Is risk on fishing quotas homogeneously distributed among EU member-states?

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Outline

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Fishing regulation in the EU

European Common Fisheries Policy (CFP)

- Management of the fisheries
  - maintain sustainably long term fish stocks
  - avoid collapses that can diminish the reproductive capacity
- Set total allowable catches (TACs): annual catch limits set for most commercial fishes.
- Overfishing
- Multi-annual Guidance Programmes: establish an equilibrium between the fishing capacity and the sustainability of the resources.

Outline

Fishing regulation in the EU

Linking fishing quota distribution with portfolio theory

- Total Allowable Catches (TACs): Catch limits set for each species

  $TAC = Q_i \quad i = 1, \dots, N$

- Quotas : The sharing out of the quotas between EU countries

  $$Q_i = \sum_{j=1}^{S} q_{ij} \quad j = 1, \dots, S$$

- Relative Stability Principle : Fixed allocation key based on their historic catches
- Financial Portfolio: Species portfolio (tonne)

  $SP_j = (q_{1j}, \dots q_{Nj})$

- Investment collection: Portfolio value(€)

  $PV_j = (q_{1j} * p_{1j}, \dots, q_{Nj} * p_{Nj})$

Outline

Objectives and Framework

- Innovative approach:
  Sanchirico, J.N., et al., (2008)
  Edwards, S.F., et al., (2010)
- Risk (r_{jt}) measurement related to each Fishing Portfolio's Value (PV_j)
- Test if significant differences on risk exist

Outline

Methods

- Risk measurement through various indicators
- Hypothesis testing:
  Parametric model (ANOVA y ANOVA post hoc)
  Non-parameric model (Kruskal-Wallis)

Risk Measurement

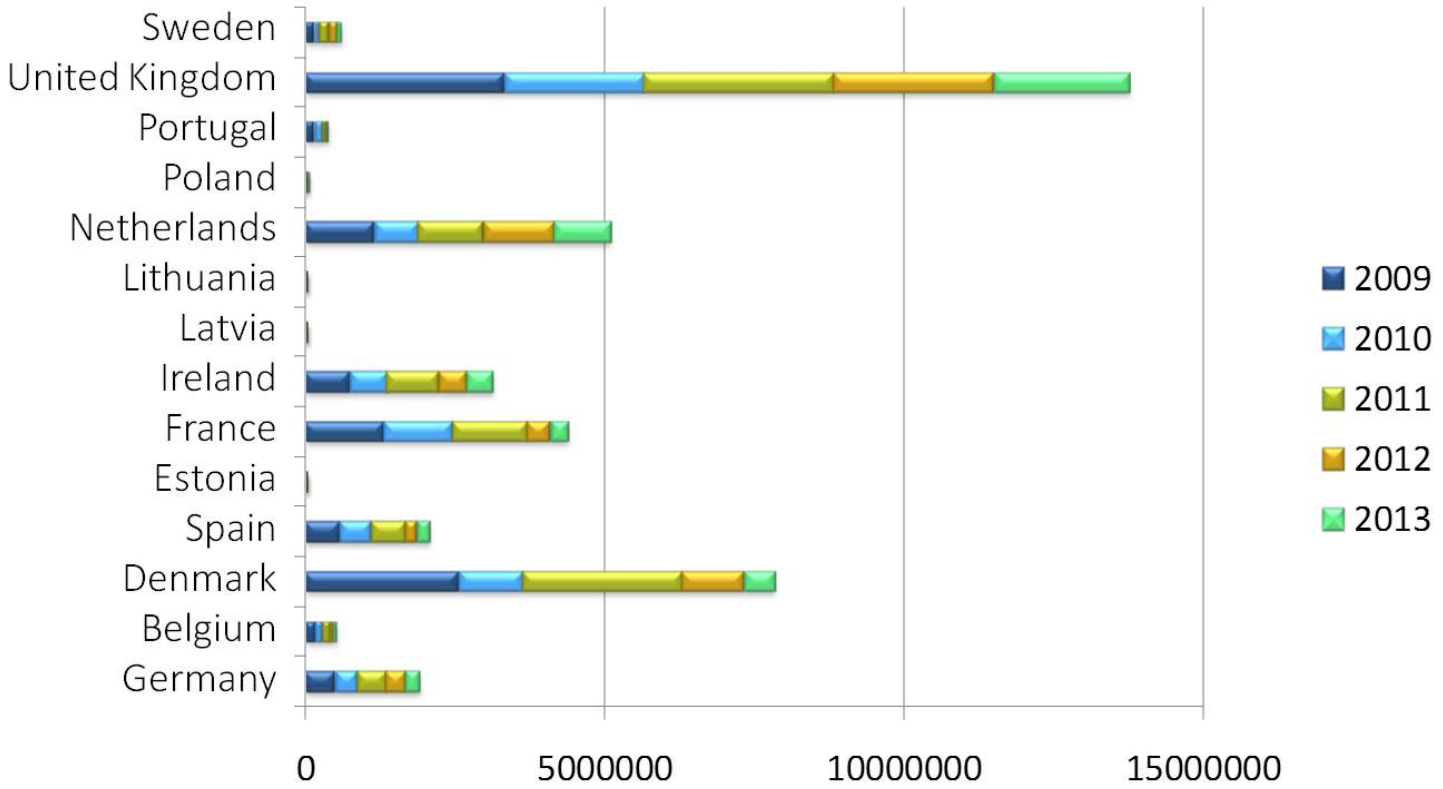
Risk indicators

- Semivariance: Uses deviations under the average value
  $S = E(Min(0, R - c)^2)$
- Value-at-Risk: maximum probable loss for a given confidence interval, and over a certain period of time.
  VaR$=\alpha \cdot \sqrt{\sigma^2 \cdot \Delta t}$

Outline

Value of the Quotas

- Value of the quotas yearly accumulated (total €)



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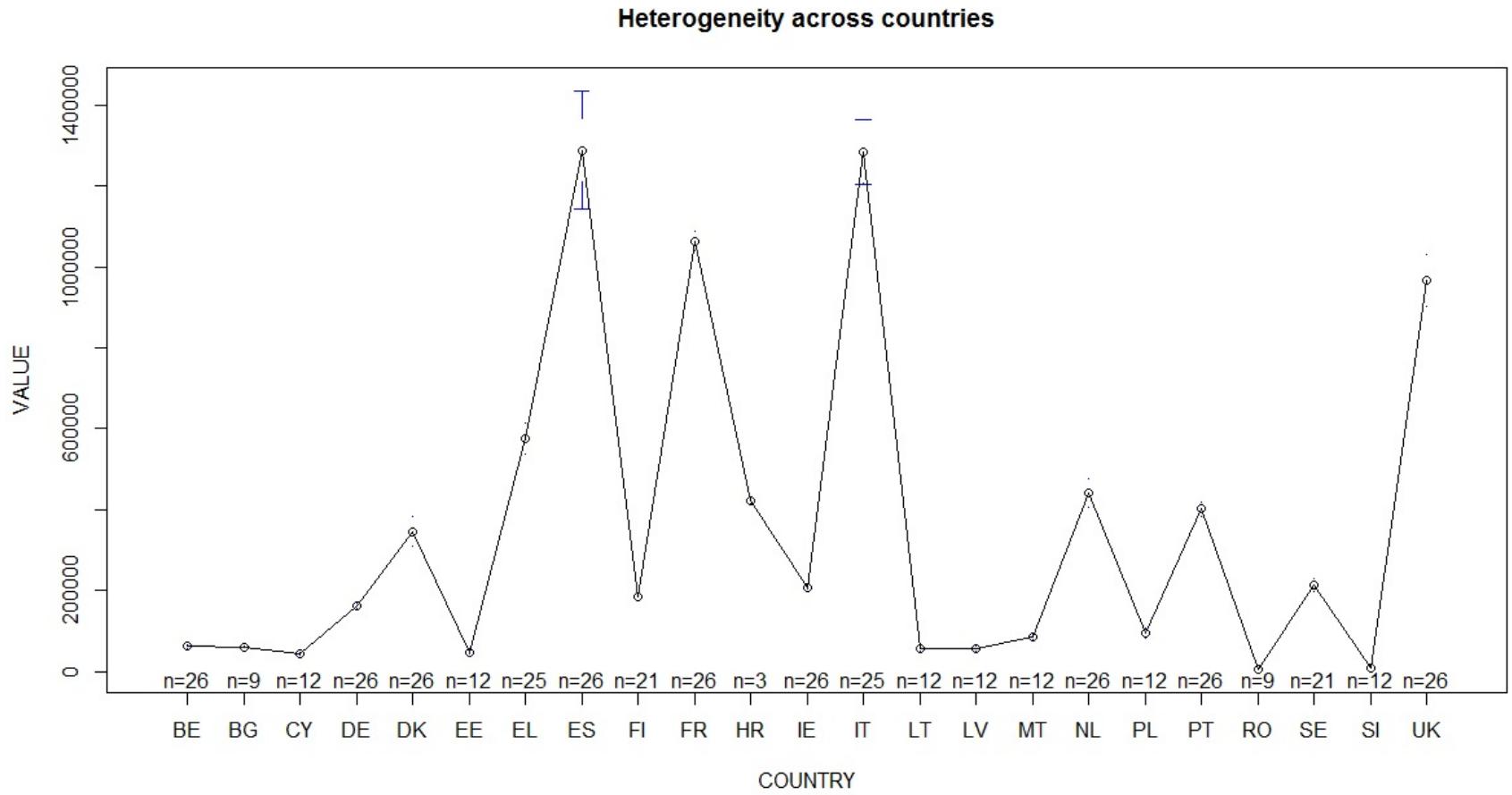
Landings

Captures

- Value of the landings of fishery products in EU: by Countries



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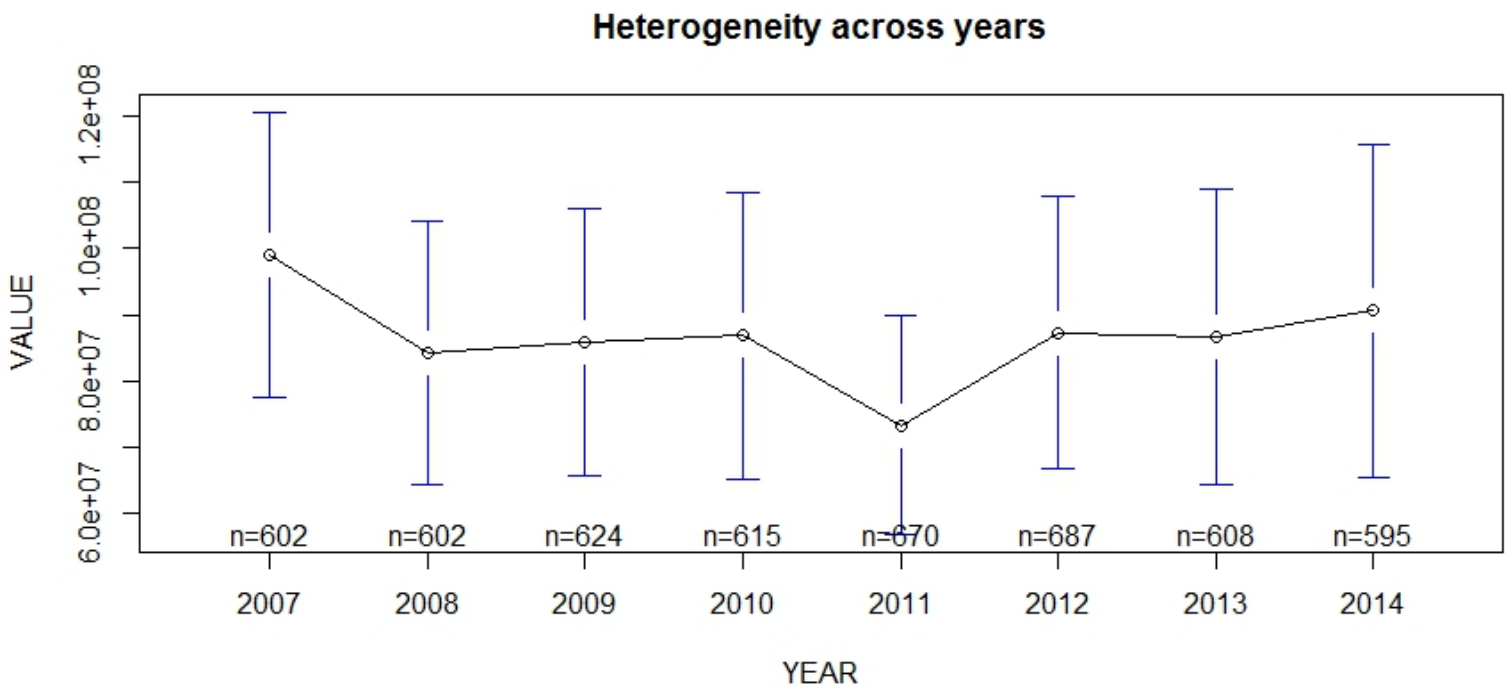
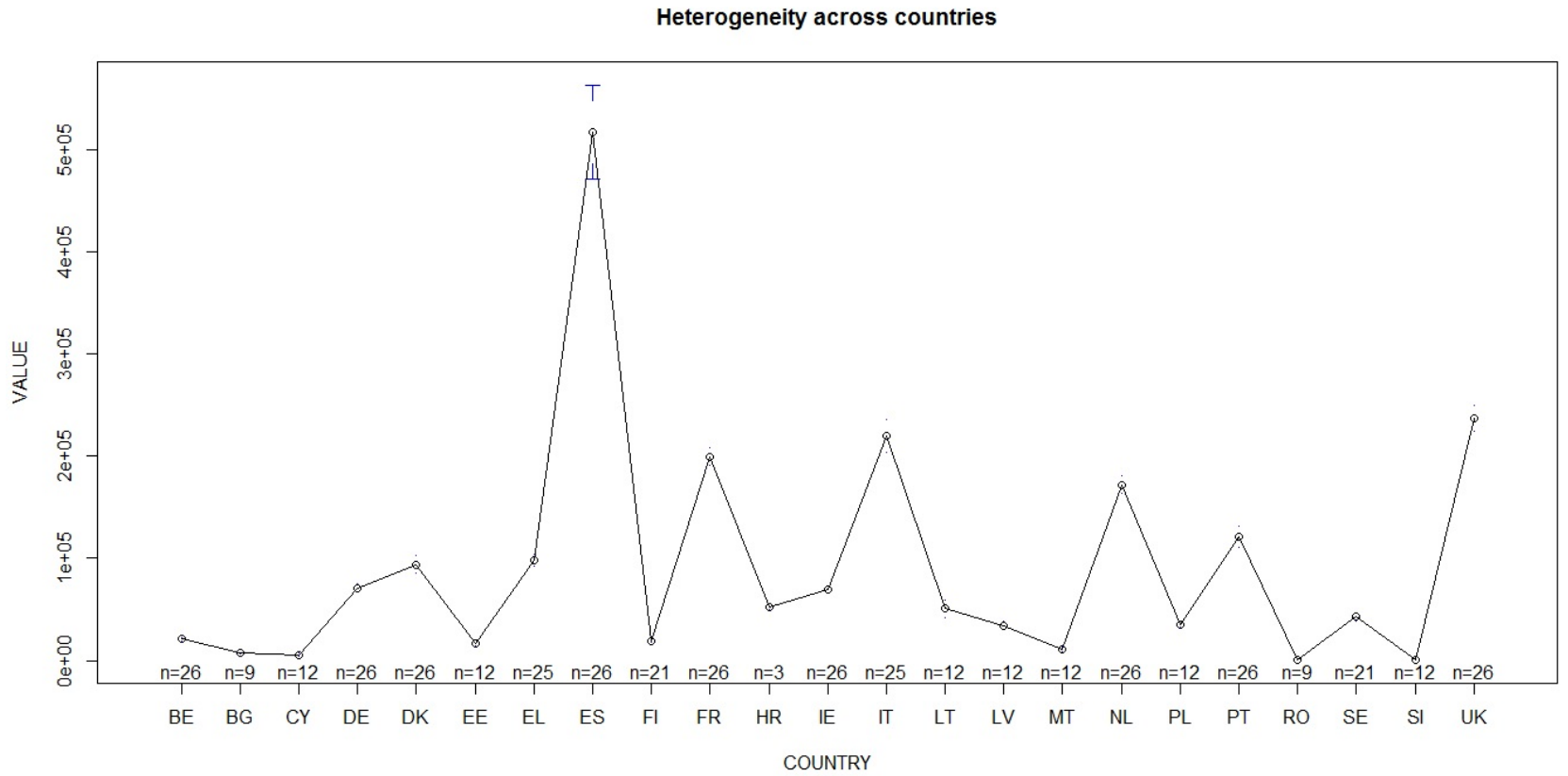


Outline

Capacity of the Fleets

Gross Tonnage (GT)

- Fleets' Capacity by GT: mean value for Countries (1990-2015)



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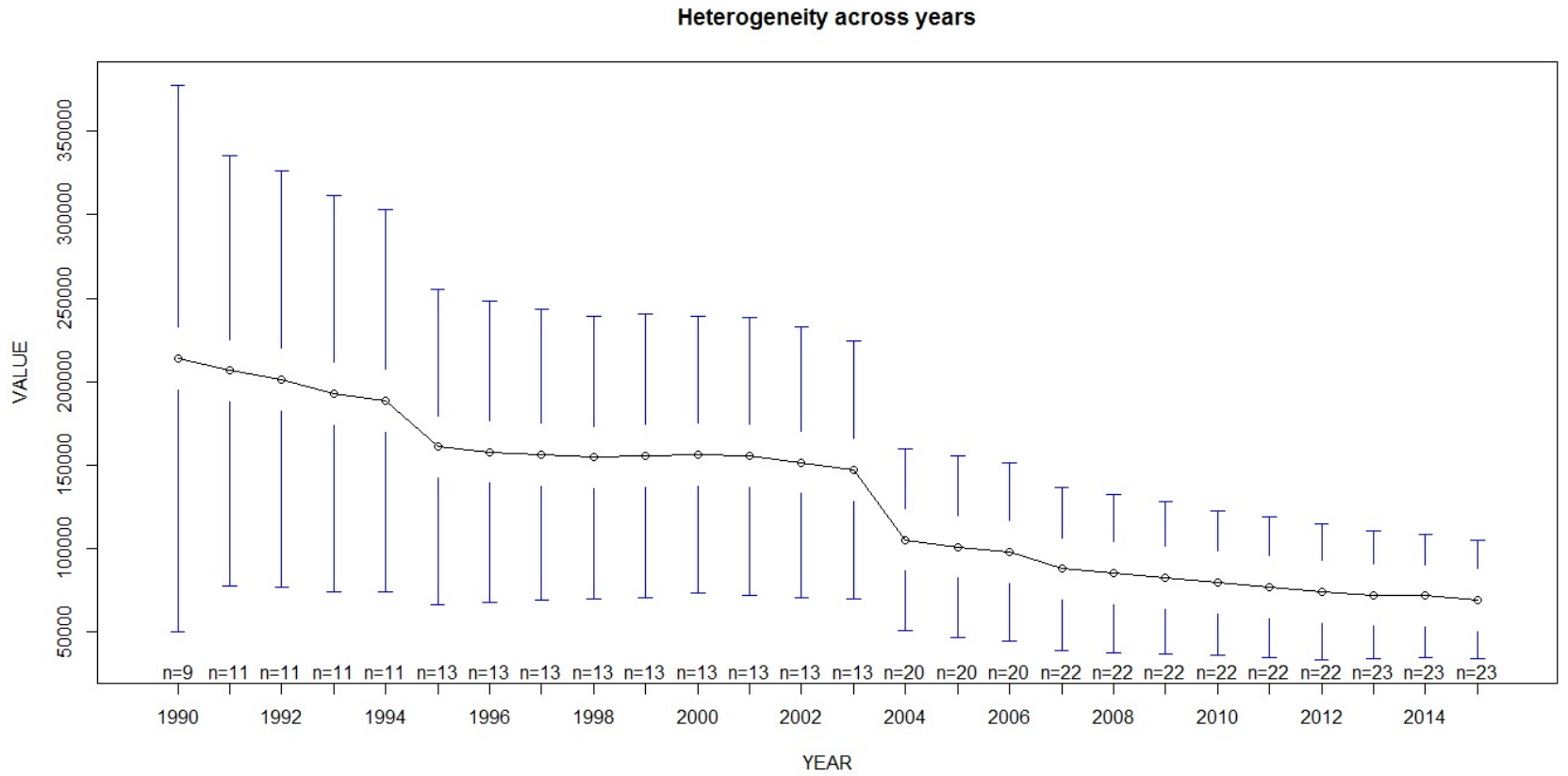
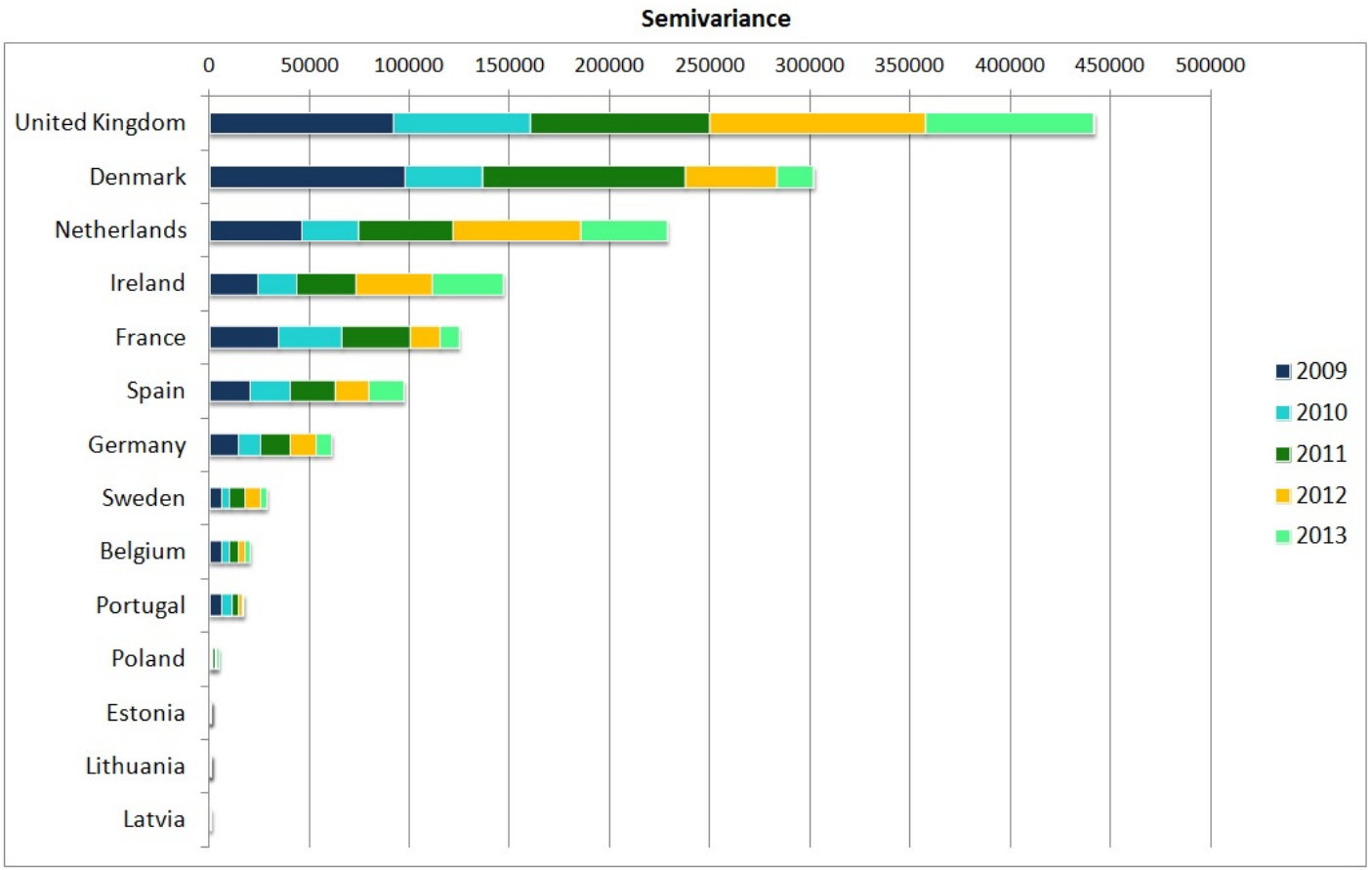


Outline

Quotas: Expected value's Semivariance

Do significant differences on risk exist?

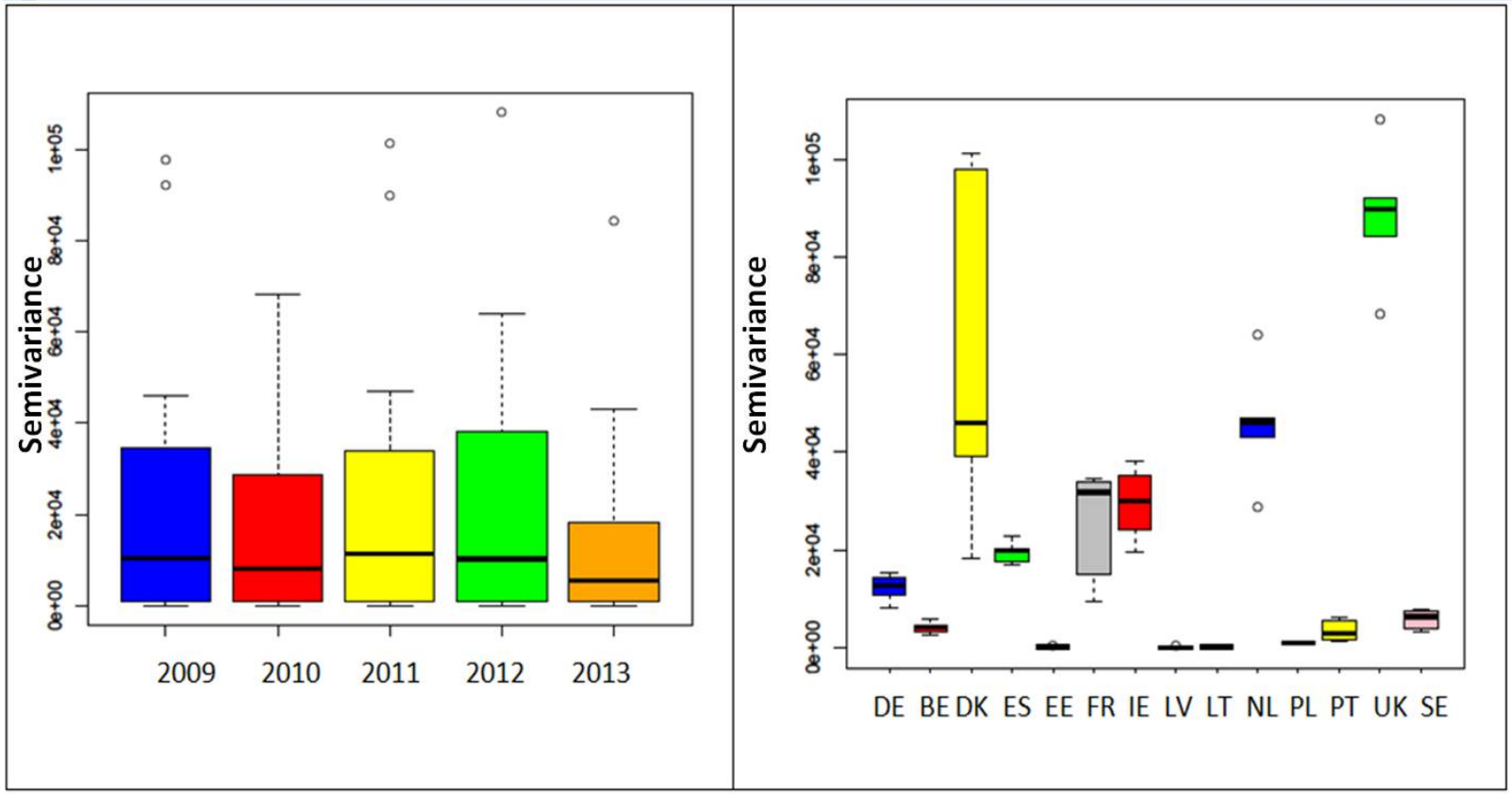
- The risk



Quotas: Expected value's Semivariance

Do significant differences on risk exist?

- Graphic analysis



Quotas: Expected value's Semivariance

Hypothesis testing:

- **Parametric model** (ANOVA):
  Normality (Test Shapiro Wilks): NO
  Homocedasticity (Test Levene): Country:NO & Year:YES
- **RESULTS**:
  Variable COUNTRY: significant
  Variable YEAR: not significant
- **DECISION**: Complement ANOVA with non-parametric model
- **Non-parametric model** (Kruskal-Wallis):Confirms the results

Conclusions

1. European fishing quotas, landings and fleets are not homogeneously distributed

- Principal quota holders are in average: UK, Denmark and Netherlands (2009-2013)
- Landings mainly take place in: Spain, Italy and France (2007-2014)
- The fleet distribution among the EU countries (1990-2015) follow a similar pattern compare to the landings

2. Based on the measurement of risk:
   - Risk exists associated to the value of fishing quotas
   - Significant differences on risk exist among countries
     - High risk: United Kingdom, Denmark, Netherlands
     - Medium risk: Ireland, France, Spain, Germany
     - Low risk: Sweden, Belgium, Portugal, Poland, Estonia, Lithuania, Latvia

3. The risk is an important complement to achieve the objectives of the Relative Stability Principle.

Further research

- Explore alternative risk indicators
- Apply the potential of the Value-at-Risk
- Combine: Landing and quota evolution with fleet dynamics

Thank you very much for your attention!