Colorado State University

Who wins, who loses?

Water markets under *imperfectly* competitive conditions.

Christopher Goemans, Ph.D.
Associate Professor
Department of Agricultural and Resource Economics
Colorado State University

What Do We Know About Water Markets?

- Water markets lead to an efficient allocation of water based on the assumption of perfect competition
- Voluntary water transfers are commonly modeled using holistic water resource models and most assume a perfectly competitive market structure
- Wide range of market settings typically characterized by imperfect conditions. E.g., :
  - few buyers and many sellers
  - imperfect information
  - non-profit maximizing behavior
  - heterogeneous goods
  - large transaction costs

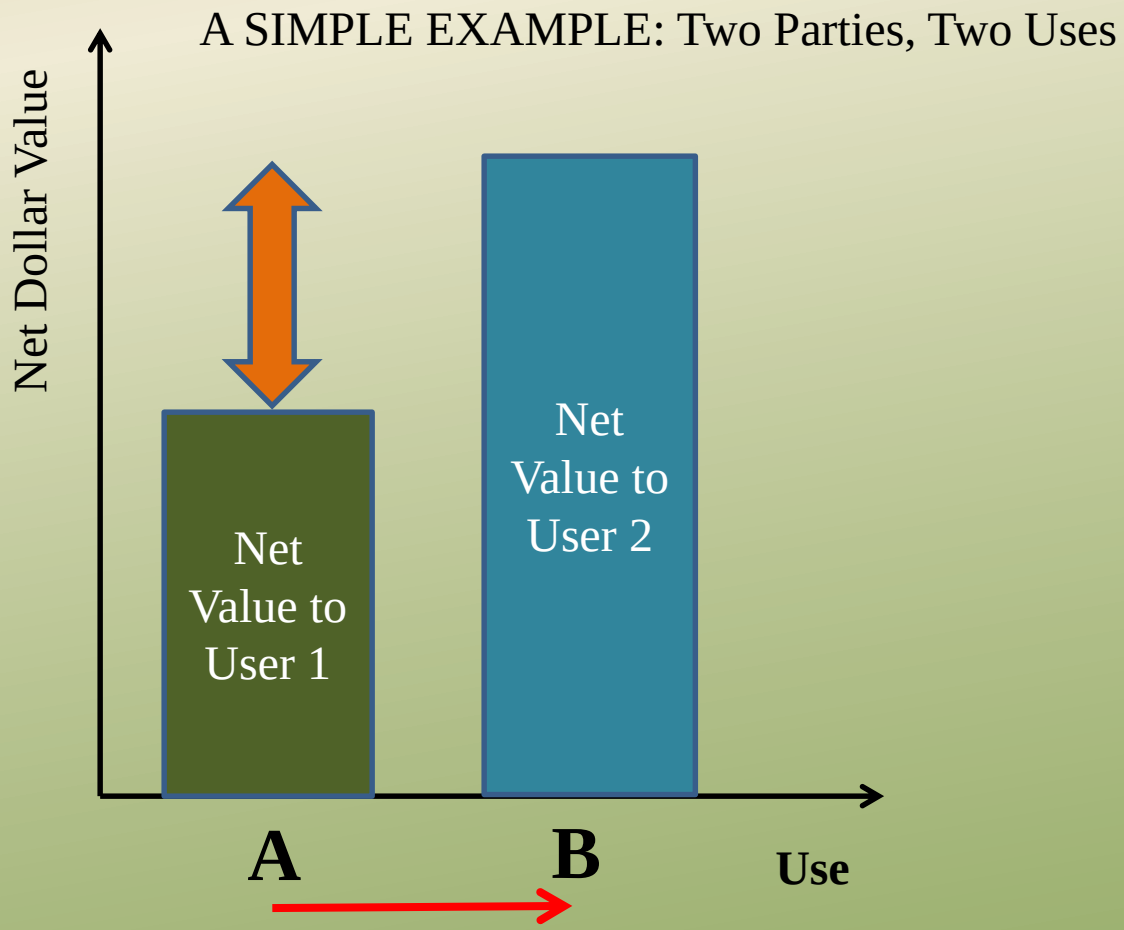
Three Questions…

- How do water markets function when…
  1. we introduce transactions costs associated with leasing across uses?
  2. information on transactions isn't public?
  3. we impose institutional or physical costs associated with transferring water across space?

*Unfortunately, quality data on water market activity is very limited.

Three Alternative Ways to Evaluate Water Markets

1. Changes in Total Net Benefits

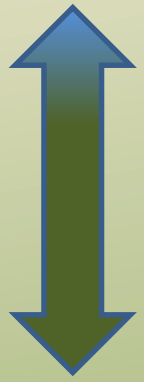


Three Alternative Ways to Evaluate Water Markets

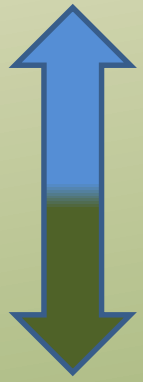
2. Distribution of Benefits/Costs (who wins and who loses?)

Example: Market Power

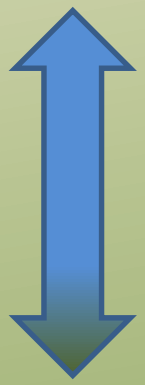
Seller has Market Power



No Market Power



Buyer has Market Power



Share of Benefit to Seller

Share of Benefit to Buyer

Three Alternative Ways to Evaluate Water Banks

3. Distribution of Benefits/Costs (who wins and who loses?)

Example: "Third-Party Impacts"

Externality: A benefit/cost incurred by a party not directly involved in the transactions

Non-pecuniary: benefit/cost not reflected in the transaction.

Pecuniary: benefit/cost reflected in the transaction through prices.

Part 1:

EXPERIMENTAL EVIDENCE

Experiment Overview

Trading Period 1
Market for ***Water Rights***

Revenues from Selling ***Water Rights***

+

Trading Period 2
Market for ***Water***

Net Revenues from Buying and Selling ***Water***

+

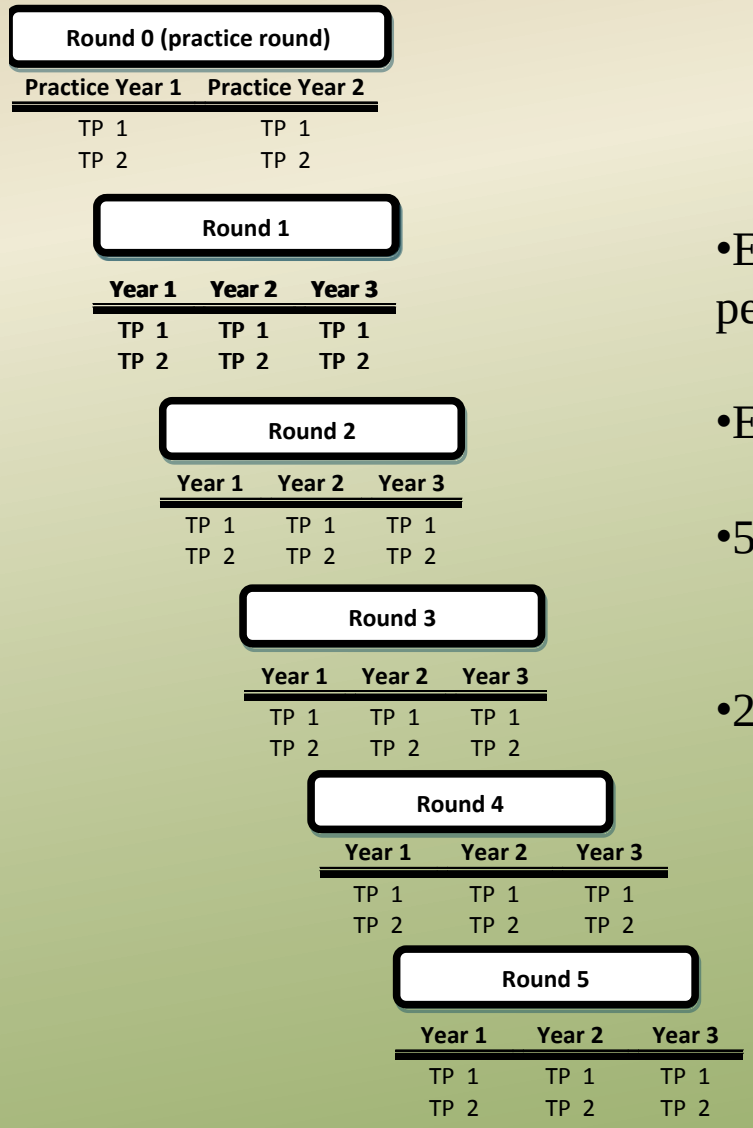
End of Year Production Profits

Revenues from Production of "**other good**"

=

Total Profit in Each Year

Experiment Overview (cont.)

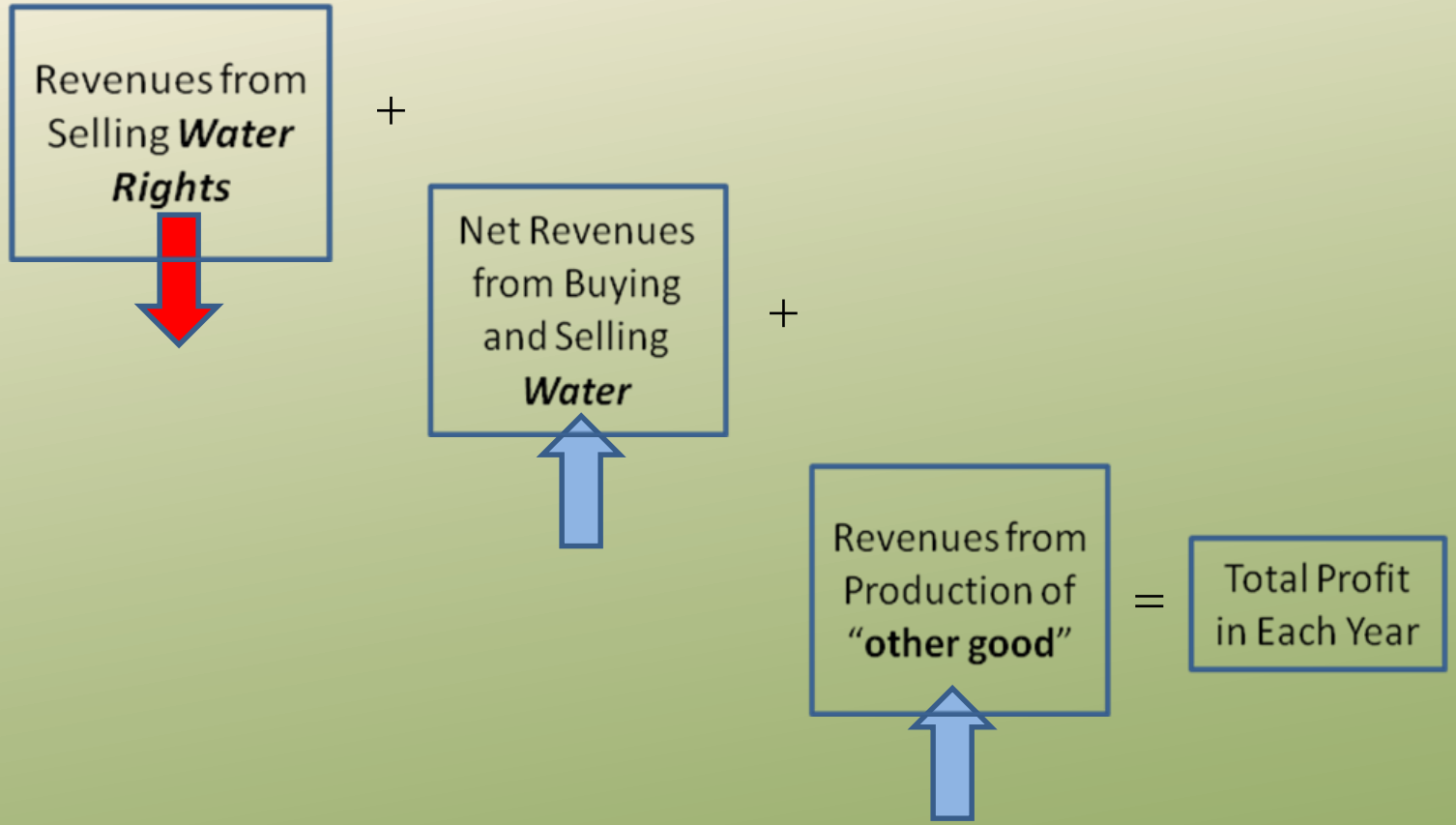


- Each round consists of 2 trading periods
- Each round consists of 3 years
- 5 ***independent*** rounds
  - 1 "practice" round
- 2 treatments

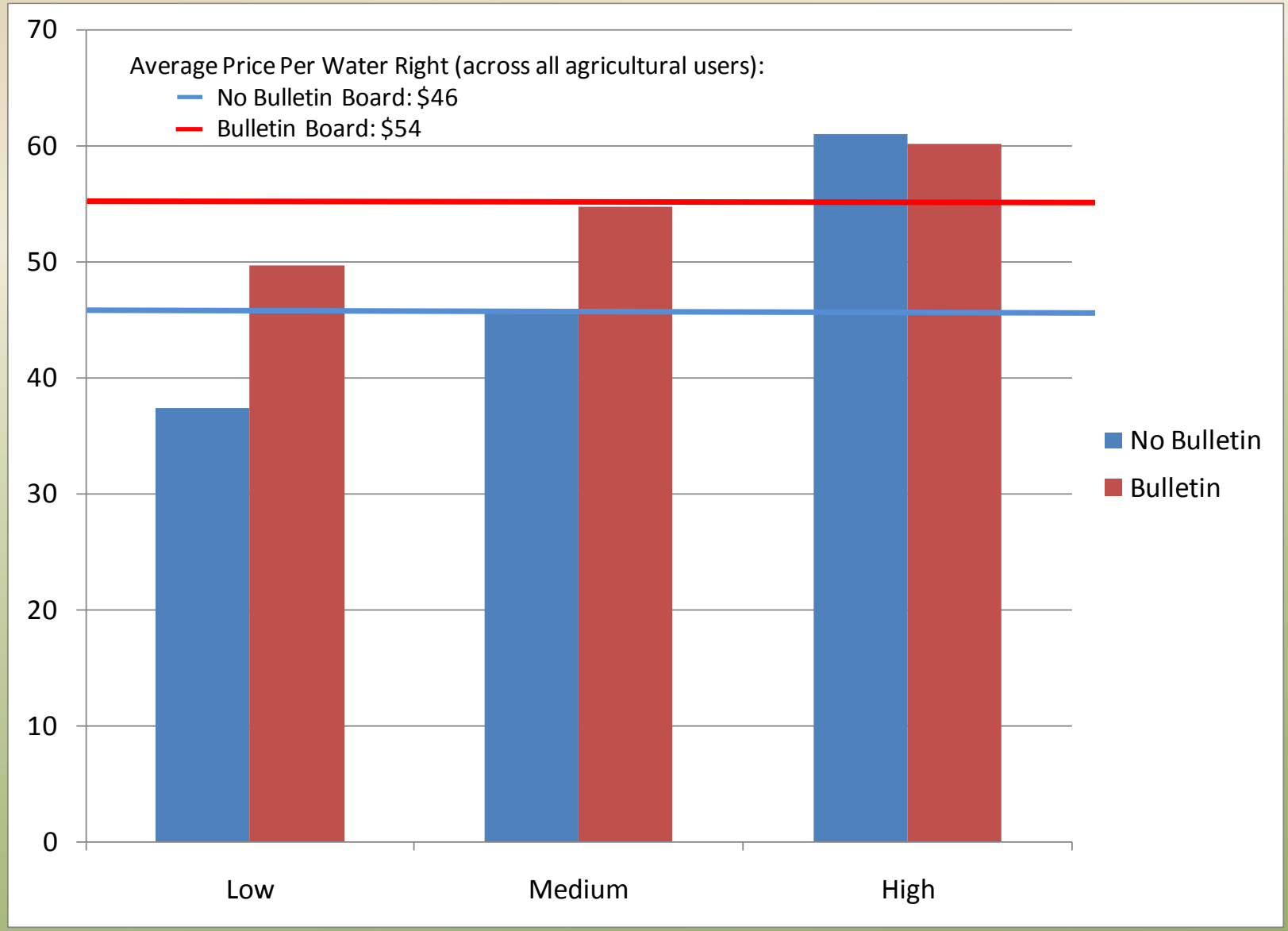
Impact on Agricultural Profits

Total Agricultural Profits per Round		
	No Leasing	Leasing
Total	**2193**	**1749**

Why did agricultural profits fall when leasing was in place?



Results: Water Rights Prices

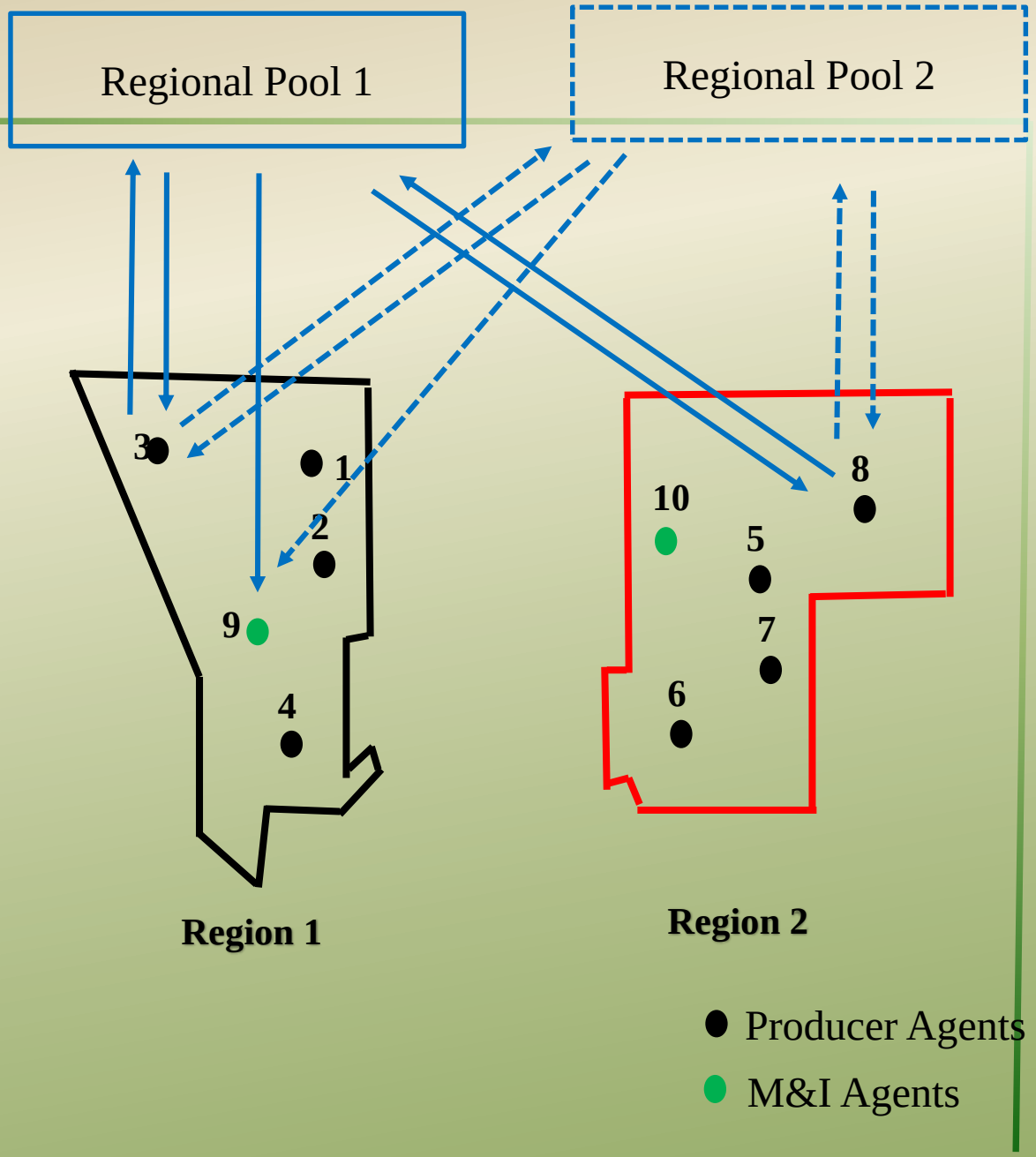


Part 2:

SIMULATED EVIDENCE

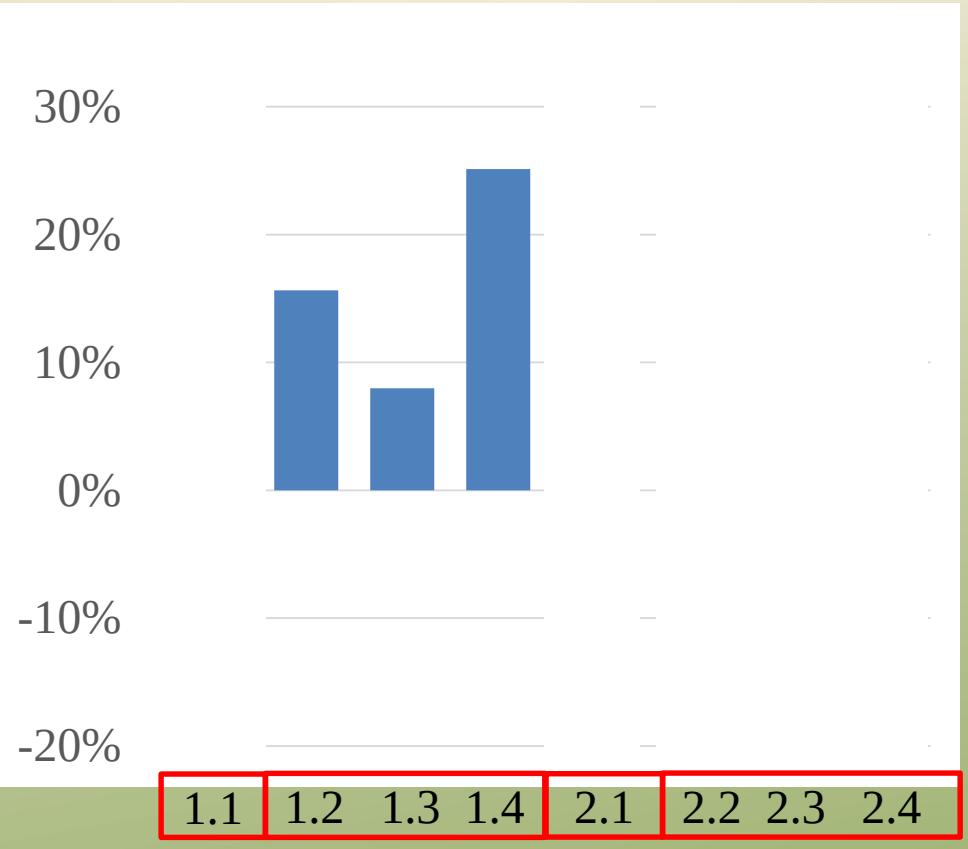
Multiple Regional Pools

- Transaction costs vary across users based on location
- Transaction costs mimic the idea that a buyer is located conveniently to some ditch companies but not others
- Each individual solves their own optimization problem where they have access to multiple regional pools, market conditions are assumed to be perfectly competitive within pools but not across pools

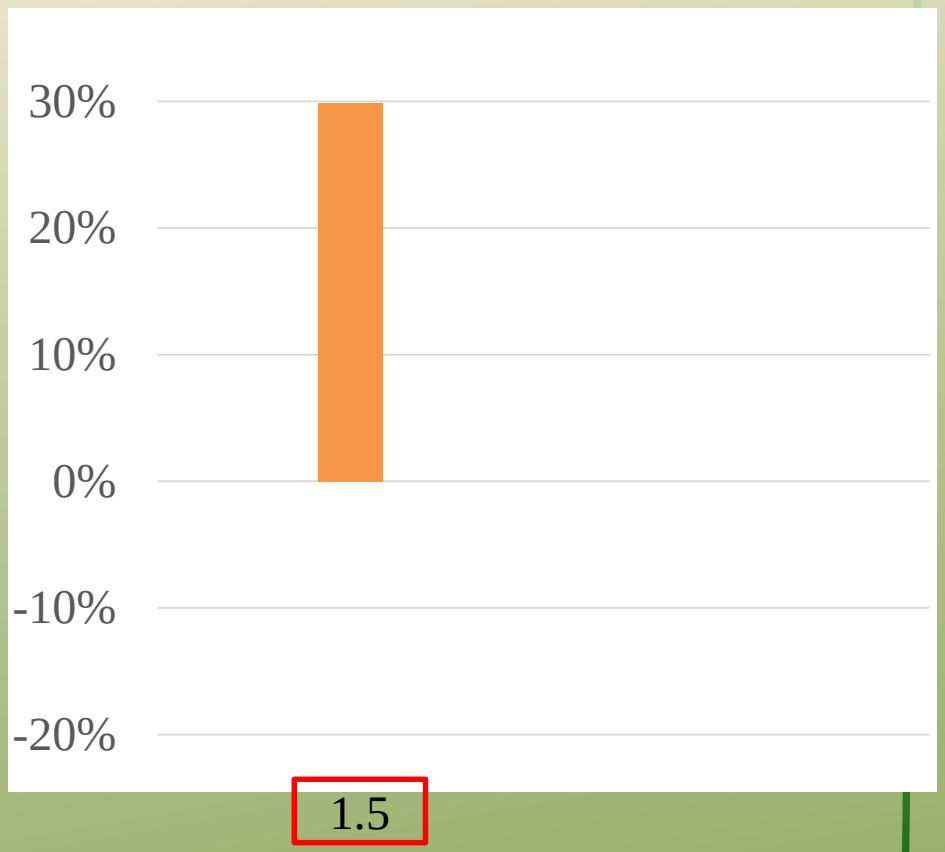


Example Results: Introducing 50% Across-Pool Transactions Costs

Percent Change in Profit



Percent Change in Cost



Questions? Comments?

Contact Information

- Christopher Goemans:

Email: cgoemans@colostate.edu

Phone: (970) 491-7261