water transfer as a diplomatic negotiation (Sax, 2008)

- The extent of the entanglements varies depending on the particular circumstances. But, some degree of entanglement is always present.
- Therefore, it is a mistake to think of a transfer as a contract with just two parties. It is more like a diplomatic negotiation with a number of parties, each with important and legitimate interests.

- As an economist, you can look as this entangled property and vigorously disapprove.
- But, unless you can persuade existing rights holders to give this up, or unless you can steamroller their opposition, your disapproval will accomplish nothing.
- There has to be a strategy – a political strategy – to bring about change.
- This is relevant for water marketing because these features become hindrances.

The problems that still remain in the MDB

1. The degree of environmental restoration that was hoped for is not yet being achieved.
2. The issue of return flows has not received adequate attention.
3. The monitoring of diversions (especially in the Northern system) leaves much to be desired.
4. The linkage with groundwater has not received adequate attention.
5. Anxiety about water being held off the market for speculative purposes by “water barons.”
6. Continuing concern about the economic impact on farming communities.

- All of these, especially (1)-(4), are matters of concern in California.