Water Pricing in Chile: Decentralization and Market Reforms

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- Performance of WR Markets
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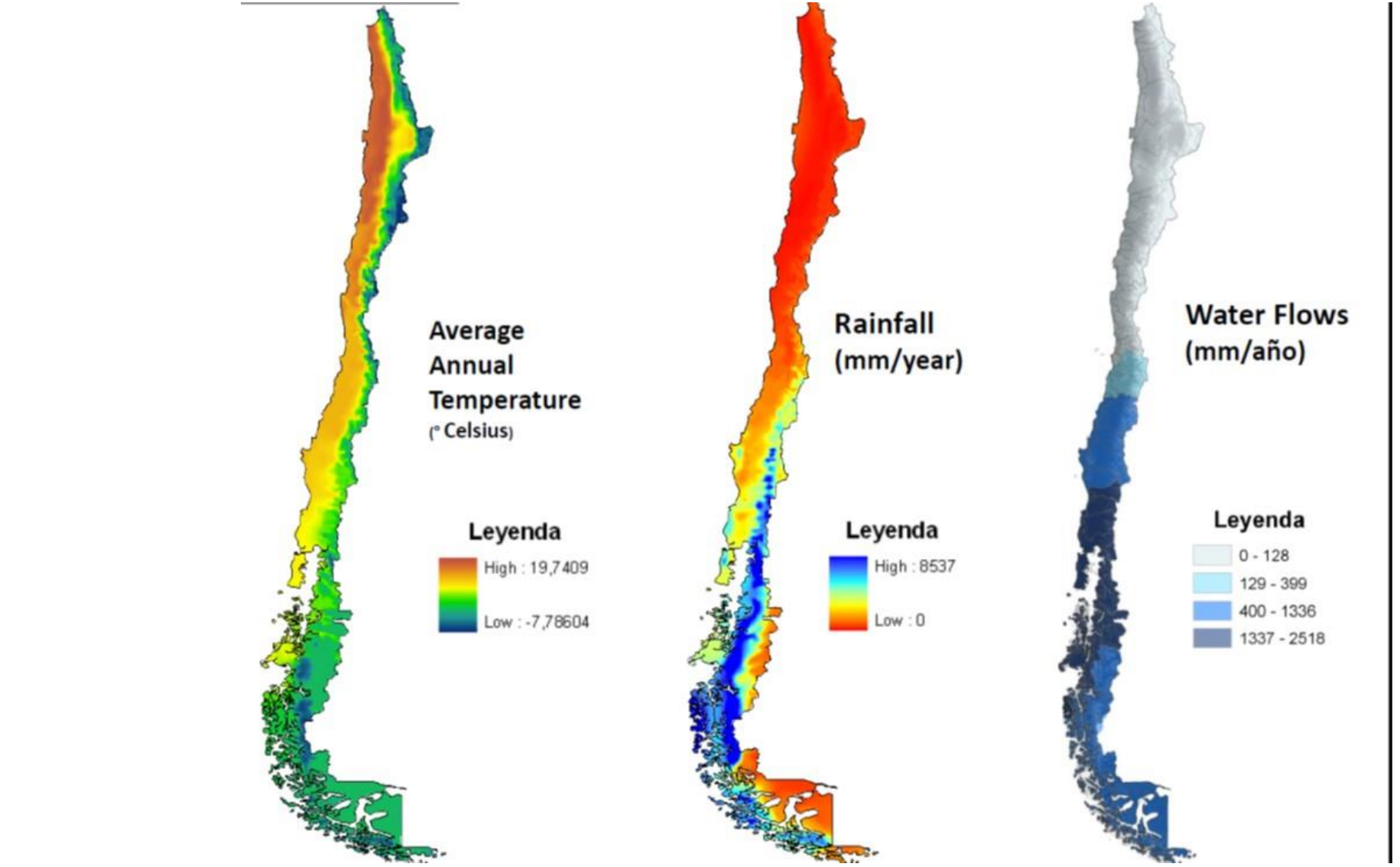
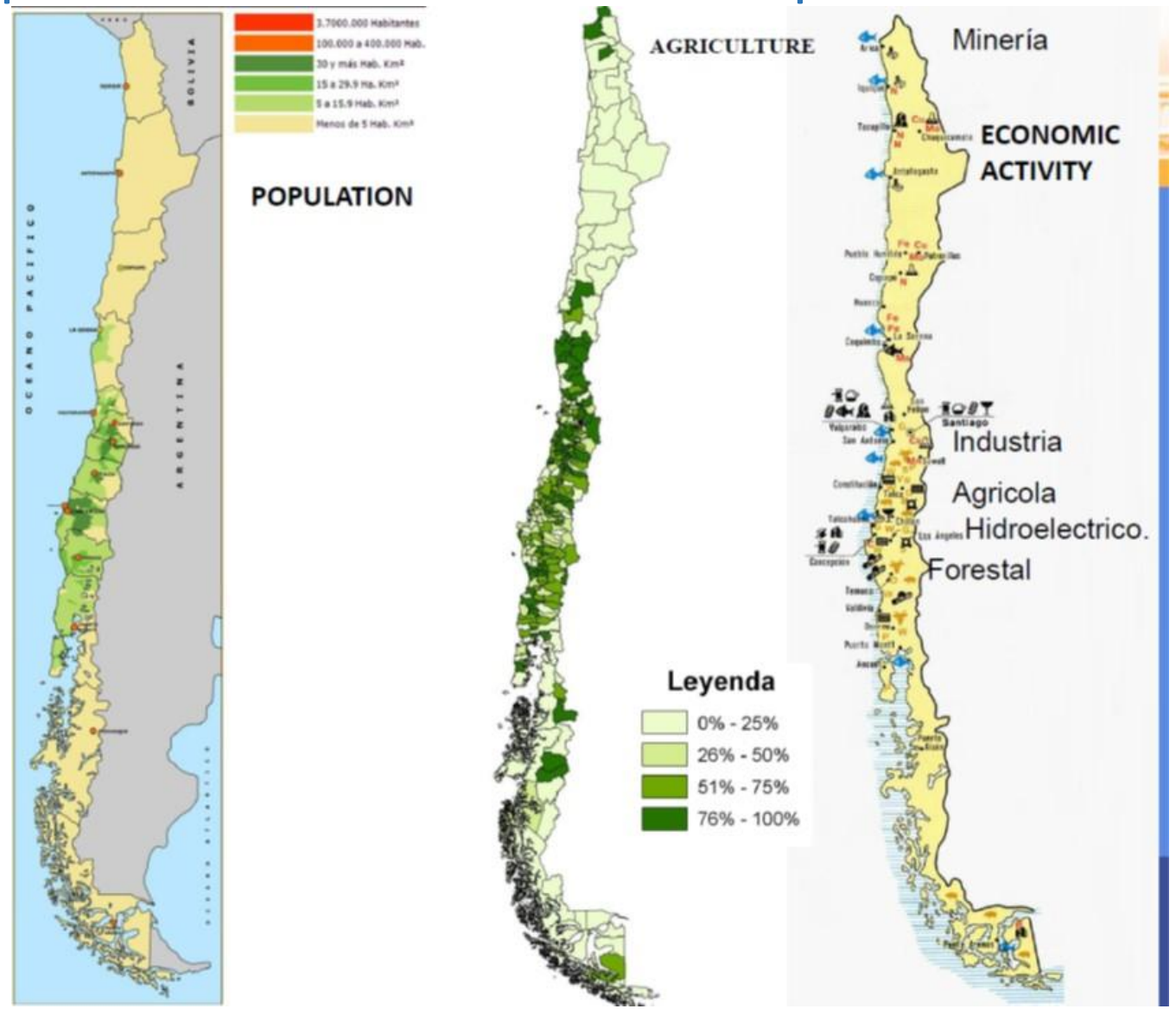
- Closing Remaks

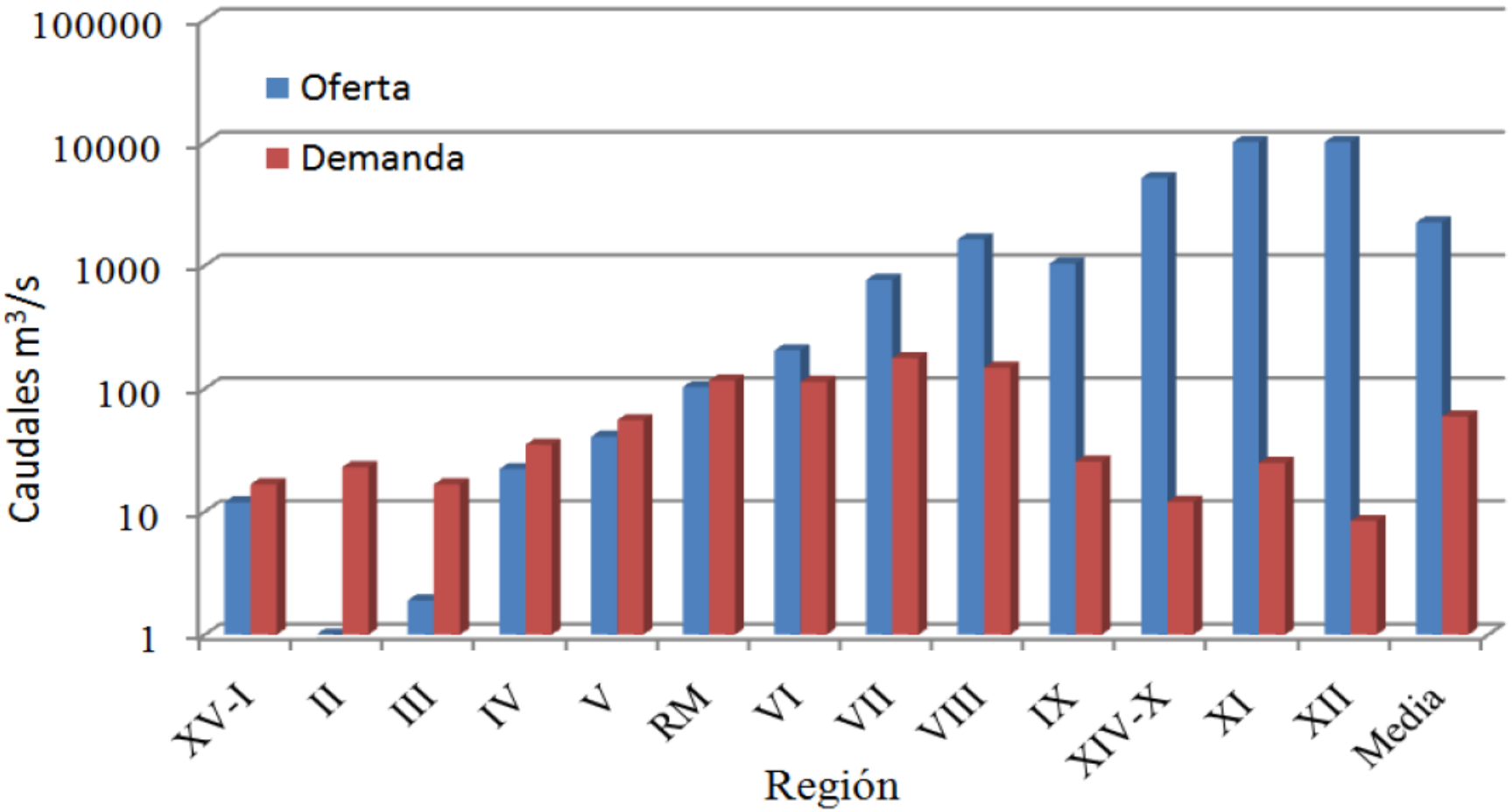
Climatic and Hydrologic Characteristics



Demographic and Productive Spatial Distribution



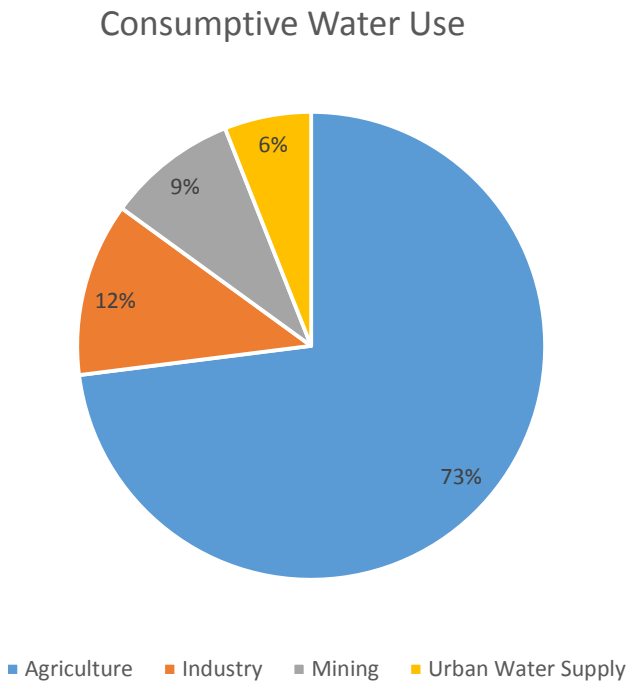
Hydrologic Water Balance (World Bank 2011)



Water Pricing for a Dry Future: Policy Ideas from Abroad and their Relevance to California

Water Withdrawals

- Approximately 4.000 m^3/second/year (World Bank, 2011).
  - 85% is used in non-consumptive hydroelectric generation.
  - Consumptive water use in Chile



1981 Water Law

- During the late 1970s, economic paradigm changed from
  - One in which the State must protect and oversee optimal allocation of resources,
  - To one in which the market is responsible for allocating resources in an efficient manner.

- The Water Code of 1981 (WC 1981)
  - Maintained water as “national property for public use
  - Granted permanent, transferable water-use rights
  - WR are not sector specific
  - No Priorities

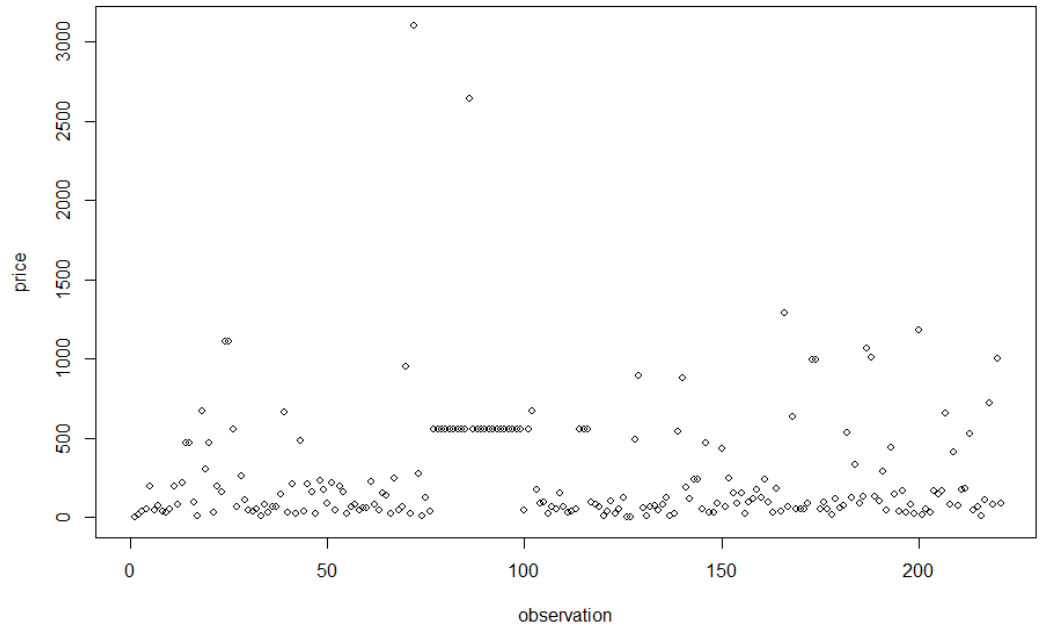
Surface WR Transaction and Prices (2005 – 2008)

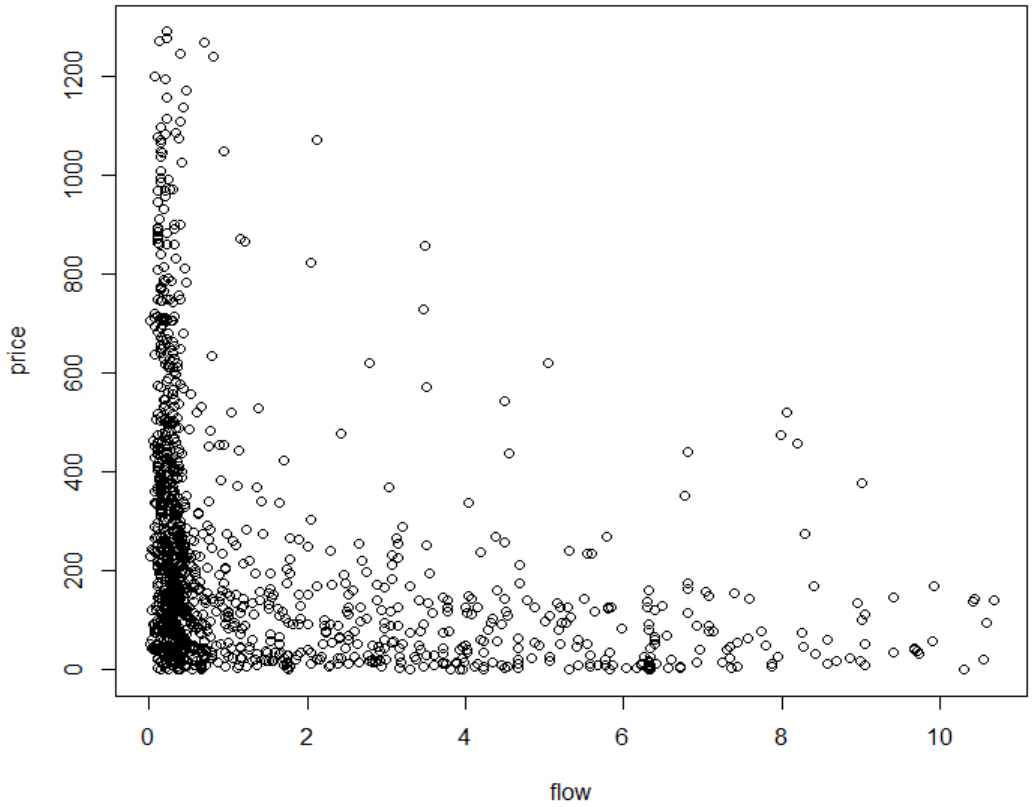
Region	Total Transactions (Number WR)	WR Transactions independant of Land	WR Transaction Values (Only WR Transactions independent of Land) (10^6 US$)	Average WR Transaction price (US$/WR)
Dry Pacific	12,221	11,223	3,623	512,243
Central Chile	8,835	8,522	1,160	228,737
Southern Humid Pacific	793	784	31	50,863
Total	**21,849**	**20,529**	**4,814**	**215,623**

Source: (World Bank, 2011)

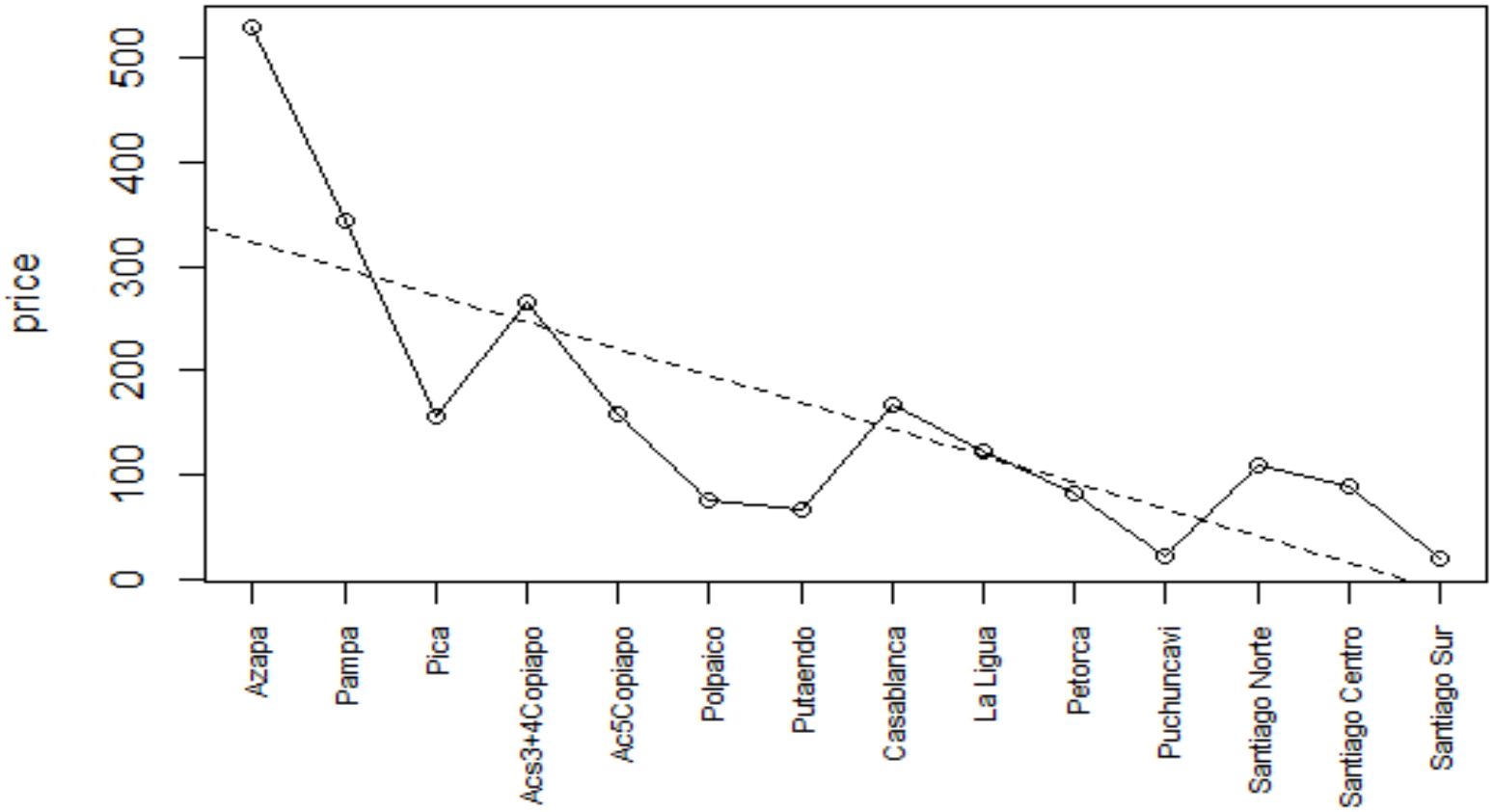
Surface WR Prices in Maipo Basin

- WR prices present a large dispersion
  - CV = 470%





Groundwater WR prices (UF/l/s) from north to central Chile



Performance of WR Markets in Chile

- WR Market
  - Allowed users to consider water as an economic good
    - Internalizing scarcity value
  - Facilitated the reallocation of granted rights
    - Development of mining in areas in the semiarid northern region of Chile
    - Satisfy growing urban water demand in Central Chile
    - Solution or water scarcity problems when a quick response has been required
  - Increased water use efficiency in agricultura, industry and mining

Problems of WR Markets in Chile

- Minimum ecological flows have not been implemented
  - WC reform 2005 established requirement
  - Most river basins located in the Dry Pacific and Central Chile Regions fully or over allocated thus it has not been possible to implement

- Third party effects of WR transactions
  - Transfer authorization is requriered only when transaction implies a change in water extraction point
  - Insufficient institutional capacity

Urban Water Pricing Regulatory Framework

- Legal Frawork (1988)
  - Separated regulatory and supervisory functions from service provider;
  - Establishes efficient tariffs so as to allow operators
    - To finance operation,
    - To finance investment requirements, and
    - To obtain a minimum return on their investments;
  - Established a subsidy to insure affordability for low-income families.

Urban Water Pricing Regulatory Framework

- New regulatory regime considered concessions to establish build and operate water and sanitation services by private providers
  - Concession holder is obliged to satisfy water quality standards,
  - Conform to the tariff regime, and
  - Implement required investment plans so as to meet increasing water demand ensuring supply continuity and quality of service.
    - No water cuts or rationing during the recent 8 year drought
  - WSS provider that does not satisfy these requirements, loses the concession
    - No indemnization

Urban Water Pricing Regulatory Framework

- State's Superintendencia de Servicios Sanitarios (SISS) role is to
  - Grant WSS concessions;
  - Monitor WSS's compliance of the development plan;
  - Set efficient tariffs that ensures full cost recovery; and
  - Monitor the continuity and quality of the water and sanitation provision service.

Tariff Setting model

Objectives

- Economic efficiency
- Water conservation incentives
- Equity
- Affordability

Policy makers face the challenge of setting water tariffs which deal with multiple objectives.

Tariff Setting in Chile

Two Part Tariff (Coase Solution)

- **Fixed charge** ($) function of metering costs and water conection diameter
- **Variable charge** ($/m^3) satisfies efficiency criteria
  - **Non Peak Variable charge**
    - Operation and Distribution Costs
  - **Peak Variable charge**
    - Operation Costs

Tariff Setting in Chile

Efficient Model Firm

Firm that starts from zero
Uses the necessary assets
To offer water and sanitation service
With an investment plan

Tariff Setting in Chile

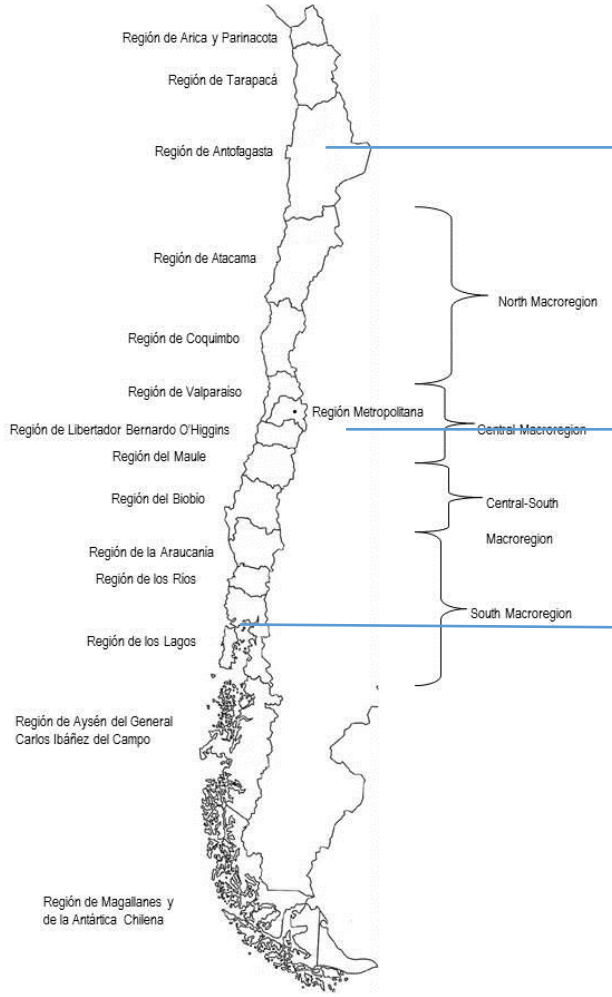
$$\tau = \frac{AI+OC+MR+T}{C}$$

AI: annualized value of the required investments.
OC: annual operating and maintenance costs.
MR: minimum guaranteed returns (only over WSS investments)
T: taxes
C: total annual projected water consumption for the next 5 years in the concession area.

AI considers water's scarcity value

- Market WR value

Tariffs 2014



Fixed cost = US$ 1,9 = € 1,5
Variable Tariff = US$ 1,3 = € 0,83
Peak Tariff = US$2,2 = €1,8

Fixed cost = US$ 1,1 = € 0,8
Variable Tariff = US$ 0,4 = € 0,44
Peak Tariff = US$1,4 = €1,1

Fixed cost = US$ 1,0 = € 0,8
Variable Tariff = US$ 0,88 = € 0,70
Peak Tariff = US$1,3 = €1,0

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Equity and Affordability

Affordability criteria:

- Provision of subsidies directly to the most vulnerable households which are classified based on annual survey.
- Central government transfers the block subsidy to the municipalities.
- The payment share ranges from
  - 15% to 85% of the water bill for low income households
  - 100% for vulnerable households
- Subsidy covers a consumption of up to 15 m^3/month.

Equity and Affordability

Water Consumption and Sanitation Subsidy

- Administered by Ministry of Social Development
  - Fosis Program
  - Casen Survey
    - Yearly and national
  - Applied to other sectors
    - Electricity subsidy
    - Housing subsidy

Equity and Affordability

Water Consumption and Sanitation Subsidy

- Advantages
  - Economic signals are not distorted
    - Families recieve bill with total consumption and cost
  - More equitable than implicit subsidies in tariffs
  - Separates public agency that sets the tariff from the agency that identifies subsidy recipients

- Disadvantage
  - Implementation costs

Chile's Urban Water and Sanitation sector

Growth and Evolution

Management Model

Water Coverage

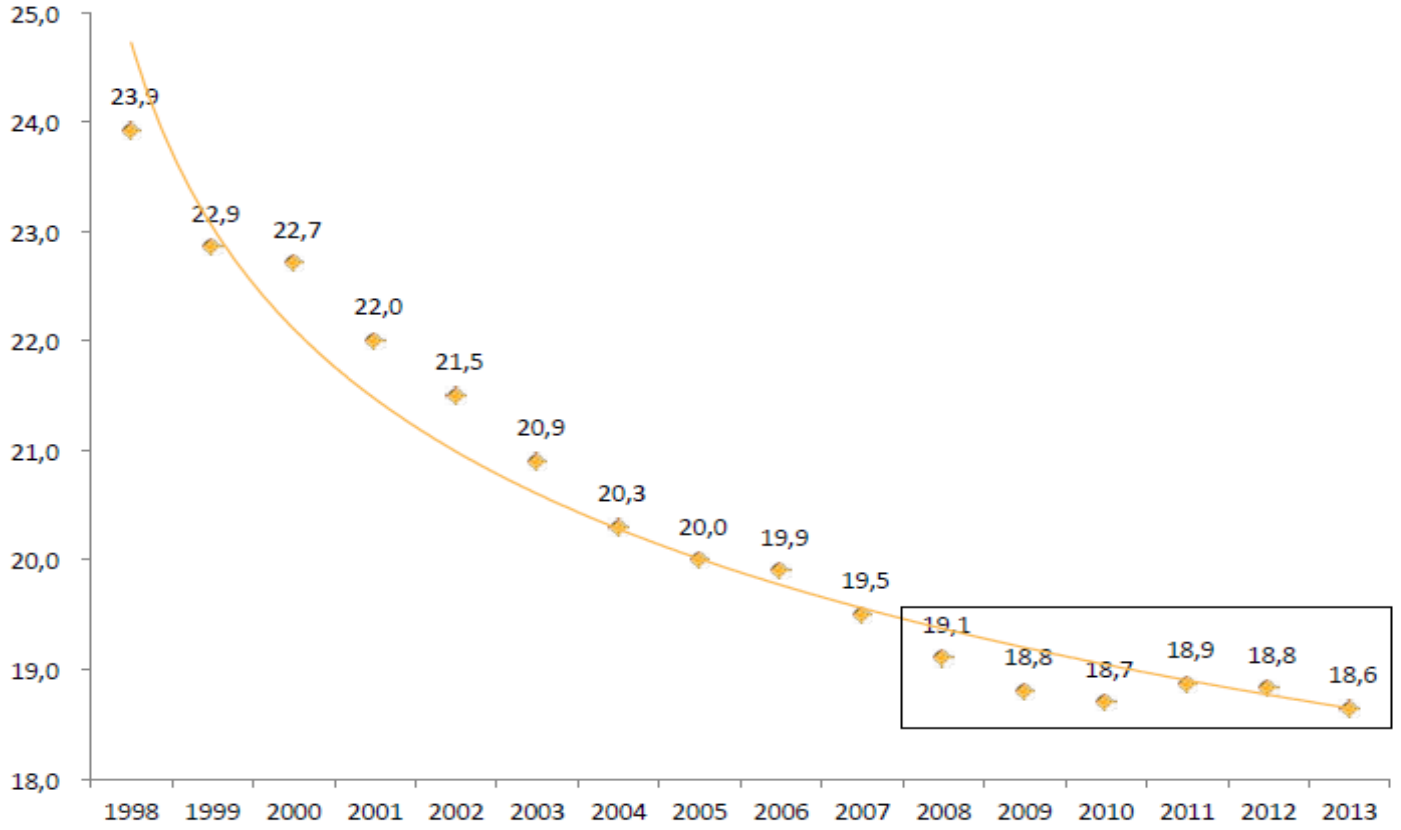
Sewer Coverage

Waste water treatment

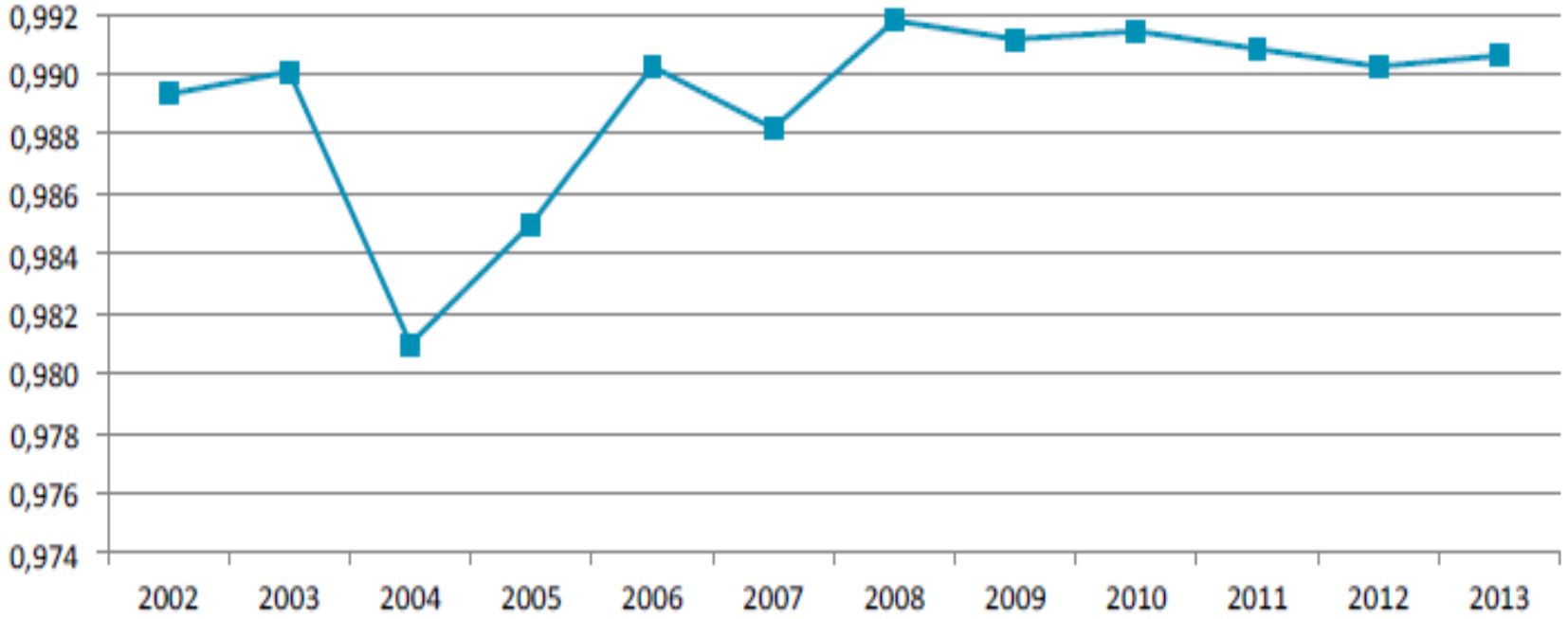
Average annual investment

SISS (2013)

Average monthly household water consumption (m^3/household/month) (SISS, 2013)



Water service quality satisfaction (SISS, 2013)



Closing Remarks

- WR Market
  - Allowed users to consider water as an economic good
  - Facilitated the reallocation of granted rights
  - Increased water use efficiency in agricultura, industry and mining
- Challenges
  - Implement ecological flows
  - Eensure optimal water use without compromising the sustainability of rivers and aquifers

Closing Remarks

- Chilean WSS Regulation has provided
  - Right economic signals for an efficient allocation of resources.

- Led to
  - Improvement in quality of service
  - Increase in WSS provision coverage, despite rapidly increasing urban populations; and
  - Increase in water conservation by customers.

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