

Are consumers over-protected? A world picture of regulations on pesticide MRL in fruits and vegetables

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Outline

- Research's issue
- What we know
- What we do
- Computation of the health score
- Results
- Conclusion

Objectives

- Analyze the link between the Maximum Residue Limit (MRL) of pesticides & the level of toxicity of the concerned chemicals
- Compute a health score
- Answer the following question: **Are consumers over-protected by pesticides MRL on fruits and vegetables over the world?**

What we know (1/2)

- **The lower the MRL, the more difficult to comply with** & (for trade analysts) the more protectionist the regulation (*Winchester et al., 2012; Drogué and DeMaria, 2012; Li and Beghin, 2014*)
- **Phytosanitary measures are actually protectionist if they block imports & has no legitimacy**
- Countries establish MRL to protect consumers & insure good agricultural practices
- Substances and levels regulated vary depending on countries & products
- **Countries may have an incentive to set very low level for MRL, whatever the toxicity level of active substance (to protect their markets)**

What we know (2/2)

- *Li and Beghin (2014)* develop an index of protectionism as a measure of the deviation of MRLs from the Codex standard
- *Folletti (2012)* introduces the link between regulation on limits for chemical residues and their level of toxicity on health impact using dummy variables

What we do

- We focus on the **health impact of the active substances regulated by most of the countries around the world**
- We try to establish **the determinants of pesticides regulation on MRL & Toxicological Risk Index (IRT)**
- We use a **scoring analysis** to classify countries according to their level of concern for consumers' health protection

MRL & IRT (1/3)

- Data include 3 dimensions:
 - Countries
 - Products
 - Substances
- Data :
 - 95 countries
 - 585 fruits and vegetables
 - 252 substances

Low MRL & Low IRT = Over-protective regulation	High MRL & High IRT = Hazardous regulation
Low MRL & High IRT = Protective regulation	High MRL & Low IRT = Harmless regulation

MRL & IRT (2/3)

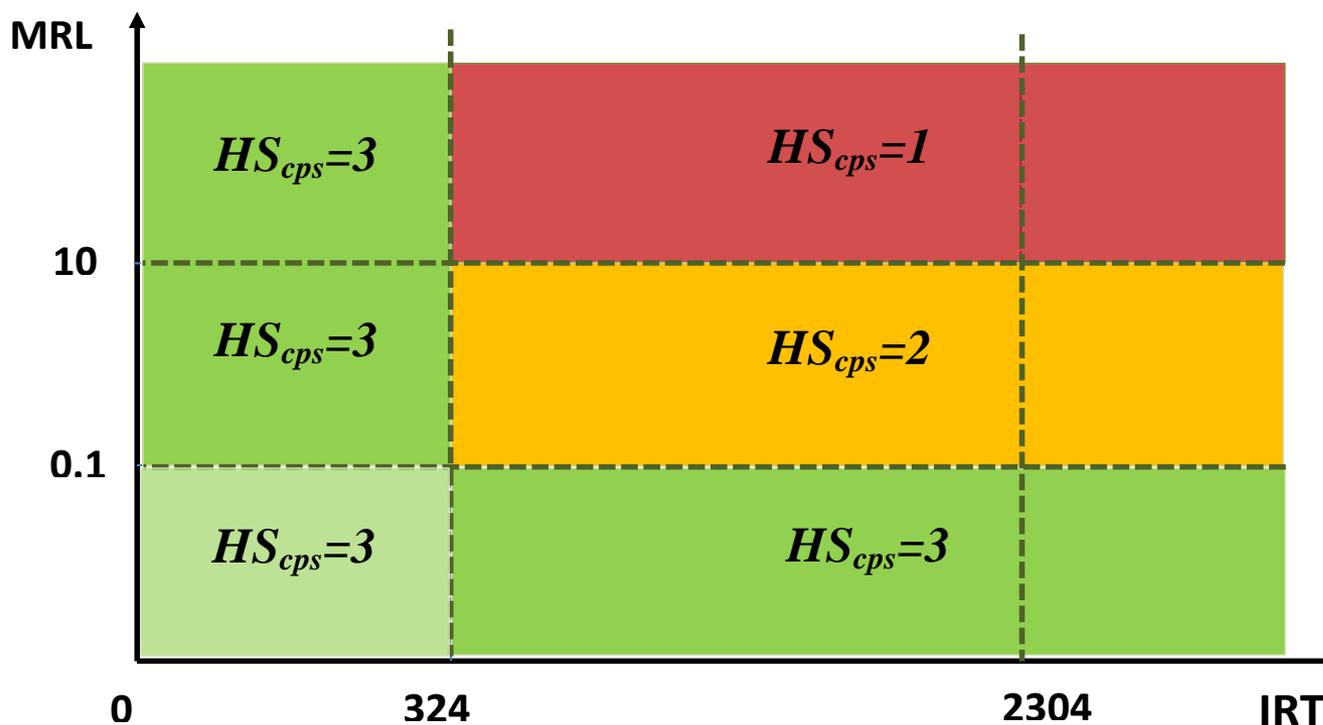
- Three thresholds for IRT:
 - **high** ≥ 2304
 - **324** \leq moderate < 2304
 - **low** < 324
- IRT thresholds are computed with the IRT formula (Samuel & al.,2007)
- Substance is **weakly toxic** if the weighting point is lower than 2 whatever the bioaccumulation (Fper); conversely it is **highly toxic** if the weighting point is equal to 16 even for a Fper=1
- This allow us to stay in the limits of our sample which vary between 0 & 4624

MRL & IRT (3/3)

- MRL thresholds based on Acceptable Daily Intake (ADI)
- We are mainly interested in the **chronic toxicity** which affects the consumer (acute toxicity affects above all the producers)

Health Score (1/3)

Low MRL & Low IRT = Over-protective regulation	High MRL & High IRT = Hazardous regulation
Low MRL & High IRT = Protective regulation	High MRL & Low IRT = Harmless regulation



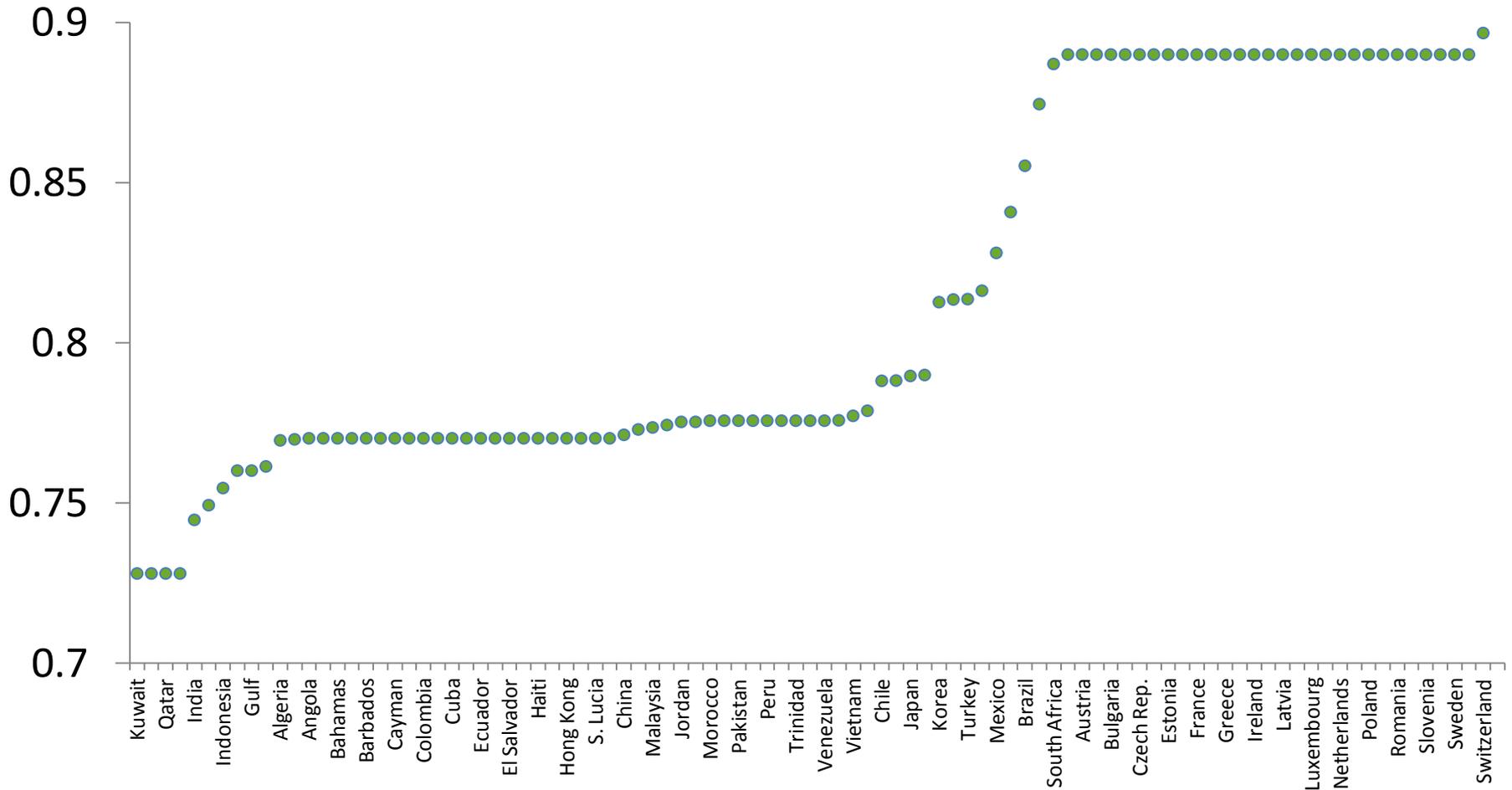
Health Score (2/3)

- The score ranges between 0.728 and 0.903, the **greater** the score the **higher** the concern a country or nation pays to health

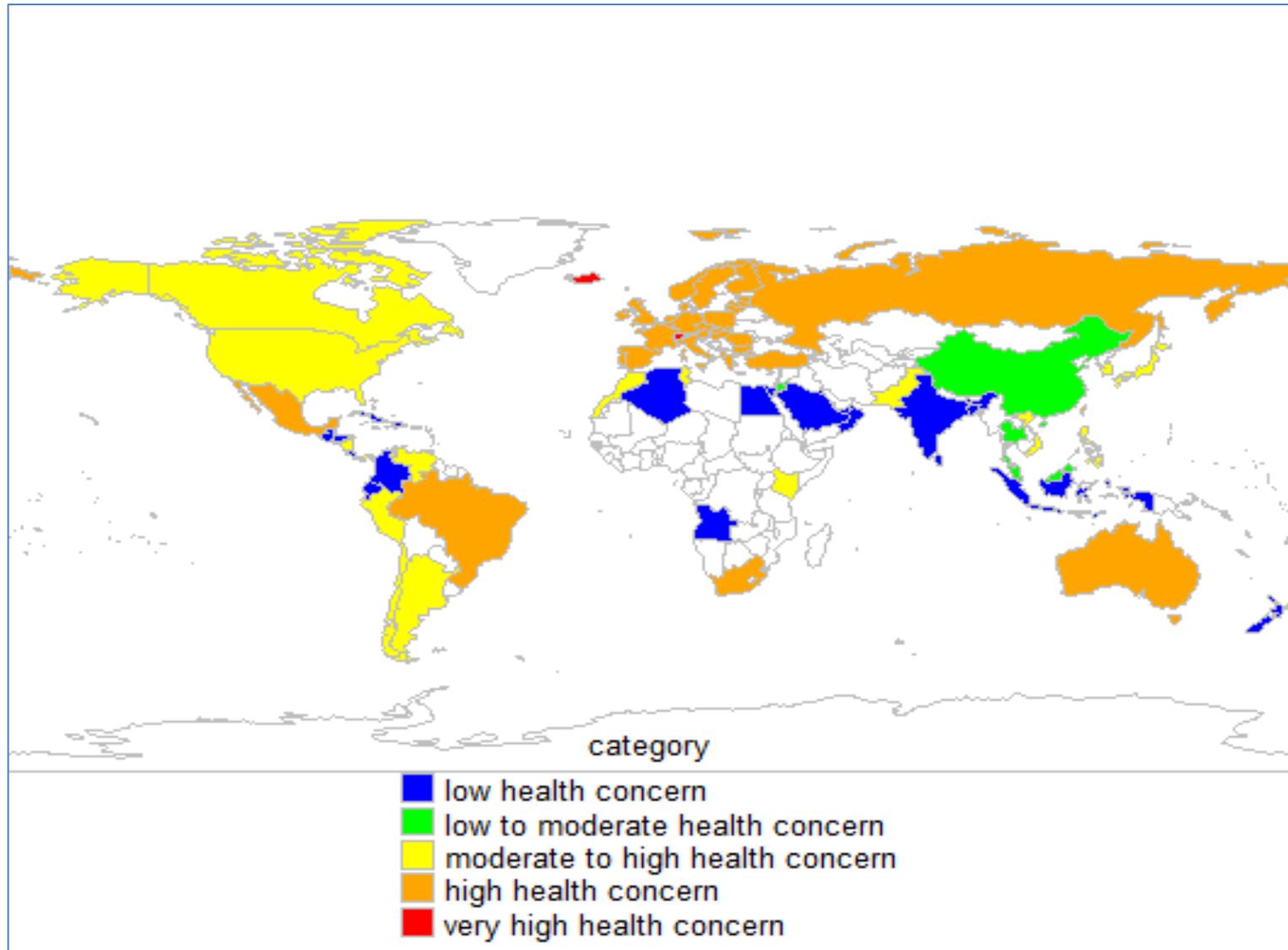
$$HS_c = \frac{\sum_p \sum_s HS_{cps}}{3 * PS}$$

1 < Health Score < 3

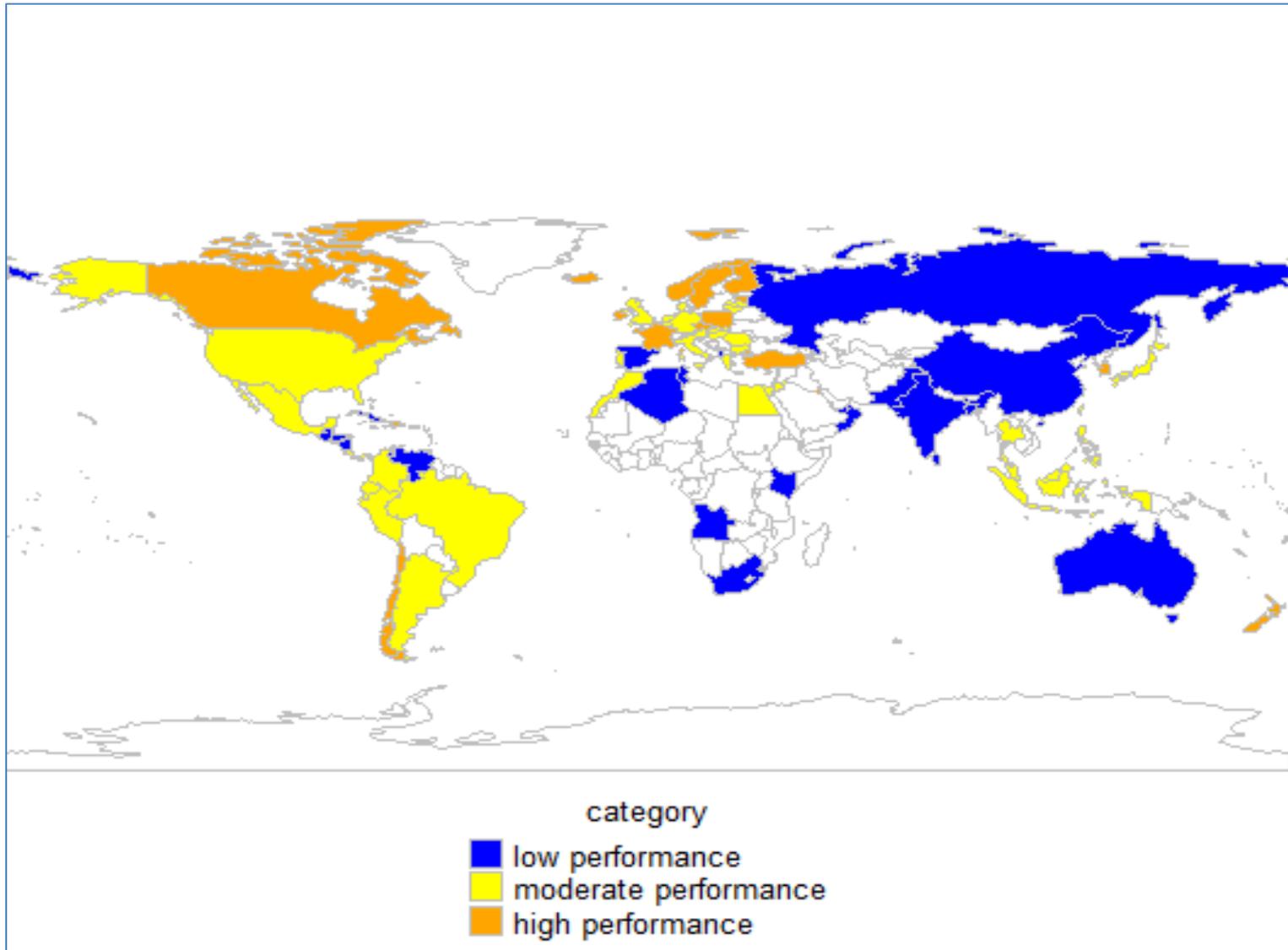
Health Score (3/3)



Mapping of the health score



Mapping of the pesticide regulation performance index



Results (1/2)

- **Switzerland** and **Iceland** as an example of over-precaution
- **Rather high level of consumer's health protection** all around the world

Results (2/2)

- **Positive link** between the level of **democracy** & **health score**
- **Positive link** between **agricultural pesticide regulation** & **health score**
- No statistical evidence between wealth and health score.
- **Products from the temperate zone** seem to **be less safe** than **tropical products**

Conclusion

- Countries are rather protective in setting MRL regulation
- The Codex regulation and countries which refer to the Codex are classified at the bottom of the ranking
- Only two cases of “over-protection” (Iceland and Switzerland)

Further step

- With this preliminary analysis we cannot disentangle the link between health motives and protectionist motives when setting a MRL. This will be done in further research with adequate econometric model
- Ordered Logit Model

Thank you for your attention

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