

# Valuing Lagoons Using a Meta-Analysis Approach: Methodological and Practical Issues

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# Introduction

- The European DITTY Project
  - The aim of this program was to develop scientific and operational tools for a more rational management of lagoon resources.
  - The analysis focused on 5 Mediterranean lagoons.
  - It took into account the different activities inside and outside the lagoons as well as the ecosystem.
- Water quality and its economic aspects
  - A major aspect of lagoons ecosystems:  
definition, criteria, impacts, economic valuation?
- How to value water quality ?
  - The valuations or benefits transfer method.

# Economic values related to lagoon activities

## Total economic value

### Use values

#### Direct use value

##### Use with or without catchments

- Industrial processes
- Agriculture
- Recreation
- Tourism

#### Indirect use value

##### Functionnal benefits

- Natural habitat
- Ecosystem
- Physical protection
- Physical location
- Life support

#### Option value

##### Direct and indirect future value

- New users
- Additionnal use
- Habitat preservation

### Non-use or passive use values

#### Heritage value

##### Environment value for future generations

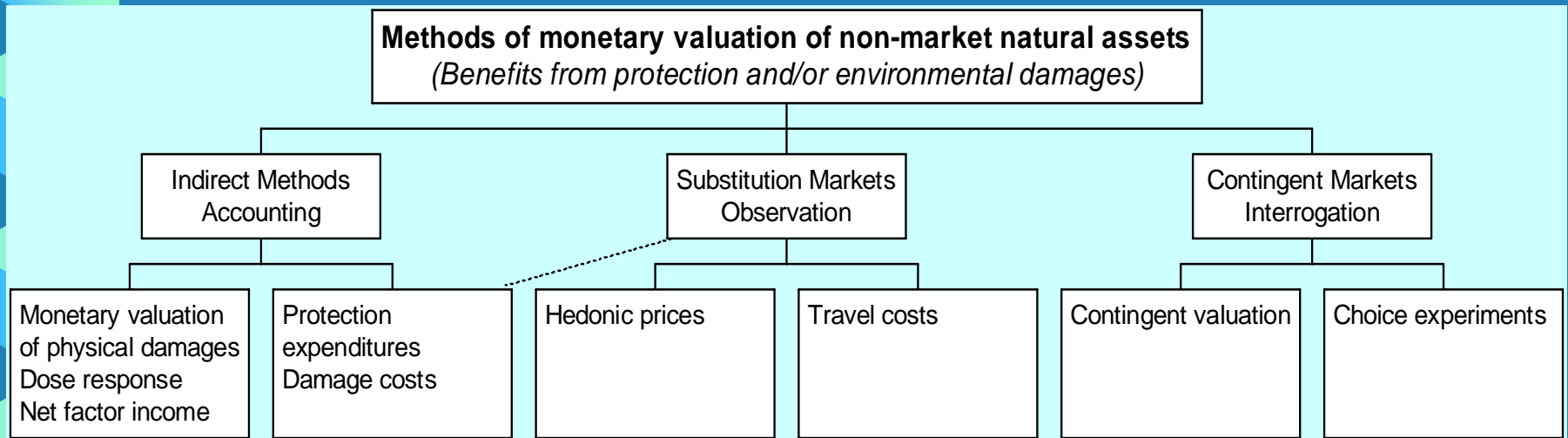
- Species
- Inhabitants
- Ways of life

#### Existence value

##### Knowledge of continued existence value

- Natural habitat
- Endangered species
- Ecosystem
- Aesthetic

# Monetary valuation of non-market natural assets



# Valuations Transfers

## 1. Main principles

### **The traditional valuation methods**

- Valuation for a given population at a given time.

### **Principle of the valuations transfer**

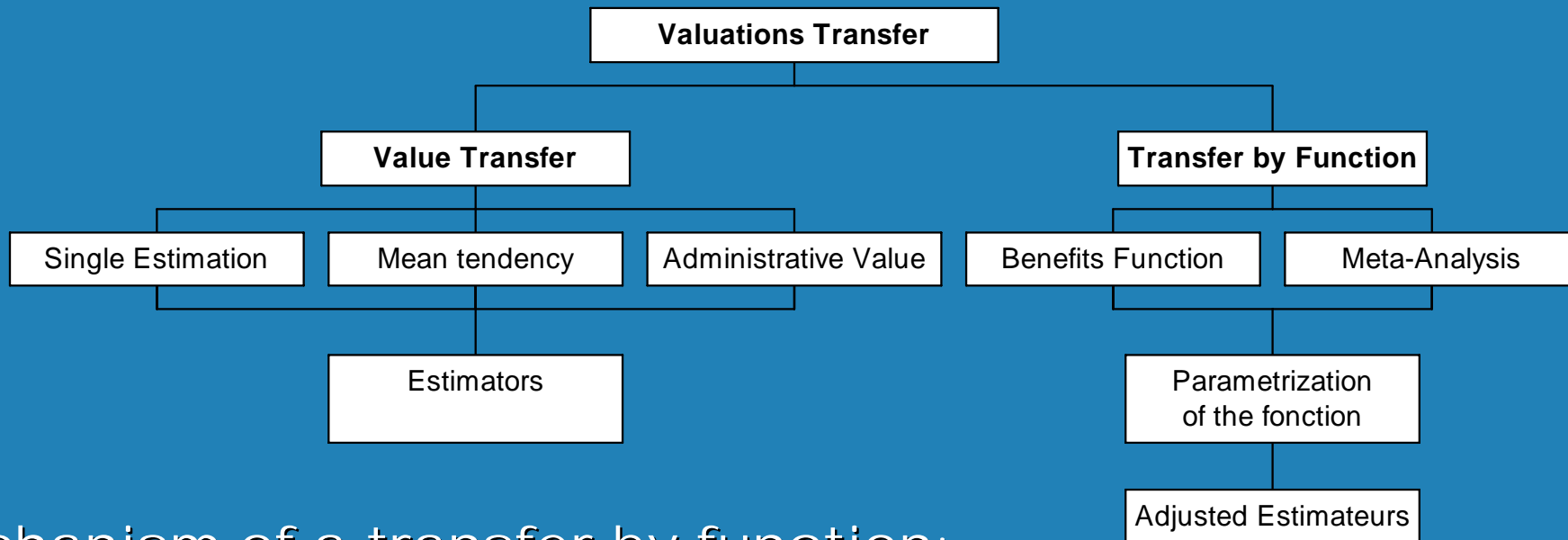
1. Carry out (or use) a survey or a set of significant surveys relative to the characteristics of the asset.
2. Transfer the value(s) obtained with these surveys to the sites whose characteristics are similar.

### **Advantages**

- To value similar assets, one survey is enough!
- Savings of time and money.

# Valuations Transfers

## 2. Methodologies



Mechanism of a transfer by function:

1. Regression on the study site(s)

$$WP_A = \beta_0 + \beta_1 X_{1A} + \dots + \beta_n X_{nA}$$

2. Valuations transfer

$$WP_B = \beta_0 + \beta_1 X_{1B} + \dots + \beta_n X_{nB}$$

Adapted from Rosenberger and Loomis (2000)

# Valuations Transfers

## 3. Precautions of use

### **The main risks while performing a Valuations Transfer**

- Choice of the primary studies and of the transfer method
- Correction of the geographical (Purchasing Power Parity) and temporal (Inflation) effects.
- The quality of the primary study is essential for the success of the transfer process and for its interpretation.

### **Debatable performances**

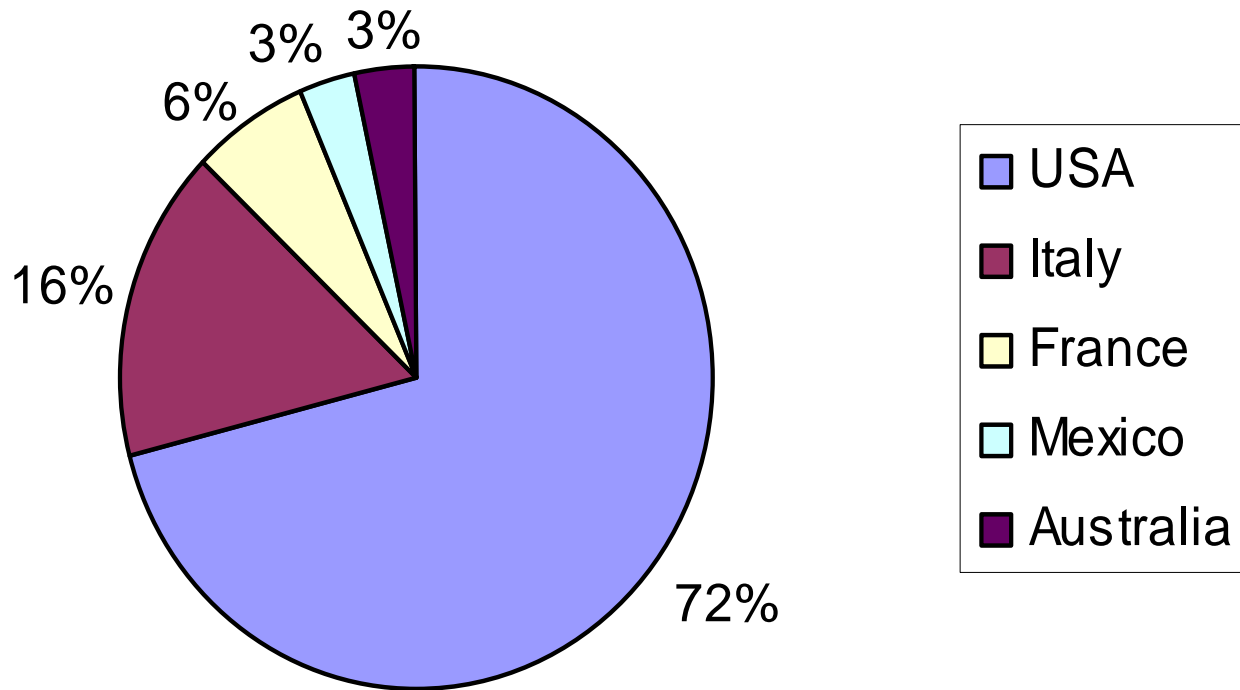
- Error rates  $\Leftrightarrow$  50 % for the best studies.
- A greater reliability using transfers by function or meta-analysis.



# Setting up a monetary database dedicated to lagoons

- Research field: economic valuation of lagoons
- Sources: EVRI, FAO, literature...
- Components:
  - 32 studies
  - 67 observations
- Main variables:
  - Site characteristics
  - Methodology of the survey
  - Characteristics of the survey
  - Functions of the lagoon
  - Activities inside & outside the lagoon
  - Threats on the lagoon

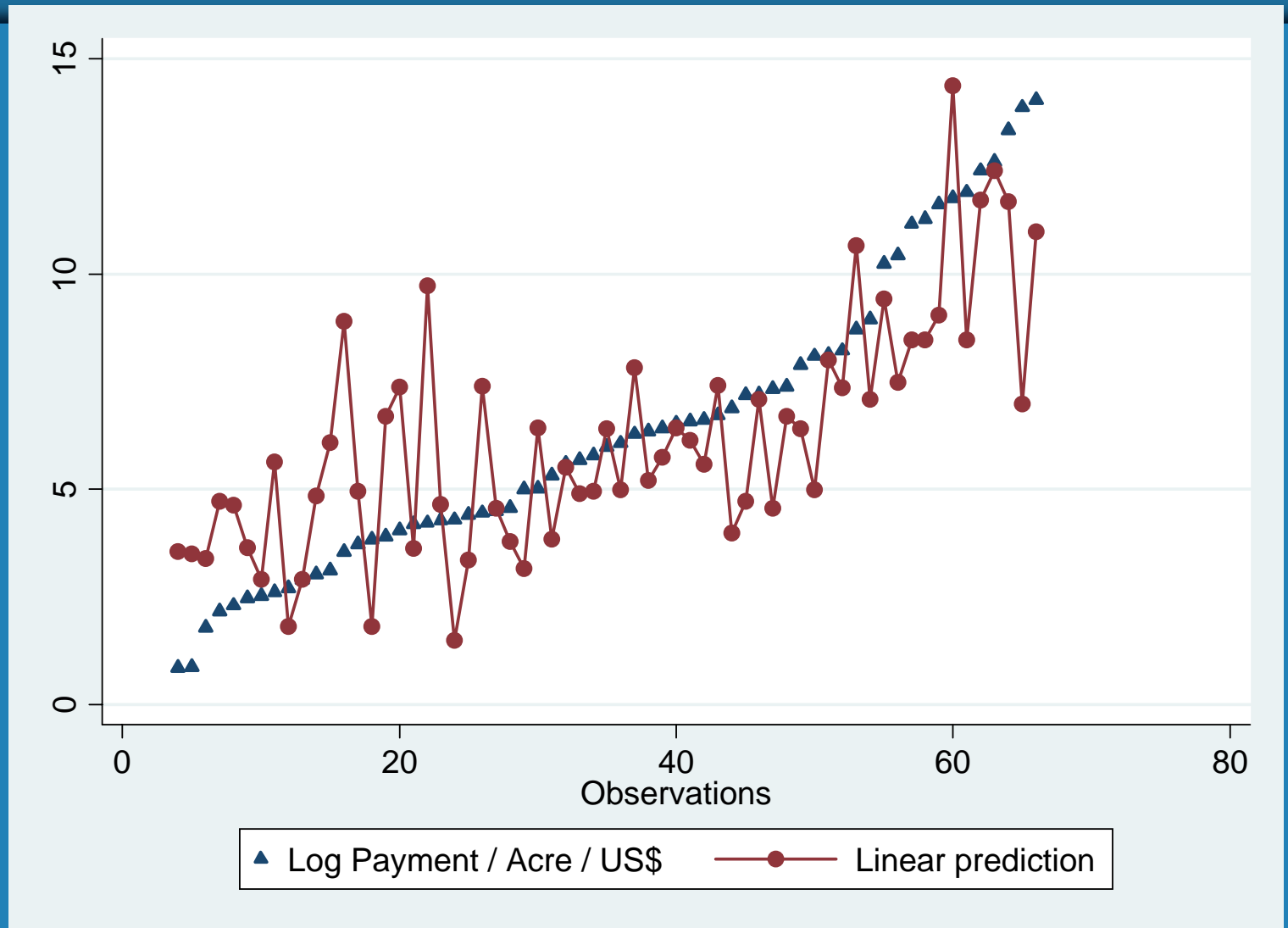
# Geographical origin of the studies



# The model ( $R^2=0.649$ )

	<i>Coefficients</i>	<i>t-value</i>	<i>Possible Interpretations</i>
Intercept	7.081***	2.94	-
Year	0.181***	3.49	↗ of Public care for the Environment
Ln (Surface)	-0.324**	-2.45	↘ of Marginal Utility with Size
Rural	1.979	2.27	In accordance with other studies
Substitutes	1.727	1.57	Biodiversity
Improvement	1.495	1.58	Biodiversity
Nature	2.206**	2.37	Biodiversity
Protection	2.065	1.50	Biodiversity
Culture	-1.685	-1.08	Threats
Sport	-1.202	-1.21	Threats
Activity-In	0.200	0.21	Valorization
Activity-Out	-0.870	-0.80	Threats
Pollution	-5.202***	-3.81	Degradation of the Ecosystem
Publication	-1.953*	-1.77	-
Reliability	1.650*	1.68	-
Stated	0.449	0.46	Includes both use and non-use values
Producer Surplus	-4.343***	-5.51	In accordance with other studies
Income Tax	2.215*	1,67	In accordance with other studies

# Validation of the model (1)



# Validation of the model (2)

- Mean Absolute Percentage Error

$$MAPE = \left| \frac{V_{observed} - V_{estimated}}{V_{observed}} \right|$$



87%

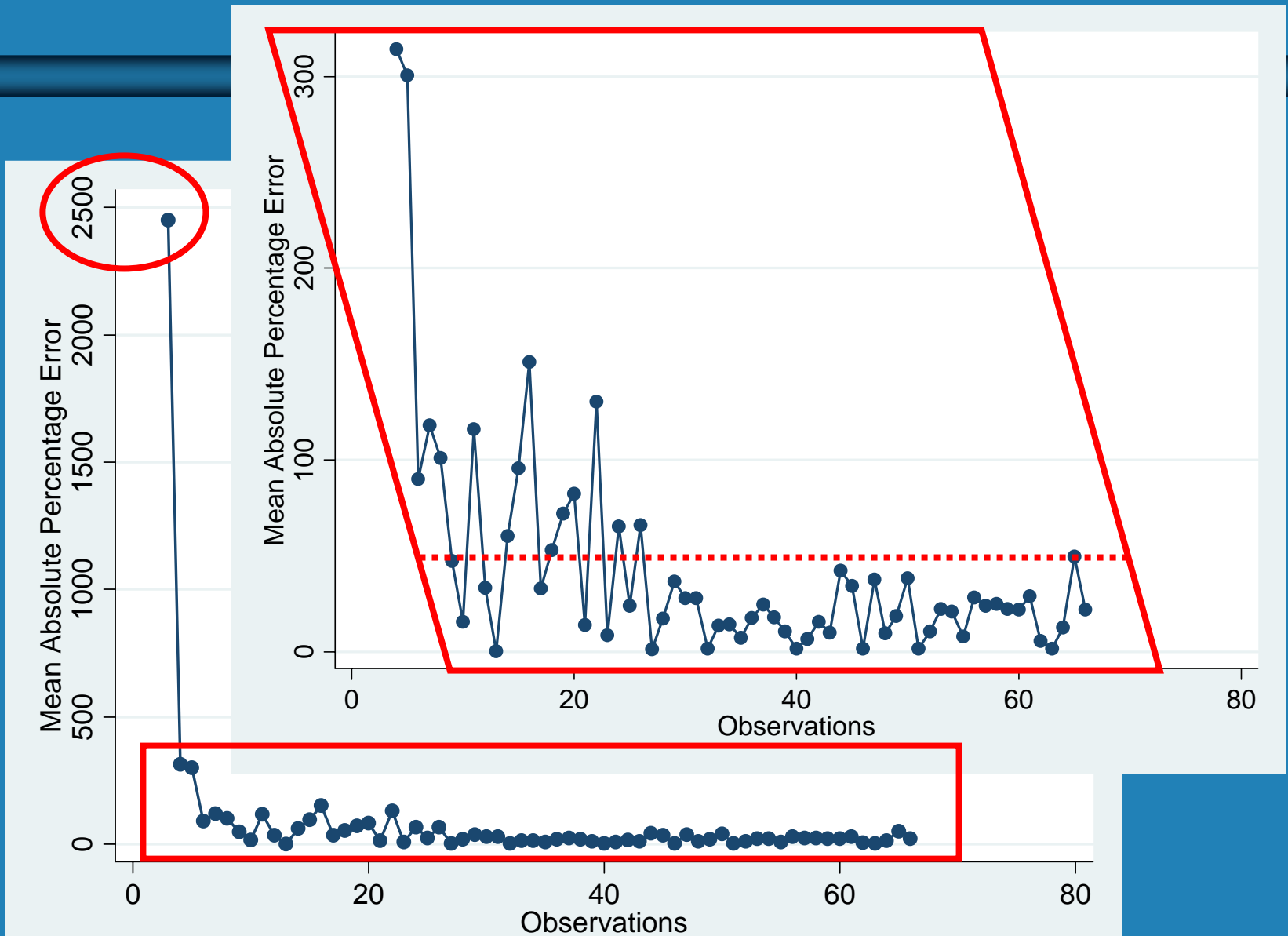
- Jackknife

→ Estimations of the regression for  $n-1$  observations and test for the  $n^{th}$  observation (exogenous)



95%

# Transfer Deviations (Jackknife)



# Concluding remarks

- An approach focused on lagoons
  - Takes into account lagoons specificities
  - Available for all types of lagoons in developed countries
- Econometric validity
  - Usual tests
  - Jackknife
- Results in accordance with literature
  - Need for "good" original studies
  - Transfer deviations rates
- Future extensions to developing countries

# References

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Thank you  
for your attention!

