ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

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Integrated Water Resource Management

WATER MARKETS IN EU AGRICULTURE: RESULTS FROM EX-ANTE ECONOMIC EVALUATION

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Workshop: Water markets A response to water scarcity and drought in Europe? Paris, 11/02/2014

OUTLINE

- Why ex-ante economic evaluation
- Modeling exercise Italy
- Modelling exercise France
- Modelling+WTA Spain
- Discussion
- Conclusions

WHY EX-ANTE ECONOMIC EVALUATION

- Assess potential economic costs/benefists from establishing trade (before it is established)

- Modelling approch->simulation
- Survey approach->stated intentions/WTA/WTP

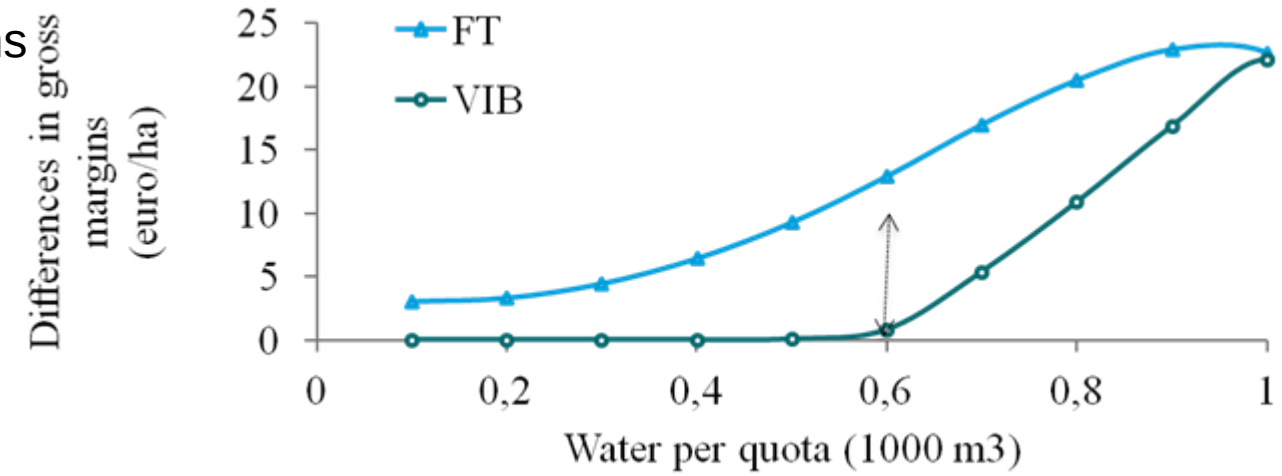
MODELISATION OF WATER MARKETS – SMALL RESERVOIRS (ITALY)

- Linear programming under constraints using GAMS
  - Water allocation among farmers in small artificial reservoirs
  - Objective function : maximizing the gross margin of farmers
  - Constraints: needed and available water (quotas)

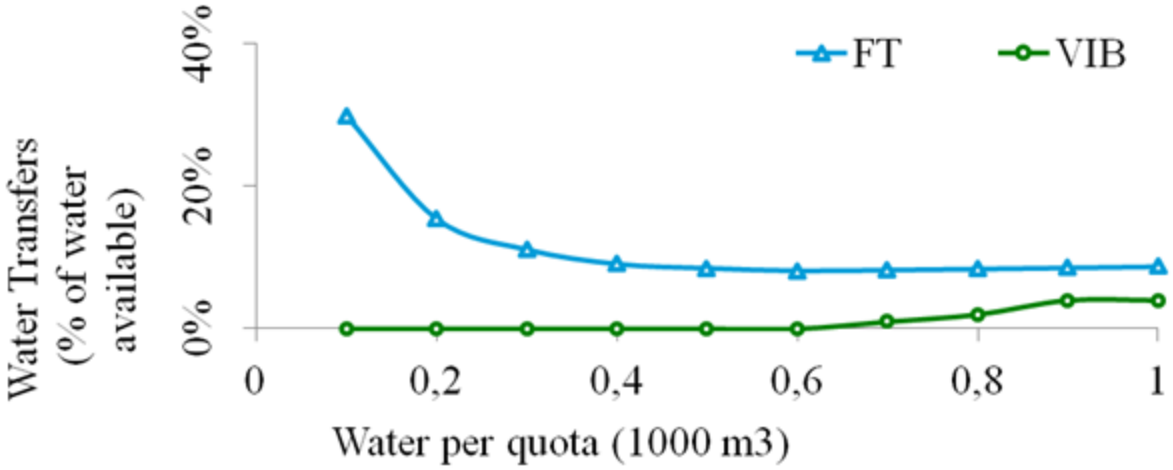
- Used to simulate
  - the impacts of changing water availability
  - the potential benefits of water market

WATER REALLOCATIONS WITHIN RESERVOIRS (RAVENNA PROVINCE, ITALY):
FREE TRADE VS VOLUNTARY IRRIGATION BOARD ARRANGEMENTS

Gross Margins



Water Transfers



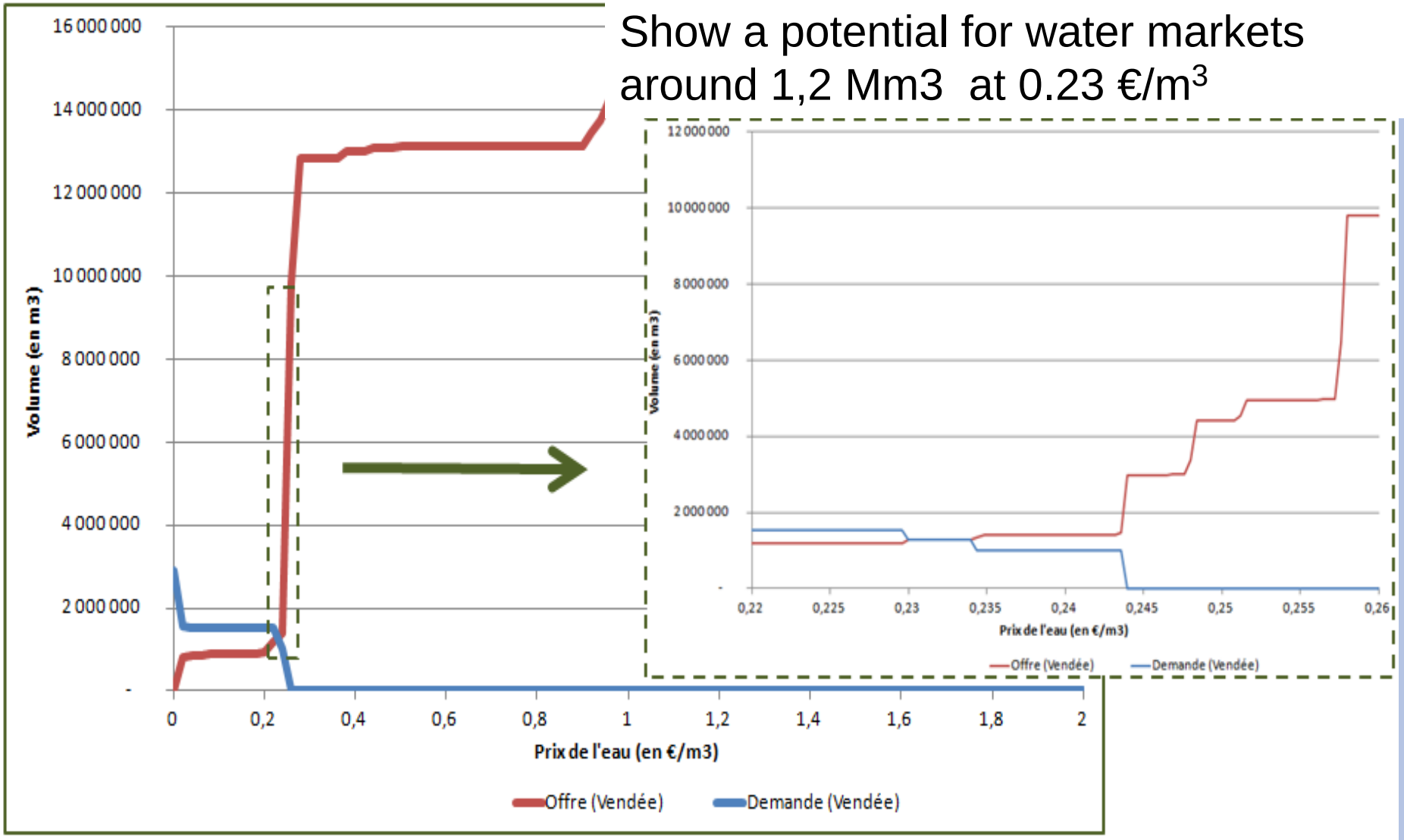
MODELISATION OF WATER MARKETS – MARAIS POITEVEN (FRANCE)

- Linear programming under constraints using GAMS
  - Objective function : maximizing the gross margin of farmers
  - Under the constraints of needed and available water (quotas), crops rotations, etc.

- Used to simulate
  - the impacts of a reduction of quotas
  - the potential benefits of water market
  - the effect of taxes on withdrawals

SUPPLY AND DEMAND CURVES

Show a potential for water markets around 1,2 Mm3 at 0.23 €/m^3



WTA/WTP FOR WATER IN GUADALQUIVIR & MEDITERRANEAN AREA (SPAIN)

- Survey-based techiques
  - Wilingness to accept (for selling water)
  - Willingnes to pay (for buying water)

- Used to assess
  - Marginal water value for farmers (at different availability levels)
  - Potential for water transfer (based on difference WTA-WTP in different areas)

1) WTP / WTA

willingness to pay (euro/m^3)	Mediterranean			Guadalquivir		
	Min	Average	Max	Min	Average	Max
MAX_WTP_500	0,20	0,39	0,50	0,00	0,08	0,18
MAX_WTP_1000	0,20	**0,39**	0,50	0,10	0,15	0,40

willingness to accept (euro/m^3)	Mediterranean			Guadalquivir		
	Min	Average	Max	Min	Average	Max
MIN_WTA_500	0,25	0,41	0,50	0,05	**0,15**	0,24
MIN_WTA_1000	0,20	0,40	0,50	0,05	0,15	0,18

Average year the difference WTP (0,39 €/m^3) vs WTA (0,15 €/m^3) predicts market from Guadalquivir to Mediterranean. Margin is higher that transaction cost (0,20€/m^3)

DISCUSSION

- Modelling water transfers show increases in gross margins, but these are not terrific!
- Benefits are highly dependent on water availability and farm heterogeneity
- WTP/WTA shows potential for trade smaller than models (but…)
- Need for detailed case by case models and integration of institutional and technical barriers and transaction cost.
- Results of models, surveys and analysis of water trade in Spain shows behaviour similar to established markets in California & Australia

CONCLUSIONS

- Ex-ante evaluation: Useful to assess the potential economic benefits from trade (before it is established) & distribution
  - Tend to over-estimate water market intensity
  - But can underestimate heterogeneity
- Need of detailed case by case modeling
- Key issue: transaction cost and farmer attitudes and perceptions are difficult to estimate ex-ante

THANK YOU VERY MUCH

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