

Economic Incentives for Demand Reduction

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"A discussion between two conservationists who are interested in conserving different things often degenerates into polite name calling or worse. Smith will tell Jones that he doesn't know what true conservation is. And Jones will reply acidly that what Smith proposes—far from being conservation—is profligate waste. Finally the discussion ends from boredom or exhaustion, with each conservationist walking away shaking his head and saying to himself that he doesn't see how anyone could hold such inane views."

Orris C. Herfindahl, 1961 (Pg. 1)

Overview

- What is Conservation?
- Types of Conservation Programs
 - A conservation “supply curve”
 - The importance of customer types
- Why Would Someone Conserve or not Conserve?
 - An example
 - The role of the utility
- Potential Barriers to Conservation

What is Conservation?

Conservation as defined by the state of Colorado:

“Water conservation means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution.

The objective of water conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services. (§[37-60-126](#)C.R.S.) ”

Colorado Water Conservation Board Website

What is Conservation?

An economists view of conservation:

*"It is preferable, in my opinion, to preserve common usage and to agree that a conservative act is one which saves something for future use instead of present use or which saves something for use instead of nonuse...A proper usage, if the everyday meaning of "conserve" is retained, should not involve the implicit view that conservation is always desirable. Sometimes it is, but sometimes it is not. **The question always is whether the gains outweigh the costs.**"*

Orris C. Herfindahl, 1961 (Pg. 4)

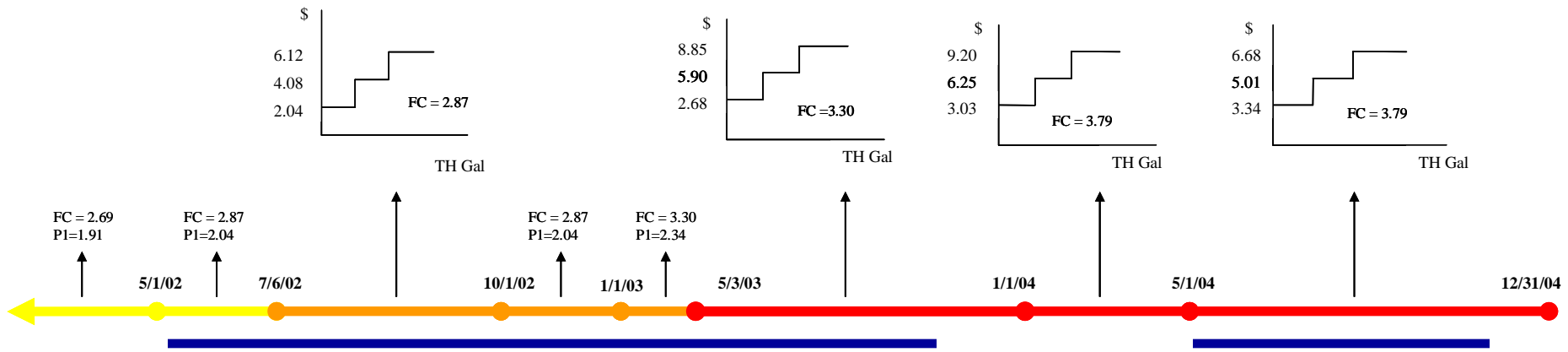
An Overview of Demand Management Policies

- Pricing Strategies
 - Price Level
 - Price Structure
- Non-price Strategies
 - *Outreach and Education*
 - *Restrictions*
 - *Technology Rebates*

Excellent Overviews of the Literature on the effectiveness of these programs:

- Barta (2004; Colorado Water Resources Research Institute)
- Klein et al. (2007)

Timeline of Price and Restriction Policies



Single Rate
Households face a fixed service cost (FC) plus a uniform per unit charge (P1); all prices are shown per thousand gallons (TH Gal)

Inc. Block Rate
In addition to FC, households face an increasing block rate structure for all units consumed. Block widths are standardized across all households

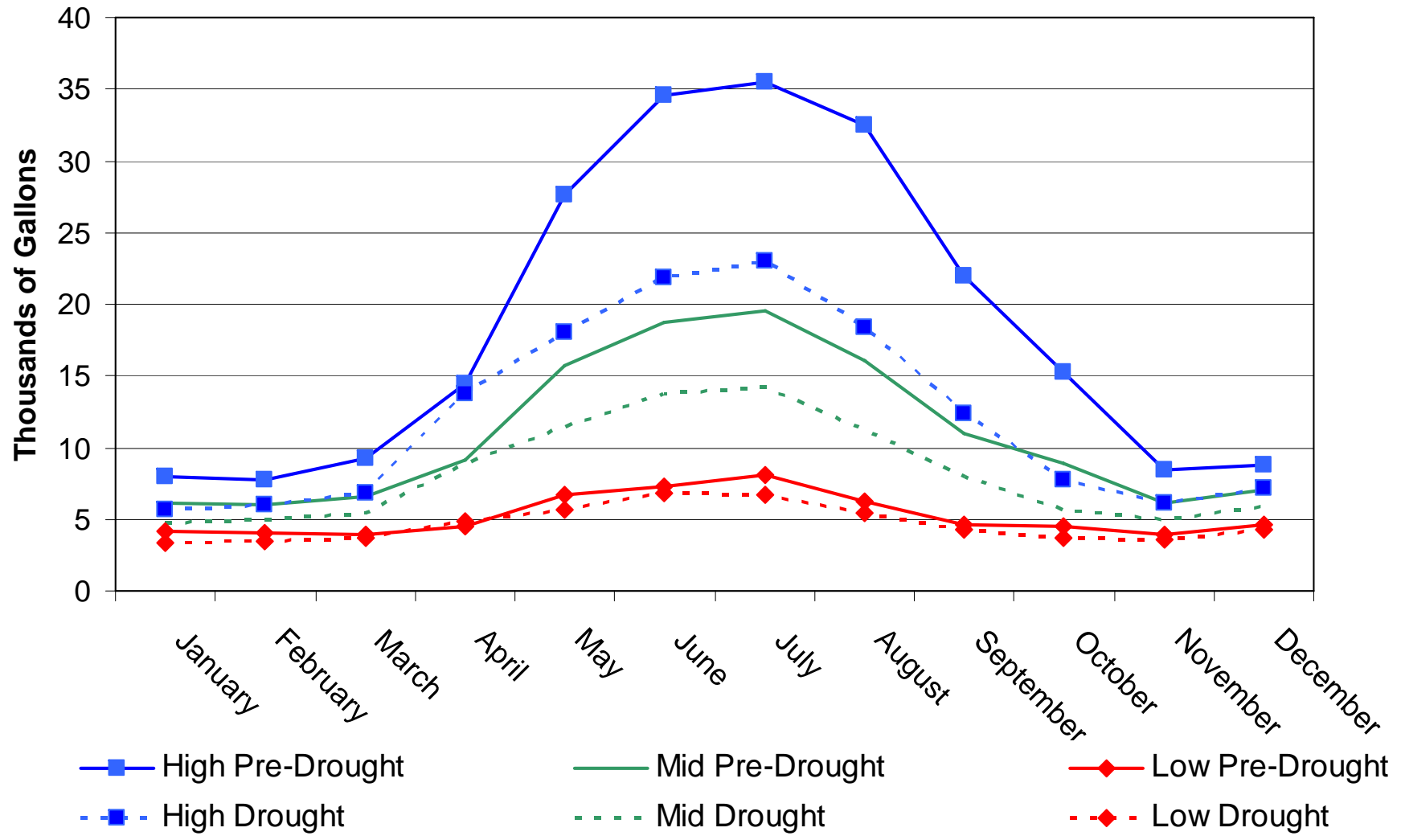
Inc. Block Rate based on Water Budgets
In addition to FC, households face an increasing block rate structure for all units consumed. Block widths are **specific** to each household, based on average daily indoor consumption (ADIC) and an irrigation allowance (IA). Households receive a varying percentage of their ADIC and IA in each block depending on drought conditions.

* Block widths in diagrams not to scale
** Rate structure type reflects the rate structure utilized during summer months

Water Restrictions

Source: City of Aurora: Water Management Plan (2002-2004) and ratesall.txt provided by the City of Aurora Utilities Department.

Water Use by Type of User, Before and During Drought



Effectiveness of Price and Restrictions: Evidence from Aurora, Co

	<u>Price Elasticity</u>
All	-0.60
Low Users	-0.34
Middle Users	-0.57
High Users	-0.75

$$\text{Price Elasticity} = \frac{\% \text{ change in quantity demand}}{\% \text{ change in price}}$$

Why Would Someone Conserve?

Example: Low-Flow Sink

Base Case: Sink
Alternative: Low-Flow Sink

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs: Capital Requirements as of Base Date			
Future Costs: Energy Consumption Costs Energy Demand Charges Energy Utility Rebates Water Costs Recurring and Non-Recurring OM&R Costs Capital Replacements Residual Value at End of Study Period			
Subtotal (for Future Cost Items)	-----	-----	-----
Total PV Life-Cycle Cost	-----	-----	-----

Payback Period
Estimated Years to Payback (from beginning of Service Period)
Simple Payback occurs in year
Discounted Payback occurs in year

Adapted from Page 33 of DOE 2002

A Conservation "Supply Curve"

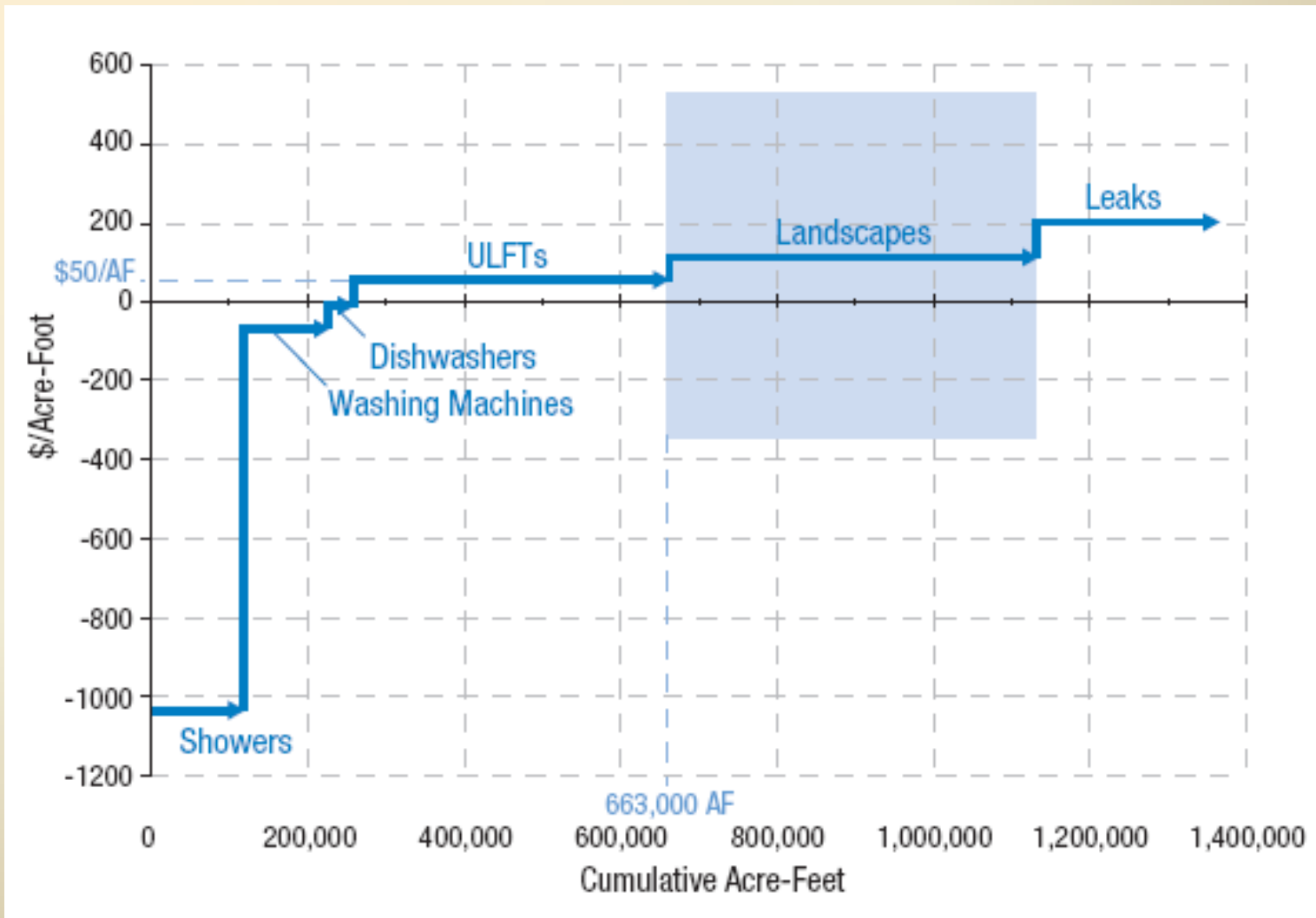


Figure 5-1, Pg. 116, Gleick, Peter H, et al. 2003

Why Would Someone NOT Conserve?

Example: Low-Flow Sink

Base Case: Sink
Alternative: Low-Flow Sink

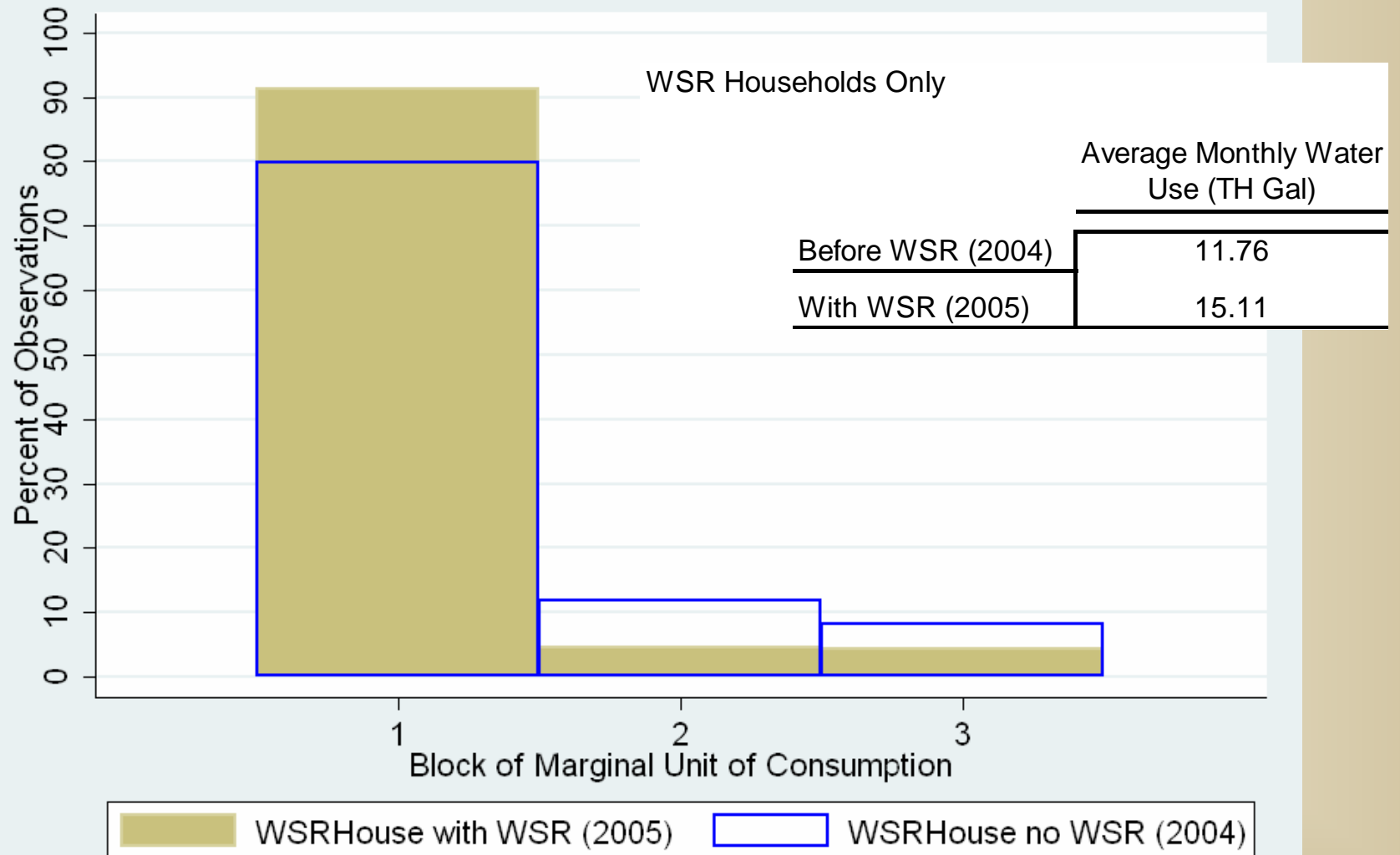
	Base Case	Alternative	Savings from Alternative
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Future Costs:			
Energy Consumption Costs			
Energy Demand Charges			
Energy Utility Rebates			
Water Costs			
Recurring and Non-Recurring OM&R Costs			
Capital Replacements			
Residual Value at End of Study Period			
Subtotal (for Future Cost Items)	-----	-----	-----
	-----	-----	-----
Total PV Life-Cycle Cost			

How can the utility impact the customers' decision?

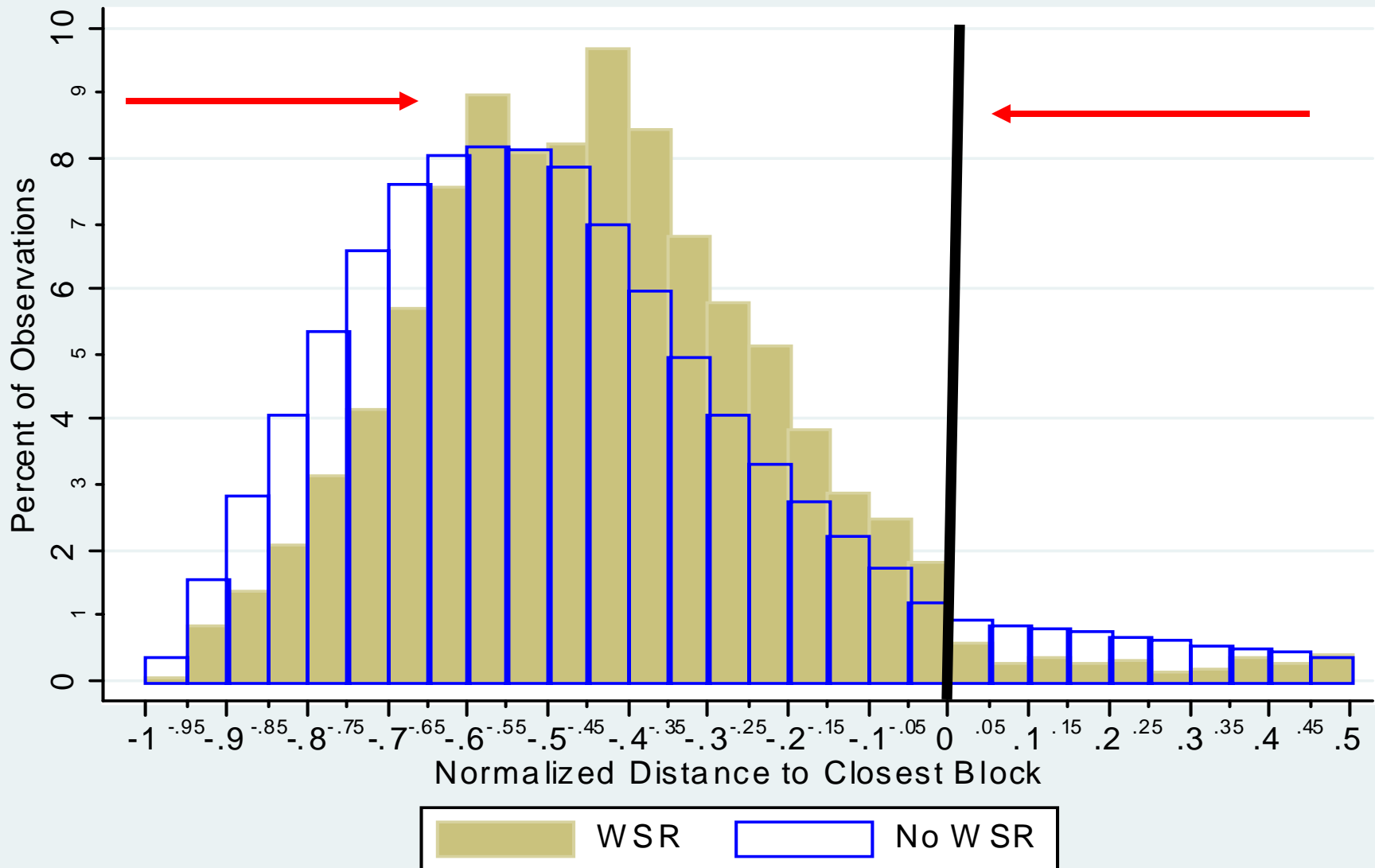
- Rebates
- Price
- Information

Payback Period
Estimated Years to Payback (from beginning of Service Period)
 Simple Payback occurs in year
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Does Information Matter?



Are “Smarter” Customers more Responsive Customers?



Questions? Coments?

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