RIO GRANDE VALLEY WATER MARKETS AND LEGISLATIVE INFLUENCES
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Introduction
- Texas population is expected to double over the next 50 years, increasing demand for potable water.
- This is especially true for the Lower Rio Grande Valley which relies primarily on the Rio Grande and conventional potable water treatment methods.
- Recent studies show that the economics of brackish groundwater desalination are competitive with conventional treatment methods.
- An amendment to Texas Senate Bill 3 established the price at which irrigation water in the Lower Rio Grande Valley converts to municipal water at 60% of the market price of municipal water existing/converted before January 1, 2008.
- The price rate was identified by a Task Force comprised of irrigation districts and municipal stakeholders through a process reflecting economic game theory.
- This legislation could create unintended consequences for the change in adoption between desalination and traditional treatment methods by artificially lowering the costs of conventional methods relative to desalination.

Desalination Facility in McAllen, TX
- Recent analyses indicate desalination technology is competitive and perhaps slightly less expensive than conventional surface water treatment at pre-2008 water rights prices.
- Legislation shifted the relationship to favor conventional surface water treatment on a cost basis.
- A decrease in the cost of supplying potable water could result in an increase in the supply produced by conventional surface water treatment facilities, with less supply produced by desalination.
- Increased supply is available to consumers, which results in an increased in consumer surplus, but producer surplus could be less or more.
- Financial results suggest effects of legislation on cost per acre-foot for a 7.5-4 million gallon per day facility to be:
  - Conventional ($/ac ft): $649.67
  - Desalination ($/ac ft): $151.01

Background of Legislation
- SB3, in Section 49.507, established the price at which municipalities can purchase converted irrigation water at 60% of the current market value of municipal water converted before January 1, 2008.
- Evolution of the Amendment was a long process because two competing bills addressing this issue were traveling through the legislature simultaneously.
  - Abolishment Bill: HB 1211/ SB 975
  - ID would completely surrender all rights and powers to deliver water to municipalities.
  - Died in Calendar Committee
  - Compromise Bill: HB 1563/ SB 847
  - Implement compromise that was struck by Water Rights Task Force
  - Died in Calendar Committee, but was later passed as a floor amendment.

Methodology
- Interviews with experts, economic and financial analyses, and on-line and library research.
- Qualitative economic analyses of the Valley water market using graphics and theory.
- Capital budgeting and annuity equivalent analyses to compare financial implications of conventional water treatment facilities relative to brackish groundwater desalination facilities.
- Quantitative economic analyses utilizing financial analysis to determine impacts on Valley water market.

The Players: Irrigation Districts and Municipalities
- Irrigation Districts (ID) are constitutionally responsible for delivering water to municipalities.
- Municipalities pay IDs for the cost to deliver water, not for the actual water.
- Irrigation water rights can be purchased and converted to municipal water rights at a conversion rate of 2-b/1.
- IDs believed the delivery rate being charged was too low because only operational costs were covered.
- Municipalities believed they were paying too much for the water because they had a greater use value and the irrigators for the water.
- Water Rights Task Force was created in 2005 to address the Valley water issues.
- Eight-member committee of ID representatives, municipal representatives, and the Rio Grande Watermaster’s Office.
- Resulting agreement between the task force members contributed to the language incorporated into an amendment to SB3, in Section 49.507.
- Compromise represents game theory economics.

Desalination Facility in Brownsville, TX
- Counterintuitive to desalination districts and municipal stakeholders through a process reflecting economic game theory.
- This legislation could create unintended consequences for the change in adoption between desalination and traditional treatment methods by artificially lowering the costs of conventional methods relative to desalination.

Economic & Financial Analysis
- * Input Substitution: Economic choice between two inputs to produce a given quantity of one product.
  - Isoquant: Equal quantity of output of a good with varying combinations of two inputs.
  - Isocost: Equal level of cost for all combinations of the two inputs.
- * IC2 is the isoquant of desalination and conventional treatment pre-legislation.
- * LC2 is the isoquant of desalination and conventional treatment post-legislation.
- * IS2 is the isoquant of conventional water supply shifted by legislation.
- * IF represents the least-cost combination of potable water created by the two methods post-legislation.

Isocost and Isoquant Pre-Legislation
- Post-Legislation Industry Supply, Aggregate Supply, and Industry Demand Curves
- Consumer & Producer Surplus Before Legislation
- Qualitative economic analyses utilizing financial analysis to determine impacts on Valley water market.

Isocost and Isoquant Post-Legislation
- Post-Legislation Industry Supply, Aggregate Supply, and Industry Demand Curves
- Consumer & Producer Surplus After Legislation
- Qualitative economic analyses utilizing financial analysis to determine impacts on Valley water market.

References
- Hongisz, Sunny. 2007. General and Irrigation Districts. County Irrigation District No. 2. San Juan, TX. Personal communications.

Conclusions
- Legislation was in response to requests from Valley constituents and appears to satisfy their request, but also has some unintended consequences for the Valley water market.
- Floor Amendment 60 to Texas Senate Bill 3 has potentially affected municipalities’ future choices in potable water supply between conventional surface water treatment and brackish groundwater desalination.
- An incentive for the continued use of conventional surface water treatment is created, while a disincentive for the adoption and expansion of brackish groundwater desalination is created.
- Economic and social efficiency is weakened by discouraging adoption of new technology that can potentially provide water for future generations.
- It is not within the scope of this study to conclude that this legislation is a social good or detrimental due to the complexity of the issue.

Economics matters and is applicable to many real-world situations.